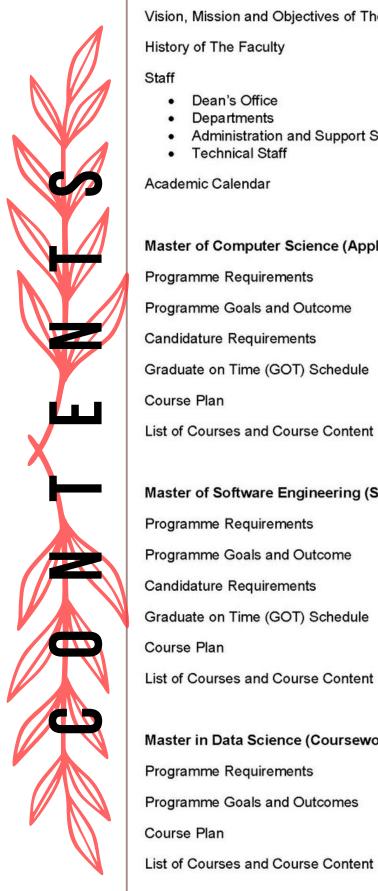


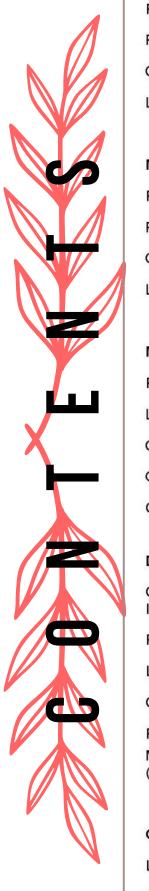
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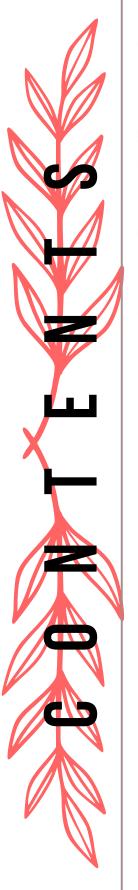




Vision, Mission and Objectives of The Faculty				
History of The Faculty				
<ul> <li>Dean's Office</li> <li>Departments</li> <li>Administration and Support Staff</li> <li>Technical Staff</li> </ul>	4			
Academic Calendar	34			
Master of Computer Science (Applied Computing) (Mixed Mode)				
Programme Requirements	35			
Programme Goals and Outcome	37			
Candidature Requirements	39			
Graduate on Time (GOT) Schedule	40			
Course Plan	41			
List of Courses and Course Content	43			
Master of Software Engineering (Software Technology) (Mixed Mede)				
Master of Software Engineering (Software Technology) (Mixed Mode)  Programme Requirements	49			
Programme Goals and Outcome	51			
Candidature Requirements	53			
Graduate on Time (GOT) Schedule	54			
Course Plan	56			
List of Courses and Course Content	59			
Master in Data Science (Coursework)				
Programme Requirements	66			
Programme Goals and Outcomes	68			
Course Plan				



Master of Cyber Security (Coursework)	
Programme Requirements	79
Programme Goals and Outcomes	82
Course Plan	84
List of Courses and Course Content	86
Master of Artificial Intelligence (Coursework)	
Programme Requirements	93
Programme Goals and Outcomes	95
Course Plan	97
List of Courses and Course Content	98
Master of Computer Science (Master by Research)	
Programme Requirements	106
Learning Outcomes	107
Candidature Requirements	109
Graduate on Time (GOT) Schedule	110
Course Content of Research Methodology	111
Doctor of Philosophy	7.000.000
Course Content of Advanced Research Methods in Computer Science and Information Technology	112
Programme Education Objectives	113
Learning Outcomes	114
Candidature Requirements	115
Proposed Graduate on Time Schedule  Major Administrative and Regulatory Milestones for PhD Candidates (Conventional PhD) (Sciences)	116
General Information	
Legislation and Prescribed Rules	117
Marking Scheme and Grade Point Average (GPA)	118



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r	kesea	rcn	GIL	IIО	an	Ce

Progress Report	119
Supervision Policy of Postgraduate Candidates at The University of Malaya	120
* Role and Responsibility of the Supervisor	
* Role and Responsibility of The Candidate	
Guidelines for the Preparation of Research Reports, Dissertations and Thesis	128
Thesis/Dissertation Submission & Examination in Universiti Malaya	162
Publication Requirement	163
Avoiding Plagiarism	166
Intellectual Property	167
Postgraduate Activities	168
Facilities	171
Laboratory Regulations	

- Enquiries and Technical Problems

Disclaimer



A globally-influential faculty, enriching lives & shaping the future through computing technology



To enrich lives and shape the future for the nation and humanity through education, research and technopreneurship



- To sustain an outstanding faculty dedicated to excellence in undergraduate and postgraduate teaching, learning and research
- To contribute towards the development of the nation through the production of quality research and publications
- To provide innovative academic programs that can respond to the changing needs of the society
- To produce quality graduates who are equipped with advanced knowledge and skills of computer science and information technology

## HISTORY OF THE FACULTY



The provision of computer facilities and services at the Universiti Malaya (UM) began in mid-1967, soon after the Computer Centre was officially formed in 1965. This also made the university one of the pioneers in computer usage in Malaysia. In December 1969, the Computer Centre took on an additional role of teaching and research of computer science and information technology. The Computer Centre Board was formed, comprising the Vice Chancellor (as Chairman), the Director of Computer Centre (as Secretary), and a representative from each Faculty, Institute, Centre of the University, and from the University Senate.

In 1974, the Diploma in Computer Science postgraduate programme was introduced. From its inception in the 1974/75 session to the 1999/2001 session, a total of 304 students had been awarded the Diploma.

The Master of Computer Science (M. Comp. Sc.) and the Doctor of Philosophy (Ph.D.) were two higher degree research programmes approved by the Senate and had been administered by the Computer Centre since 1985. In addition, the Computer Centre offered a 4-year Bachelor of Computer Science programme. The first undergraduate enrollment for 1990/91 session was 50 students.

In April 1993, the University Senate agreed to the formation of the Computer Centre Study Board. The Board proposed the establishment of a faculty to be called the Faculty of Computer Science and Information Technology (FCSIT). The existing Computer Centre was to be annulled and replaced by a Computer Services Division which was placed under the Chancellery.

On September 22 1994, the Universiti Malaya Council agreed to the formation of the Faculty of Computer Science and Information Technology (FCSIT), and the Computer Services Division. A sum of RM 4.2 million was obtained from the Ministry of Education under the 6th Malaysia Plan to put up a new building for the faculty, with the necessary infrastructure for teaching, learning and research. The building was officially declared open by the then Minister of Education, Datuk Seri Najib Tun Abdul Razak on 26 September 1996.

## HISTORY OF THE FACULTY



The Bachelor of Information Technology programme started in the 1996/97 academic session, with an initial intake of 50 students. In 1997, the Faculty established four departments, Artificial Intelligence, Software Engineering, Information and Library Science, and, Computer Systems and Technology.

To accommodate an increased student population, an additional building was built in 1997-98 which was officially opened by Dato' Dr. Fong Chan Onn, the then Deputy Minister of Education on 21 September 1998. Since its establishment, the Faculty of Computer Science and Information Technology has been led by a number of distinguished persons. The following have served as Directors/Deans:

1967 - 1973 1973 - 1975 1975 - 1978 1978 - 1982 1982 - 1990 1990 - 1992 1992 - 2000 2000 - 2002 2002 - 2004	Mr. Ong Yin Fook Professor Paul Peach Dr. R.K. Pillay Dr. Tan Bock Thiam Associate Professor Ir. Dr. Mashkuri Yaacob Professor Lee Poh Aun Professor Ir. Dr. Mashkuri Yaacob Associate Professor Dr. Siti Salwah Salim Associate Professor Dr. Zainab Awang Ngah
2004 - 2005 2005 - 2006 2006 - 2007 2007 - 2009 2009 - 2010 2010 - 2011 2011 - 2014 2014 - 2017 2017 - 2019 2019 - 2021 2022 - 2024 2024 - 2024	Professor Ir. Dr. N. Selvanathan Associate Professor Dr. Siti Salwah Salim Professor Dato' Dr. Ir. Mashkuri Hj. Yaacob Professor Dr. Mohd. Sapiyan Baba Professor Dr. David Ngo Chek Ling Professor Dr. Wan Ahmad Tajuddin Wan Abdullah Professor Dr. Siti Salwah Salim Professor Dr. Abdullah Gani Professor Dr. Abrizah Abdullah Professor Datin Dr. Sameem Abdul Kareem Professor Dr. Loo Chu Kiong Professor Ir. Dr. Chan Chee Seng
2024 - Present	Associate Professor Dr. Norisma Idris







## **DEAN'S OFFICE**



: Associate Prof. Dr. Norisma Idris PhD (Malaya), M.Sc. (Malaya), B.CS. (Hons) (Malaya)

Dean



: Dr. Ong Sim Ying PhD (UTM), BComSc (SE) (Malaya)

Deputy Dean (Postgraduate)



PhD (Malaya), MIT (UKM), BSc (Computer)(Hons)(UTM)

: Professor Dr. Nor Liyana Mohd Shuib

Deputy Dean (Undergraduate)



Deputy Dean (Research)

: Associate Prof. Dr. Dr. Saaidal Razzalli Azzuhri
PhD of Computer Networks (University of
Queensland), MSc (IT) (Malaysia University of Science
& Technology), BEng (Telecommunication) (Malaya)





Deputy Dean (Development)

: Associate Prof. Dr. Siti Hafizah Ab. Hamid PhD (Malaya), M.Sc (Computer System Design), (Manchester University Institute of Science and Technology), BSc (Hons) (Computer) (UTM)



Deputy Dean (Student Affairs)

 Dr. Erma Rahayu Mohd Faizal Abdullah
 PhD (UTM), Master OITA University (Kejuruteraan Elektrik), BComSc (Malaya)

### **HONORARY PROFESSOR**



: Honorary Professor Dr. Abdullah Gani PhD, University of Sheffield, UK, MSc (Information Management, Hull University, UK, B.Phil, Hull University, UK



Honorary Professor Datin Dr. Sameem Abdul Kareem PhD, UM (2002), MCS, Univ. of Wales, UK (1992), BSc, UM (1986)

### **HEAD OF DEPARTMENT**



 Dr. Asmiza Abdul Sani
 PhD (University of York, UK), Master (University of York, UK), BComSc (SE) (Malaya)





: Dr. Muhammad Shahreeza Safiruz Kassim
PhD (Computer Science) (University of Southampton),
MSc (Al)(Distinction) (University of Southampton, UK)
BEng (Nagaoka University of Technology, Japan)



Computer System and Technology

: Associate Prof. Dr. Amirrudin Kamsin
PhD (University College London, UK), MSc (NCCA,
Bournemouth University, UK), BSc (Hons) (Malaya)



Information Systems

: Dr. Hoo Wai Lam PhD (UM), B.CS. (Hons) (UM)



## DEPARTMENT OF ARTIFICIAL INTELLIGENCE

Head of Department: Dr. Muhammad Shahreeza Safiruz Kassim

NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
1.	Dr. Muhammad Shahreeza Safiruz Kassim (DS13)	PhD in Computer Science, University of Southampton  MSc in Artificial Intelligence (Distinction), University of Southampton, UK  Bachelor of Engineering, Nagaoka University of Technology, Japan	Bayesian probability modelling     Machine Learning     Parameter estimation
2.	Prof. Ir. Dr. Chan Chee Seng (VK7)	PhD (2008) PhD, University of Portsmouth, U.K.  Master (2005) MSc in Communication Systems Engineering, University of Portsmouth, U.K.  Bachelor (2003) BEng (Hons) in Electronics Engineering, Multimedia University.	Fuzzy Sets & Systems and Computer Vision (Image/Video Content Analysis and Human- Robot Interaction)
3.	Prof. Dr. Loo Chu Kiong (VK6)	PhD (2004) PhD, Universiti Sains Malaysia Bachelor (1996) Bachelor of Engineering (Hons), Universiti Malaya.	Soft Computing     Affective Computing     Human-Robot Interaction (HIR)     Deep Learning.
4.	Assoc. Prof. Dr. Norisma Idris (DS14)	PhD (2011) PhD (Natural Language Processing), Universiti Malaya.  Master (2001) Master of Computer Science, Universiti Malaya.  Bachelor (1999) Bachelor of Computer Science (Hons), Universiti Malaya.	Artificial Intelligence in Education (Automated summarization assessment, Summary sentence decomposition, Adaptive learning, essay grading system)      Natural Language Processing (Text Normalization, Malay text processing, Stemming algorithm, Sentiment Analysis))



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
5.	Assoc. Prof. Dr. Aznul Qalid Md Sabri (DS14)	PhD (2013) Doctoral Degree (PhD), Ecole Des Mines, Douai, Perancis (Kepintaran Buatan)  Master (2009) Masters in Vision and Robotics, Heriot-Watt University  Master Degree, (2009) Universite De Bourgogne (Robotik)  Bachelor (2006) Bachelor of Computer	Computer Vision (Human Action Classification, Feature Extraction, Object Detection/ Recognition, Biometrics, Machine Learning, Data Analytics)
6.	Dr. Erma Rahayu Mohd Faizal Abdullah (DS13)	Science, Universiti Malaya.  PhD (2013) Doctoral Degree, Universiti Teknologi MARA (Kejuruteraan Elektrik)  Master, (2007) OITA University (Kejuruteraan Elektrik)  Bachelor (2003) Bachelor of Computer Science (Hons)(Multimedia), Universiti Malaya	Computer Vision and Image Processing     Neural Networks, Genetic Algorithms and Fuzzy Logic (Backpropagation algorithm)     Pattern Recognition
7.	Dr. Liew Wei Shiung (DS13)	PhD (2022) (Computer Science), Universiti Malaya Master of Biomedical Engineering (2015), Universiti Malaya Bachelor of Electronics Engineering (2010), Multimedia University	Affective computing, artificial intelligence, evolutionary computing, neural networks.
8.	Dr. Lim Chee Kau (DS13)	PhD (2015) PhD (Comp Science), Universiti Malaya  Master (2002) Master of Computer, Universiti Malaya  Bachelor (1996) Bachelor of Science (Hons), Universiti Sains Malaysia	Fuzzy Relational Theory     Fuzzy Logic
9.	Dr. Nurul Japar (DS13)	PhD (2021) PhD (Computer Vision), Universiti Malaya  Bachelor (2018) Bachelor of Computer Science (Artificial Intelligence), Universiti Malaya.	Image Processing     Computer Vision     Machine Learning



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
10.	Dr. Saw Shier Nee (DS13)	PhD (2019) PhD, National University of Singapore Bachelor (2013) Bachelor of Biomedical Engineering, Universiti Malaya	Al in Healthcare     Health informatics     Machine Learning
11.	Dr. Unaizah Hanum Obaidellah (DS13)	PhD (2012) Cognitive Science, University of Sussex, UK  Master (2007) Master of Computer Science (Artificial Intelligence), Universiti Malaya.  Bachelor (2004) Bachelor of Computer Science (Artificial Intelligence), Universiti Malaya.	Cognitive Science (Diagrams, Semantic and spatial representation, Memory, Learning)     Biomedical simulation & modelling
12.	Dr. Woo Chaw Seng (DS13)	PhD (2007) PhD, Queensland University of Technology, Australia  Master (1999) Master of Computer Science, Universiti Malaya.  Bachelor (1996) Bachelor of Computer Science, Universiti Malaya.	Artificial Neural Network     Biomedical Image Segmentation     Wavelet Transform Applications     Data Hiding and Steganography (Multimedia Watermarking)     Mobile Computing (mobile security)     Soft Computing (swarm Behavior, Software Agent)     Security Services Sn: Digital Forensic, Steganography, Network Security, Public Key Infrastructure and Biometrics (Digital Watermarking)     National Security Sn: Including Health Aspects Such as Medicine and Medical Supply, Disaster Preparedness and Imported Diseases (Tele-Medicine)     Biometrics Security System (mobile biometric systems)



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
13.	Dr. Zati Hakim Azizul Hasan (DS13)	PhD (2014) PhD in Artificial Intelligence and Robotics, Auckland University of Technology, New Zealand  Master (2007) Master of Computer Science (Artificial Intelligence), Universiti Malaya.  Bachelor (2004) Bachelor of Computer Science (Artificial Intelligence), Universiti Malaya.	Robotics (mobile robots, localization and mapping)     Cognitive Mapping (spatial cognition in humans and animals)     Biomedical simulation & modelling     Biometrics (Speech processing, spectral analysis)
14.	Dr. Mohamed N. M. Lubani (DS11)	PhD (Computer Science) The National University of Malaysia (UKM)  Master of Computer Science University Malaya (UM)  Bachelor of Information Technology Damascus University, Damascus, Syria	Artificial Intelligence     Machine Learning for Natural Language Processing
15	Dr. Uzair Ishtiaq (DS13)	PhD (Computer Science) Universiti Malaya  Master of Science (Computer Science), (Computer Science) National University of Computer and Emerging Sciences  B.S in Information Technology, (Information Technology) Bahauddin Zakariya University	Machine Learning
16.	Dr. Zainab Malik (DS13)	PhD (Artificial Intelligence/Computer Vision), Universiti Teknologi Malaysia (UTM)  M. Phil (Computer Science), Quad-i-Azam University  Bachelor of Science in Computer Science, National University of Modern Languages	Artificial Intelligence     Computer Vision



## DEPARTMENT OF SOFTWARE ENGINEERING

## Head of Department: Dr. Asmiza Abdul Sani

NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
1.	Dr. Asmiza Abdul Sani (DS13)	PhD (2013) University of York, UK  Master (2007) University of York, UK  Bachelor (2006) Bachelor of Computer Science (Hons) (Software Engineering), Universiti Malaya.	Formal methods, model-driven engineering, advance software engineering
2.	Prof. Dr. Chiew Thiam Kian (VK7)	PhD (2009) University of Glasgow, Scotland  Master (2000) Master of Computer Science, Universiti Malaya.  Bachelor (1998) Bachelor of Computer Science, Universiti Malaya.	Web Performance Analysis and Management (Web Performance)      Usability of Web-Based Systems (Web Usability)      Software Architecture (Interoperability)      Personalised and Community-Based Healthcare (ICT, Healthcare, Interdisciplinary)
3.	Prof. Dr. Siti Hafizah Ab. Hamid (VK7)	PhD (2013) Universiti Malaya.  Master (2002) Master of Science (Computer System Design), Manchester University Institute of Science and Technology.  Bachelor (2000) Bachelor of Science (Hons) (Computer Science), Universiti Teknologi Malaysia, Skudai.	Software Verification, Validation & Testing (Test Cases, Formal Specification)     Logics and Meanings of Programs (Formal Methods)     Mathematical Logic and Formal Language (Object-Oriented Languages (OOL))     Edutainment (Mobile Games, Elearning, Object-Oriented Programming)     Project Management (PRINCE2)
4.	Assoc. Prof. Dr. Mumtaz Begum Peer Mustafa (DS14)	PhD (2012) Universiti Malaya.  Master (2006) Master of Science, Universiti Malaya.  Bachelor (2002) Bachelor of Science (Computer Science), Universiti Putra Malaysia.  Diploma (1998) Pusat Teknologi dan Pengurusan Lanjutan (PTPL), Malaysia	Component Based Software Development (Component Based Software Engineering, Software Reuse, Reusable Component)     Software Testing     Speech Recognition     Speech Synthesis     Pattern Recognition     Software Agents     Human Computer Interaction



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
5.	Assoc Prof. Dr. Raja Jamilah Raja Yusof (DS14)	PhD (2012) Universiti Malaya.  Master (2000) Master of Computer Sciense, Universiti Malaya.  Bachelor (1997) Bachelor of Engineering, Imperial College of Science, Technology and Medicine.	Human Computer Interaction (Interface Design, Information Visualization, Hierarchical Task Analysis Model)     E-Culture (Muslim Information System, Techno-Daie, Islam, Science and Technology)     Cognitive Psychology (Reading Comprehension)     Information Processing (Arabic Stemming)     Information, Computer and Communication Technology (ICT), Software Engineering
6.	Dr. Adeleh Asemi Zavareh (DS13)	PhD of Computer Science (Artificial Intelligence), Universiti Malaya (2014)  Master of Computer Science, University of Pune, India (2008)  Bachelor of Computer Science, University of Ashrafi Isfahani, Isfahan, Iran (2006)	Human Computer Interaction     Evaluation of Software and Systems     Neuro Fuzzy Inference Systems     Multi Criteria Decision Analysis     Software Design     Data Analysis     Big Data     Decision Support Systems     Knowledge Based Systems     E-Commerce
7.	Dr. Nazean Jomhari (DS13)	PhD (2010) Manchester University, United Kingdom  Master (2001) Master of Science, University of Essex, Colchester, UK  Bachelor (2000) Bachelor of Science (Hons) (Information Science), Universiti Kebangsaan Malaysia.	Interface Design (Older Adult, Child, Autistic and Computer)
8.	Dr. Ong Sim Ying (DS13)	PhD (2015), Universiti Malaya Bachelor (2007) Bachelor of Computer Science (Software Engineering), Universiti Malaya	Image, Signal and Video Coding and Processing     Information Security (Data Hiding and Encryption)     Linear Programming



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
9.	Dr. Su Moon Ting (DS13)	PhD (2015) University of Auckland, New Zealand  Master (1999) Master of Science (Computer Science), Universiti Putra Malaysia.  Bachelor (1996) Bachelor of Computer Science (Hons), Universiti Putra Malaysia.	Service-Oriented Architecture)  Education (E-Learning)  Computer Aided Software Architecture (Software Architecture Documentation, Architectural Knowledge)  Web Services (Software Engineering (Case) Tools (Syntax-Directed Programming Editor)  Virtual Reality (Vrml, Vr for Internet)  Web services composition  End-user development/programming
10.	Dr. Hema Subramaniam (DS13)	PhD (2016) PhD (Software Engineering), Universiti Putra Malaysia (UPM)  Master (2010) Master of Computer Science (Software Engineering), Universiti Industri Selangor (UNISEL)  Bachelor (2007) BSc (Information Technology), Universiti Industri Selangor (UNISEL)	Software Maintainability (Aspect Oriented Software Engineering)     Counseling System (Counseling Application)     Project Management (Tools Based Project Management)     Software Tools (Web Development)
11.	Dr. Chiam Yin Kia (DS13)	PhD (2011) Doctor of Philosophy in Computer Science & Engineering, The University of New South Wales, Australia  Master (2005) Master of Science in Information Technology, Malaysia University of Science and Technology, Malaysia.  Bachelor (2003) Bachelor of Computer Science (Software Engineering), Universiti Malaya.	Software Process Modelling     Software Quality     Requirements Engineering     Software Testing     Risk Management.
12.	Dr. Mohamad Hazim Md Hanif (DS13)	Doctor of Philosophy (PhD) Imperial College London, United Kingdom  Master of Computer Science (Research) University of Malaya  Bachelor of Computer Science (Computer System and Networking) University of Malaya	Computer and information security     Artificial intelligence and machine learning     Data sciences



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
13.	Dr. Nur Nasuha Mohd Daud (DS13)	PhD Universiti Malaya  Bachelor of Computer Science (Software Engineering), Pass with Honours (with Distinction), (Kejuruteraan Perisian) Universiti Malaya (UM)	Efficient Resource Management (cloud)     Large Scale Processing     Social Network Analysis (link Prediction)
14.	Dr. Uzair Iqbal (DS13)	Degree of Doctor of Philosophy, (Data Mining) Universiti Malaya (UM) Master of Science in Software Engineering, (Kejuruteraan Perisian) University of Engineering and Technology Taxila BSC (Software Engineering), (Kejuruteraan Perisian) University of Engineering and Technology Taxila	Non-Communicable Diseases     Nursing (Including Diabetes,     Rheumatology Nursing) Medical     and Health Sciences, Nursing,     Nursing Practices      Neural Network for Machine     Learning     Applied Science and Technology,     Information and Communication     Technology (ict), Artificial     Intelligence and Machine Learning      Quality and Accessable Health     System     Human and Societal Resilency,     Basic Human and Social Needs
15.	Dr. Siti Nurliana Jamali (DS13)	PhD in Human Computer Interaction & Software Engineering, Universiti Putra Malaysia (UPM)  Master of Computer Science (Software Engineering), Universiti Putra Malaysia (UPM)  Bachelor of Computer Science (Hons), Management Science University	Software Engineering Software Requirement Engineering Human-Computer Interaction Interaction Design UI/UX System Analysis & Design Object Oriented Software Engineering Multimedia Computing Mobile Application Development E-commerce Artificial Intelligence



## **DEPARTMENT OF INFORMATION SYSTEMS**

## Head of Department: Dr. Hoo Wai Lam

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NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION	
1.	Dr. Hoo Wai Lam (DS13)	PhD (2015), Universiti Malaya (UM)  Bachelor (2010)  Bachelor of Computer Science (Hons) (2010), Universiti Malaya (UM)	Data Analytics     Machine Learning     Computer Vision     Artificial Intelligence	
2.	Prof. Dr. The Ying Wah (VK7)	PhD (2004) Universiti Malaya  Master (1995) Master of Computer Science, Oklahoma City University, USA  Bachelor (1994) Bachelor of Computer Science, Oklahoma City University, USA	Data Mining     Database	
3.	Prof. Dr. Nor Liyana Mohd Shuib (VK7)	PhD (2013) University Malaya  Master (2008) Master of Information Technology, Universiti Kebangsaan Malaysia (UKM)  Bachelor (2005) Bachelor of Science (Computer)(Hons), Universiti Teknologi Malaysia, Skudai	Management Information System (Decision Support System, Expert System)      Information Management (Database, Data Mining, Information Retrieval, Recommender System, Social Media)      Mobile Computing      Educational Technology and Media (E-learning, Learning Style, Personalization, Information Seeking, Social Media)	
4.	Prof. Ts. Dr. Vimala Balakrishnan (VK7)	PhD (2008) Universiti Multimedia Malaysia  Master (2002) Master of Science (Computer Science), Universiti Sains Malaysia  Bachelor (1998) Bachelor of Computer Science (Hons), Universiti Sains Malaysia	Data and Knowledge Engineering (Data Mining, Opinion Mining),     Information Retrieval     Social Media     Recommender Systems	

NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
5.	Assoc. Prof. Ts. Dr. Sri Devi Ravana (DS14)	PhD (2012) University of Melbourne, Australia.	Search Engine (IR Evaluation (e.g. evaluation metrics, aggregation methods, experiments)
	<b>3</b>	Master (2001) Master of Software Engineering, Universiti Malaya. Bachelor (2000)	Web Application and Services
200		Bachelor of Information Technology (Hons.) (Information Science), Universiti Kebangsaan Malaysia	
6.	Assoc. Prof. Dr. Maizatul Akmar Ismail (DS14)	PhD (2011) Universiti Malaya. Master (2002) Master of Science, Universiti	Management Information System, Semantic Web in Education, Knowledge Management, E- Commerce.
		Putra Malaysia.  Bachelor (1999)  Bachelor of Information  Technology, Universiti Malaya	
7.	Assoc. Prof. Dr. Suraya Hamid (DS14)	PhD (2013) Computing and Information Systems, The University of Melbourne, Australia	Information Services (e- Government, e-Learning, e- commerce, cybersecurity awareness and IS for Sustainability
		Master (2002) Master of Information Technology, Universiti Kebangsaan Malaysia. Bachelor (1998)	ICT and Emergent Information Technology (Information Seeking, Online Behaviour and Its Impact, Activity Theory, Qualitative Research and Social Media)
		Bachelor (1996) Bachelor of Information Technology (Hons. In Industrial Computing), Universiti Kebangsaan Malaysia.	Research and Social Media)
8.	Assoc. Prof. Dr. Kasturi Dewi Varathan (DS14)	PhD (2012) Universiti Kebangsaan Malaysia.	Big Data     Information Retrieval
		Master (2005) Master of Computer Science, Universiti Malaya.	Data Storage and Representations
		Bachelor (2002) Bachelor of Information Technology (Hons), Universiti Tenaga Nasional.	



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
9.	Assoc. Prof. Dr. Azah Anir Norman (DS14)	PhD (2014) Universiti Malaya.  Master (2004) Master of Information Security, Royal Holloway University of London, UK  Bachelor (2000) Bachelor of Information Technology, Universiti Kebangsaan Malaysia.	Management Information System (Electronic Commerce Security, Information Security Management, Information Systems)
10	Assoc. Prof. Dr. Tutut Herawan (DS14)	PhD(UTHM)(2010), (Computer Science) Universiti Tun Hussein Onn (Uthm)  M.Sc(Math)(University Gadjah Mada)(2006), (Mathematical Sciences) Universiti Gadjah Mada, Indonesia  B.Ed(Ahmad Dahlan University)(2002), (Education) Universitas Ahmad Dahlan	Symbolic and Algebraic Manipulation     Orthogonal Latin Squares, Magic Squares, And Magic Cubes     Discrete Mathematics     Rough Set and Soft Set Theories     Decision Support System     Data Mining, Kdd, Soft Computing
11.	Assoc. Prof. Dr. Norjihan Abdul Ghani (DS14)	PhD (2013) Universiti Teknologi Malaysia. Bachelor (2000)  Master (2002) Master of Information Technology (The Science), Universiti Kebangsaan Malaysia.  Bachelor Bachelor of Information Technology, Universiti Utara Malaysia.	Database (Database Security & Privacy)     Digital Image Processing System (Image Retrieval)     Data Security (Information Security and Privacy)
12.	Dr. Riyaz Ahamed Ariyaluran Habeeb Mohamed (DS13)	PhD (2019)  Master of Software Engineering (2013)  B.Eng, (Computer Science and Engineering) (2008)	Machine Learning     Data Science     Generative AI     Cloud Computing



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
13.	Ts. Dr. Mohd Shahrul Nizam Mohd Danuri (DS13)	PhD of Information Management (Research), UiTM  Master's Degree in Intellectual Property, UKM  BSc. Degree in Computer Science (Hons), USM	Information Systems Big Data & Data Science Internet of Things (IoT) Cloud Computing



## DEPARTMENT OF COMPUTER SYSTEM AND TECHNOLOGY

Head of Department: Assoc. Prof. Dr. Amirrudin Kamsin

NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
1.	Assoc. Prof. Dr. Amirrudin Kamsin (DS14)	PhD (2014) PhD, University College London, UK  Master (2002) Master of Science, NCCA, Bournemouth University, UK  Bachelor (2001) Bachelor of Computer Science (Hons), Universiti Malaya.	Computer Animation     Human Computer Interaction
2.	Prof. Ts. Dr. Miss Laiha Mat Kiah (VK7)	PhD (2007) University of London  Master (1999) Master of Science, University of London  Bachelor (1997) Bachelor of Computer Science, Universiti Malaya	Security Protocols (Group Communication, Key Management, Wireless Mobile Environments)     Communication Protocols (Wireless Security, Ad-Hoc Network Security, Mobile Communication Security)     Information Security (Applied Cryptography, Applied Steganography)
3.	Prof. Ts. Dr. Rafidah Md Noor (VK7)	PhD (2010), Lancaster University, UK Master (2000) Master of Science, Universiti Teknologi Malaysia Bachelor (1998) Bachelor of Information Technology, Universiti Utara Malaysia	Mobile Network Technologies (Network Mobility, Quality of Service, Quality of Experience, Vehicular Ad Hoc Networks)
4.	Prof. Ts. Dr. Nor Badrul Anuar Juma'at (VK7)	PhD (2012), University of Plymouth, UK Master (2003) Master of Computer Science, Universiti Malaya Bachelor (2001) Bachelor of Computer Science (Hons), Universiti Malaya	Intrusion Detection Systems, Intrusion Response Systems, Security Event and Incident Management, Digital Forensic, Network Security)      High Speed Network (Switching, Routing, Ipv6, Multicast)      Management Information System (E-Thesis, Library Systems, Online Systems)



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
5.	Prof. Dr. Mohd Yamani Idna Idris (VK7)	PhD (2013) Universiti Malaya  Master (2002) Master of Computer Science, Universiti Malaya  Bachelor (2000) Bachelor of Engineering (Hons), Universiti Malaya	Image and Signal Processing     Embedded Systems (FPGA, SOC)     Sensor Networks
6.	Prof. Dr. Por Lip Yee @ Por Khoon Sun (VK7)	PhD (2012) PhD, Universiti Malaya  Master (2003) Master of Computer Science, Universiti Malaya.  Bachelor (2001) Bachelor of Computer Science (Hons), Universiti Malaya.	Security Services Sn: Digital Forensic, Steganography, Network Security, Public Key Infrastructure and Biometrics (Information Hiding, Steganography)
7.	Assoc. Prof. Dr. Ang Tan Fong (DS14)	PhD (2011) PhD, Universiti Malaya  Master (2001) Master of Computer Science, Universiti Malaya  Bachelor (2000) Bachelor of Information Technology (Hons), Universiti Malaya	Cloud Computing Software Defined Networking Internet of Things Game-based Learning
8.	Assoc. Prof. Dr. Ling Teck Chaw (DS14)	PhD (2005) Universiti Malaya  Master (1996) Master of Computer Science, Universiti Malaya  Bachelor (1992) Bachelor of Science (Hons), Universiti Malaya	Software Defined Networking     Cloud Computing, Core Network Technology     High Performance Computing (Grid Scheduling, Qos)     Parallel Architecture and Processing (Cloud Computing, Distributed Systems)
9.	Assoc. Prof. Dr. Rosli Salleh (DS14)	PhD (2001), University of Salford  Master (1997) Master of Science, University of Salford  Bachelor (1994) Bachelor of Computer Science (Hons), Universiti Malaya	Wireless Communication and Technologies Sn: Including Communication Equipment (Mobile Ipv6, Handoff)



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
10.	Assoc. Prof. Dr. Tey Kok Soon (DS14)	PhD (2014), Universiti Malaya (Power Electronics and Drivers)  Bachelor (2011) Bachelor of Engineering (Electrical Engineering), Universiti Malaya	Embedded System,     System on Chip,     Control and Implementation     Photovoltaic System
11.	Assoc. Prof. Ts. Dr. Ismail Ahmedy (DS14)	Bachelor (2006) Bachelor of Science (Hons)(Computer) (2006), Universiti Teknologi Malaysia  Master (2009) Master of Science (Computer Science) (2009), University of Queensland  PhD (2015) Universiti Teknologi Malaysia	Internet of Things     Wireless Sensor Networks     Wireless Technologies     Embedded Systems
12.	Assoc. Dr. Saaidal Razzalli Azzuhri (DS14)	PhD of Computer Networks (2014), University of Queensland  Master (2008) Master of Science (IT) Malaysia University of Science & Technology  Bachelor (2004) Bachelor of Engineering (Telecommunication) Universiti Malaya	Computer & Wireless Networks     Fiber Optical Communication     Unmanned Aerial Vehicle (UAV)
13.	Dr. Muhammad Faiz Mohd Zaki (DS13)	BcompSc (Networking) (Malaya) – 2015 MSc (Web Science and Big Data Analytics) (London) – 2017 PhD (Network Traffic Classification) (Malaya) – 2022	Network Analytics and Management (Network Traffic Classification, Granular Network Traffic Classification)     Network Security (Network Traffic Profiling, Network Traffic Filtering)     Data Analytics
14.	Dr. Muhammad Nur Firdaus Sahran (DS13)	Doctoral Degree (PhD), (Computer Science) Universiti Malaya (UM) Bachelor of Computer Science (Computer Systems and Networking) Pass with Honours (with Distinction), (Sistem dan Rangkaian Komputer) Universiti Malaya (UM)	Computer networks     Software-defined networking



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
15.	Dr. Bryan Raj a/l Peter Jabaraj (DS13)	Doctoral Degree (PhD) Universiti Malaya (UM)  Bachelor of Computer Science (Computer System And Network) Pass With Honours (With Distinstion), (Computer System And Network) Universiti Malaya (UM)	Algorithms and Techniques     Clustering and Routing
16.	Mrs. Fazidah Othman (DS11)	Master (2004) Master of Science (Computer Science), Universiti Teknologi Malaysia Bachelor (1999) Bachelor of Computer Science (Hons), Universiti Teknologi Malaysia	Security Services Sn: Steganography, Network Security, Public Key     Infrastructure.
17.	Mr. Noorzaily Mohamed Nor (DS11)	Master (1999), Master of Computer Science Universiti Malaya Bachelor (1995) Bachelor of Science (Hons), Universiti Malaya	Detection and Estimation     Arithmetic and Logic Structures     Embedded System
18.	Mr. Emran Mohd Tamil (DS11)	Master Master of Science, Universiti Teknologi MARA  Bachelor Bachelor of Engineering, Universiti Teknologi Malaysia	System-On-Chip (Soc) (System-On-Chip, Circuit Design, Embedded System, Scada)     Signal Analysis and Processing (Biosignal Processing, Feature     Extraction, Pattern Classification, Artificial Intelligence)
19.	Dr. Burhan UI Islam Khan (DS11)	PhD(Engineering), (Computer and Information Engineering) International Islamic University Malaysia (IIUM)  M.Sc(Computer and Information Engineering), (Computer And Information Engineering) International Islamic University Malaysia (IIUM)  B.Tech(Computer Science & Engineering), (Computer Science & Engineering) Islamic University of Science & Technology	Secure Routing for Adhoc Networks  Formation and Analysis Network Performance Indicators  Application of Game Theory and Mechanism Design in System Design and Modeling  Secure One-Time-Passwords  Authentication and Authorization mechanisms in Cloud Computing and IoT



## **MULTIMEDIA UNIT**

NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
1.	Prof. Ts. Dr. Ainuddin Wahid Abdul Wahab (VK7)	PhD (2011) PhD, Surrey University, UK (Multimedia Network)  Master (2006) Master of Computer Science, Universiti Malaya  Bachelor (2002) Bachelor of Computer Science, Universiti Malaya	Digital Forensic     Information Security
2.	Assoc. Prof. Dr. Amirrudin Kamsin (DS14)	PhD (2014) PhD, University College London, UK  Master (2002) Master of Science, NCCA, Bournemouth University, UK  Bachelor (2001) Bachelor of Computer Science (Hons), Universiti Malaya.	Computer Animation     Human Computer Interaction
3.	Assoc. Prof. Dr. Mohamad Nizam Bin Ayub (DS14)	PhD (2016) PhD, University of the West of Scotland  Master (2001) Master of Science, Herriotwatt University  Bachelor (2000) Bachelor of Computer Science (Hons), Universiti Malaya.	Interactive Multimedia     Serious Game
4.	Assoc. Prof. Dr. Nor Aniza Abdullah (DS14)	PhD (2006) PhD, University of Southampton  Master (1999) Master of Science, University of London  Bachelor (1997) Bachelor of Computer Science (Hons) Universiti Malaya	Adaptive Multimedia     Image Processing     E-Learning



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
5.	Dr. Nurul Fazmidar Mohd Noor (DS13)	PhD (2011), Lancaster University, UK Master (2000) Master of Interactive Multimedia, Liverpool John Moores University, UK Bachelor (1999) Bachelor of Computer Science (Hons), Universiti Malaya	3d Information Visualization     Virtual Reality     Serious Game     Affective Computing
6.	Dr. Suzan Jabbar Obaiys (DS13)	PhD PhD, Universiti Putra Malaysia  Master MSc, Science, Universiti Putra Malaysia  Bachelor BSc, Mathematics, Baghdad University, Iraq	Numerical Analysis
7.	Mrs. Hannyzzura Pal @ Affal (DS11)	Master (1998) Master of Science University of Westminster  Bachelor (1997) Bachelor of Computer Science (Hons), Universiti Malaya	Image Processing     E-Learning     Interactive Multimedia
8.	Mrs. Nornazlita Hussin (DS11)	Master (2000) Master of Science, University of Bath, UK  Bachelor (1999) Bachelor of Computer Science (Hons), Universiti Malaya	Augmented Reality     Virtual Reality     Edutainment
9.	Mrs. Mas Idayu Md Sabri (DS11)	Master (2003) Master of Science, University of Bath, UK  Bachelor (2001) Bachelor of Computer Science (Hons), Universiti Malaya	<ul> <li>Edutainment</li> <li>Audio Synthesis</li> <li>Serious games</li> <li>Gamification</li> </ul>



NO.	NAME	ACADEMIC QUALIFICATION	AREA OF SPECIALIZATION
10.	Dr. Rasha R. J. Ataallah (DS11)	PhD (Computer Science & Mathematics) Universiti Malaya (UM)	Neural Networking     Image Processing
		Master Information Technology, The Islamic University Palestine	HCI     Multimedia Processing
		Master Management and Information Technology, University of Palestine- Palestine	Matlab     Data Science
		BS Computer Education, Al Aqsa University	Information Retrieval     Data Mining

## **Administration and Support Staff**



: Faculty Manager (N12) Che Mazni Sidek



: Senior Assistant Registrar (N10) Noor Yusrina Hashim



: Assistant Registrar (N9) Balqis Bahari



: Assistant Registrar (N9) Nur Nadia Arshad



Assistant Registrar (N9) Nursyahirah Mamat Yasin



: Assistant Registrar (N9) Nurul Farhana Mohd Nasir



: Assistant Registrar (N9) Siti Nur Aisyah Zulzaidi



: Office Secretary (N6) Zunaida Alwadood



: Accountant Assistant (Finance) (W5) Norazleen Ramli



: Administrative Assistant Officer (N5) Nur Azleen Abdul Rahim



: Administrative Assistant Officer (N5) Siti Nor Anilawatie Muhammad



: Senior Administrative Assistant (Clerical/Operational) (N2) Mohd Afiffudin Mohd Ali



Senior Administrative Assistant (Clerical/Operational) (N2) Julianna Ariff



Senior Administrative Assistant (Clerical/Operational) (N2) Norhayati Mohd Supi



 Senior Administrative Assistant (Clerical/Operational) (N2) Norkusharina Nasir



Senior Administrative Assistant (Clerical/Operational) (N2) Rohani Mohamed Arifin



Senior Administrative Assistant (Clerical/Operational) (N2) Shahrul Hasnah Ahmad



: Administrative Assistant (Finance) (W2) Haida Izwani Che Mahmood



Administrative Assistant (Clerical/Operational) (N1) Azeerin Ahmad



Assistant Office Secretary (N1) Nurfatehah M. Zahir



Assistant Office Secretary (N1) Nur Hidayah Mohd Sarbini



Assistant Office Secretary (N1) Nurnajwa Husna Mohd Rafi



Administrative Assistant (Clerical/Operational) (N1) Al Zarinah Awang Mohktar



Administrative Assistant (Clerical/Operational) (N1) Nadhirah Mohd Aznam



Administrative Assistant (Clerical/Operational) (N1) Norhanim Husaini



Administrative Assistant (Clerical/Operational) (N1) Nurfaziela Ibrahim



: Administrative Assistant (Clerical/Operational) (N1) Zaleha Sumairi



: Administrative Assistant (Clerical/Operational) (N1) Nur Izzati Alias



: General Office Assistant (H1) Mohd Fareek Muhiyeddin



: General Office Assistant (H1) Nanthini Krishnan



: Driver (H1) Mohd Haffes Rahim

#### **Technical Staff**



: Senior Assistant Information Technology Officer (FA6) Azzyaty Razalli



: Senior Assistant Information Technology Officer (FA6) Haryati Masilan



: Senior Assistant Information Technology Officer (FA6) Wan Mohd Hasanul Isyraf Wan Yusoff



: Assistant Information Technology Officer (FA5) Jamal Amran



: Assistant Information Technology Officer (FA5) Mohd Annuar Ja'afar



: Assistant Information Technology Officer (FA5) Tun Hairul Farid Ton Hamzah



: Assistant Information Technology Officer (FA29) Nor Azura Adnan



: Assistant Engineer (JA29) Mohd Azizie Aris



: Assistant Engineer (JA29) Mohd Noor Aizad Morad



: Assistant Engineer (JA29) Zulzefle Kassim



: Senior Computer Technician (FT22) Mohd Farhan Abdul Rahman

## ACADEMIC CALENDAR SESSION 2025 / 2026



#### Lampiran B2

ACADEMIC CALEND (MASTER	AND			SION	
	SEN	/IESTER I			
Orientation (Week of Welcome) - WOW	1	week	05.10.2025		12.10.2025
Lectures	6	weeks*	13.10.2025	-	23.11.2025
Mid Semester I Break	1	week	24.11.2025	-	30.11.2025
Lectures	8	weeks*	01.12.2025	-	25.01.2026
Revision Week	1	weeks*	26.01.2026		01.02.2026
Semester I Final Examination	3	weeks*	02.02.2026	-	22.02.2026
Semester I Break	2	week	23.02.2026	-	08.03.2026
	22	weeks			
	SEN	IESTER II			
Lectures	7	weeks*	09.03.2026	-	26.04.2026
Mid Semester II Break	1	week	27.04.2026	-	03.05.2026
Lectures	7	weeks*	04.05.2026		21.06.2026
Revision Week	1	week*	22.06.2026		28.06.2026
Semester II Final Examination	3	weeks*	29.06.2026		19.07.2026
Semester II Break	4	weeks	20.07.2026	-	16.08.2026
	23	weeks	_		
SF	PECIA	L SEMESTE	R		
Lectures	7	weeks*	27.07.2026		13.09.2026
Special Semester Final Examination	1	week*	14.09.2026	-	20.09.2026
Special Semester Break	1	week	21.09.2026		28.09.2026
	9	weeks			

#### Notes:

- (1) The Module Registration and Examination Schedule can be referred to at <a href="https://umsitsquide.um.edu.my">https://umsitsquide.um.edu.my</a>. All information is subject to change.
- (\*) The Academic Calendar has taken into account public and festive holidays and is subject to change:

Deepavali
Christmas Day
New Year
Thaipusam
Federal Territory Day
Chinese New Year
Nuzul Al-Quran
Eidul Fitri
Labour Day
Eidul Adha
Wesak Day
His Majesty the King's Birthday
Awal Muharram
Prophet Muhammad's (Maulidur Rasul)
National Day

20 October 2025 (Monday)
25 December 2025 (Thursday)
01 January 2026 (Thursday)
01 February 2026 (Sunday)
01 February 2026 (Sunday)
17 & 18 February 2026 (Tuesday & Wednesday)
07 March 2026 (Saturday)
20 & 21 March 2026 (Friday & Saturday)
01 May 2026 (Friday)
27 May 2026 (Wednesday)
31 May 2026 (Sunday)
01 June 2026 (Monday)
16 June 2026 (Tuesday)

31 May 2026 (Sunday) 01 June 2026 (Monday) 16 June 2026 (Tuesday) 25 August 2026 (Tuesday) 31 August 2026 (Monday) 16 September 2026 (Wednesday)

(\*) UM PG iFest 2026 09 - 11 June 2026 (Tuesday - Thursday)

Malaysia Day



# MASTER OF COMPUTER SCIENCE (APPLIED COMPUTING)

## PROGRAMME REQUIREMENTS



#### Programme Type

The type of programme offered for the Master of Computer Science (Applied Computing) is a programme which shall consist of coursework (50%) and research leading to the submission of a dissertation in the candidate's area of study (50%).

#### 2. Admission Requirements

a) The general entry requirements to enrol in this program are as follows:

Pass the Malaysian Certificate of Education (SPM)/equivalent with honours in Malay/Malaysian Language or honours in Malay/Malaysian Language of July Paper.

b) The special entry requirements to follow this program are as follows:

Bachelor's degree with a CGPA of not less than 3.00 in the field of Computer Science/Information Technology/related fields;

#### OR

Bachelor's Degree with CGPA (2.70 – 2.99) in the field of Computer Science/Information Technology/related fields and meet at least one (1) of the following criteria:

- i. Graduated from the University of Malaya
- ii. Have at least one (1) year of work experience in a related field
- iii. Produce publications in relevant fields
- iv. Scholarship recipient
- v. is an employee of a government agency.
- vi. Pass the Faculty interview; or
- passed the faculty's special assessment.

#### OR

Other qualifications approved by the Senate from time to time.

#### AND

- c) English Language Competency Requirements:
  - Non-citizen applicants who obtained their degree from a university or institution of higher learning that does not use English as the medium of instruction for the degree in question who wish to follow a degree program and/or to write their dissertation in English are required to meet the following requirements:
    - A minimum score of 550 for the paper-based test (PBT), a score of 213 for the computer-based test (CBT) or a score of 80 for the internet-based test (iBT) for the Test of English as a Foreign Language (TOEFL);
    - ii. Minimum band 6.0 for the International English Language Testing System (IELTS) (Academic);
  - iii. Scores according to the respective program standards if higher than (a) and (b);
  - iv. For any program standard that places the TOEFL or IELTS (Academic) score lower than the University's minimum score, those programs must follow the minimum score that has been set by the University;
  - v. Minimum score of 57 Pearson Test of Academic English (PTE Academic);
  - vi. Minimum grade C for English subject in General Certificate of Education (A-Level);
  - vii. Minimum grade C in B2 First by Cambridge Assessment English.;
  - viii. Minimum grade C in C1 Advanced by Cambridge Assessment English; or



- ix. Minimum grade C in C2 Proficiency by Cambridge Assessment English.
- Non-citizen applicants with the following backgrounds are exempt from the prescribed English language qualification requirements:
  - i. Comes from a country where English is the national language;
  - ii. Possess an academic credential from an institution where English is the sole medium of instruction; or
  - iii. Have studied in Malaysia and intend to pursue further education, subject to condition (b).

#### **Duration of Study**

The recommended study duration is between four (4) to eight (8) semesters.

#### **Programme Structure**

- The Master of Computer Science (Applied Computing) Programme will have forty-two
   (42) credits through coursework and dissertation.
- (2) Through Coursework and Dissertation Programme
  - (i) The programme shall consist of two parts:
    - (a) Part I comprises:
      - (i) five (5) core courses, each three credits; and
      - (ii) two (2) elective courses.
    - (b) Part II shall consist of twenty-one (21) credits and shall involve research leading to the submission of a dissertation.
- (3) Details of courses offered shall be of those approved by the Senate from time to time on the recommendation of the Faculty and shall be made known to the candidates at the start of each session.
- (4) The list of Senate approved courses for the Master of Computer Science (Applied Computing) Programme shall be as indicated in List 1. Candidates shall be informed of the prescribed combination of courses for this programme prior to registration at the start of their study programme.



# PROGRAMME OBJECTIVES & OUTCOMES



#### PROGRAMME EDUCATIONAL OBJECTIVE (PEO)

PEO 1	Graduates able to establish themselves as competent and practicing professionals in Computer Science or related fields. (Professionalism)
PEO 2	Graduates able to continuously pursue new knowledge to improve their competency and subsequently work in teams to contribute to the industry or academia in Computer Science (Ongoing Personal Development)
PEO 3	Graduates able to contribute to sustainable development and the well-being of the society through professional skills and ethics in the discipline of Computer Science (Societal Engagement).

(Assessed after 3 - 5 years after students graduated)

#### PROGRAMME LEARNING OUTCOMES

Programme Learning Outcomes (PLO)		Cluster Learning Outcome (CLS)	Taxonomy Category (K/P/A)*
PLO1	Master the advanced concepts and the latest theories in computer science.	CLS1 (Knowledge and understanding)	K
PLO2	Apply problem solving skills and computer science knowledge for computing problems.	CLS2 (Cognitive skills)	К
PLO3	Integrate knowledge, techniques, skills, methodologies and appropriate technologies to create effective ICT solutions.	CLS3A (Practical skills)	K, P
PLO4	Master the ability to apply mathematical skills in the area of computer science.	CLS3B (Digital and numerical skills)	K, P
PLO5	Communicate effectively, verbally and in writing, and able to work in a team and demonstrate leadership skills in carrying out computer science related projects.	CLS3C (Interpersonal and communication)	P, A
PLO6	Demonstrate leadership that is consistent with professional and ethical codes in computer science discipline.	CLS3D (Leadership, autonomous and responsible)	P, A
PLO7	Conceive technical and societal innovation through computer science technologies.	CLS4 (Personal and entrepreneurial skills)	K, A
PLO8	Demonstrate character that in line with professional ethical codes in computer science.	CLS5 (Ethics and Professionalism)	K, A

<sup>\*</sup>Cognitive (K), Psychomotor (P), Affective (A)





#### MATRIX OF MAPPING PLO TO PEO

	PEO1	PEO2	PEO3
PLO1	$\checkmark$		
PLO2	$\checkmark$		) }
PLO3		√	
PLO4		√	
PLO5		√	
PLO6			<b>√</b>
PLO7			√
PLO8			√





# CANDIDATURE REQUIREMENTS



No	Requirement
1.	Fulfil the minimum candidature duration of 3 semesters.
2.	Fulfil the University language requirement (Bahasa Malaysia and English) no later than the second (2 <sup>nd</sup> ) semester of candidature.
3.	Fulfil the residential requirement of 6 months.
4.	Presentation  Proposal presentation at the beginning of the research component registration.  Present research progress in a Candidature Defense session as required by the Faculty.



# GRADUATE ON TIME (GOT) SCHEDULE



Semester	Activities	Output/Milestone
1	Applicable to all international candidates: Attend Bahasa Melayu course.     Complete all core courses offered in Semester I (including Research Methodology) and 1 or 2 elective courses offered in Semester 1.      Attend relevant workshops/ research seminars (E.g., EndNote, Turnitin).	OUTPUT OF SEM 1:  Completed Bahasa Melayu course for all international candidate Completed all selected courses. Completed any relevant workshops/research seminars.
2	Complete all core courses offered in Semester II and 1 or 2 elective courses offered in Semester II. Register for dissertation and perform the following activities: Choose a research topic from a list collated by programme coordinator. Submit appointment of supervisor form to the office by the deadline given by the faculty. Prepare Proposal Defence report. Conduct Proposal Defence presentation. If the research includes human participant, apply for ethics approval. Submit progress report.	OUTPUT OF SEM 2:  Completed all selected courses. Appointed supervisor and identified research topic. Completed Proposal Defence report. Presented and passed Proposal Defence.
3	Register for dissertation and perform the following activities: Collect data/conduct experiment. Analyse data. Prepare Candidature Defence report. Conduct Candidature Defence presentation. If passed Candidature Defence, prepare a draft of dissertation. Submit a progress report.	OUTPUT OF SEM 3:  Collected data. Analysed data Completed Candidature Defence report. Presented and passed Candidature Defence. Draft of the dissertation reviewed by the Supervisor.
4	Register for dissertation and perform the following activities: Submit dissertation for examination. Make corrections based on examiner's feedback, if applicable. Submit final dissertation for Senate approval. Submit a progress report.	OUTPUT OF SEM 4:  Submitted dissertation for examination. Outcome of Committee of Examiners meeting. Received Senate letter.

#### Notes:

#### **Monitoring Panel**

- The supervisor appoints a chairperson and 2 members who are experts in the field. A fourth member is allowed to be appointed if necessary.
- 2. The same panel should follow through with the Proposal and Candidature Defence.
- 3. It is strongly recommended that one member be appointed as the internal examiner.
- 4. The main responsibilities of the panels are to advise the student in improving the research.





## COURSE PLAN



#### INTAKE SEMESTER I 2025/2026

MASTER OF CO	MPUTER SCIENCE UTING)	Credits	Semester I 2025/2026	Semester II 2025/2026	Semester I 2026/2027
Core Courses					
WOX7001	*Research Methodology	3	√		
WOA7001	Advanced Algorithms	3	<b>√</b>		
WOA7015	Advanced Machine Learning	3	√		
WOA7016	Cloud Computing	3		√	
WOA7017	Security Risk Analysis and Evaluation	3		<b>V</b>	
WOC7024	Dissertation	21		√ <b>*</b> *	√ <b>*</b> *
Elective Courses	Students are required to choose	se any two (	2) courses from	the list below]	
WOA7018	Autonomous Robotics	3	√		
WOA7019	Augmented Reality	3		√	
WOC7014	Framework-Based Software Design and Development	3		<b>V</b>	
WOC7020	Advanced Internet of Things	3	√		
WQD7003	Data Analytics	3	<b>√</b>		

<sup>\*</sup> Students are required to register for the Research Methodology course in their first semester

Note: The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.



<sup>\*\*</sup> Students are only allowed to register for a Dissertation after completing six (6) credits of coursework.



## COURSE PLAN



#### **INTAKE SEMESTER II 2025/2026**

MASTER OF C	OMPUTER SCIENCE MPUTING)	Credits	Semester II 2025/2026	Semester I 2026/2027	Semester II 2026/2027
Core Courses					
WOX7001	*Research Methodology	3		√	
WOA7001	Advanced Algorithms	3		√	
WOA7015	Advanced Machine Learning	3		√	
WOA7016	Cloud Computing	3	<b>V</b>		
WOA7017	Security Risk Analysis and Evaluation	3	V		
WOC7024	Dissertation	21		√**	<b>√**</b>
Elective Cours	ses [Students are required to cho	oose any two	o (2) courses fr	om the list bel	ow]
WOA7018	Autonomous Robotics	3	11	√	
WOA7019	Augmented Reality	3	<b>V</b>		
WOC7014	Framework-Based Software Design and Development	3	√	8	
WOC7020	Advanced Internet of Things	3		<b>√</b>	
WQD7003	Data Analytics	3		<b>√</b>	

<sup>\*</sup> Students are required to register for the Research Methodology course in their first semester

Note: The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.



<sup>\*\*</sup> Students are only allowed to register for a Dissertation after completing six (6) credits of coursework



# LIST OF COURSES & CONTENTS



#### **CORE COURSES**

Code	Courses	Credits
WOX7001*	Research Methodology*	3
WOA7001	Advanced Algorithms	3
WOA7015	Advanced Machine Learning	3
WOA7016	Cloud Computing	3
WOA7017	Security Risk Analysis and Evaluation	3
WOC7024	Dissertation**	21

#### **ELECTIVE COURSES**

(NOTE: Students are required to choose any two (2) courses from the lists below)

Code	Courses	Credits
WOA7018	Autonomous Robotics	3
WOC7014	Framework-Based Software Design and Development	3
WOA7019	Augmented Reality	3
WOC7020	Advanced Internet of Things	3
WQD7003	Data Analytics	3

#### Note:

- \* Students are required to register for the Research Methodology course in their first semester.
- \*\* Students are only allowed to register for Dissertation after completing 6 credits of coursework.

The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.





#### WOX7001 Research Methodology

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Describe appropriate methodologies used in computer science and information technology research.
- 2. Devise a plan to be carried out within a feasible duration for answering research problems and questions identified.
- 3. Demonstrate attitude and character in line with professional and ethical codes in computer science and information technology research.

#### **Synopsis of Course Content**

This course gives an overview of the dimensions of research in computer science and information technology. Major considerations and tasks in conducting research in the areas such as review of literature, identify problem statement, formulate research questions and objectives, select an appropriate approach or method to the research, plan and manage the research, tools for research, data analysis, and writing and presentation strategies, will be discussed too.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

#### WOA7001 Advanced Algorithms

#### Course Learning Outcomes\*

At the end of the course, students are able to:

- 1. Explain major algorithms and data structures.
- 2. Implement the algorithms and data structures to solve real-world problems.
- 3. Develop ICT solutions with algorithms and data structures.

#### Synopsis of Course Content

This course introduces students to the analysis and design of computer algorithms. Students will learn advanced design techniques, important classical algorithms and data structures, and their implementation in modern programming environments.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WOA7015 Advanced Machine Learning

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Practice concepts and techniques for machine learning related to digital and numerical methods.
- 2. Report the solution to machine learning problems by devising and listing the steps in machine learning applied to solve different types of problems
- 3. Demonstrate skills and knowledge on machine learning by managing a machine learning project





#### Synopsis of Course Content

This course introduces advanced concepts and techniques for machine learning. It covers topics such as linear and logistic regression, decision tree, neural network, and support vector machines as well as reinforcement learning.

#### **Evaluation and Weightage**

Continuous Assessment : 50 % Final Examination : 50%

#### WOA7016 Cloud Computing

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain the main concepts, key technologies, architecture and issues of cloud computing.
- 2. Apply appropriate solutions to solve and manage complex problems in cloud computing.
- 3. Deploy cloud applications using popular cloud platforms.

#### Synopsis of Course Content

This course is designed to introduce students to the emerging issues related to cloud computing. This course will examine several aspects of the cloud such as concepts related to cloud computing technologies, cloud models, cloud platform, virtualisation and orchestration, web services and cloud storages. This course also emphasises on practical implementations in developing and deploying cloud applications.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

#### WOA7017 Security Risk Analysis and Evaluation

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain the concepts of security risk assessment.
- 2. Apply suitable security risk assessment methods.
- Evaluate a particular security risk assessment method.

#### **Synopsis of Course Content**

This course introduces the concepts and techniques used in security risk analysis and evaluation. It includes a comprehensive explanation of the six basic phases of security risk assessment, i.e. project definition, project preparation, data gathering, risk analysis, risk mitigation, and risk reporting and resolution. The course also explains several risk assessment methods and describes techniques to measure the effectiveness of a particular method.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%





#### WOC7024 Dissertation

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Report the literature review related to the proposed research project in the approved area.
- Implement a detailed research project based on the proposed research.
- 3. Produce a dissertation of the research project

#### Synopsis of Course Content

The dissertation is concerned with the guidance rendered by the supervisor to the student on the proper way of conducting a software engineering, computer science or information technology research project, which could be in the form of face-to-face discussion, presentation, demonstration and communication. The dissertation also covers the identification of problem statements, understanding and formulation of the research objectives and research methodology to perform the research project

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

\*Students have to pass candidature seminars (proposal defence and candidature defence) before submitting a dissertation for examination. Results of candidature seminars will be emailed to the students by the faculty.

\*Dissertation will be examined by examiners. The final results will be decided by the committee of examiners

#### WOA7018 Autonomous Robotics

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Discuss the fundamental principles of autonomous robot.
- 2. Design autonomous robots with bio-inspired Intelligence, deep neural networks and deep reinforcement learning.
- Discuss the aspects of artificial intelligence and autonomous robotics systems from industrial 4.0 perspectives.

#### Synopsis of Course Content

This course will present an introduction to autonomous robots from both academic and industrial viewpoints. For the academic part, emphasis will be given to recent advances in cognitive robotics, deep reinforcement learning, which combines deep neural networks with reinforcement learning to provide a framework for discovering suitable control actions (policies) and addressing complex tasks without explicit programming. For the industry-focused lectures, aspects of artificial intelligence and autonomous robotics systems will be considered from industrial 4.0 perspectives.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%



#### WOC7014 Framework-Based Software Design and Development

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Identify the basic principles of framework-based software design and development.
- 2. Design a framework-based software system.
- Construct a framework-based innovative software project using associated programming language

#### **Synopsis of Course Content**

This course introduces the design and development of software using framework. It includes specification, implementation and configuration of an innovative software according to a specific framework. Students will learn the framework's programming language as well as the facilities provided by the framework.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WOA7019 Augmented Reality

#### **Course Learning Outcomes**

At the end of the course, students are able to:

Describe the technologies related to Augmented Reality.

Apply the related new technologies in the design of augmented reality applications.

Develop interactive augmented reality applications for both PC based and mobile devices using a variety of input devices.

#### **Synopsis of Course Content**

This course is designed to introduce students with knowledge related to augmented reality concepts and technology. This is followed with a discussion on how knowledge about human sensory systems can facilitate in designing ergonomic augmented reality devices that match human perceptual capabilities. Students are then trained to develop an augmented application using a suitable programming language and 3D software. Towards the end of the course, there will be discussions on several examples of augmented reality applications with emphasis on the contributions of the augmented reality technology and future direction of this technology.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

#### WOC7020 Advanced Internet of Things

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain the architecture and key technologies of the Internet of Things.
- 2. Identify the challenges in the implementation of the Internet of Things.
- 3. Solve problems related to the Internet of Things in wireless communications.

#### Synopsis of Course Content

This course is designed to introduce to students the emerging issues related to the Internet of Things. This course will examine several aspects of the Internet of Things such as application areas related to the Internet of Things technologies, real-time models, local sensors, network components and





application-level components. This course also emphasises on solving problems related to wireless communications in developing and deploying the Internet of Things.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

#### WQD7003 Data Analytics

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain the concepts of data analytics.
- 2. Use suitable techniques for data pre-processing.
- 3. Apply data analytics and machine learning techniques to solve real-world problems.

#### **Synopsis of Course Content**

This course aims to develop students' ability to describe, explore and analyze data using suitable data analytics techniques

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%





# MASTER OF SOFTWARE ENGINEERING (SOFTWARE TECHNOLOGY)

## PROGRAMME REQUIREMENTS



#### Programme Type

The Master of Software Engineering (Software Technology) programme which shall consist of coursework and research leading to the submission of a dissertation in the candidate's area of study, whereby fifty percent (50%) of the total number of credits shall be for research.

#### 2. Admission Requirements

a) The general entry requirements to enrol in this programme are as follows:

Pass the Malaysian Certificate of Education (SPM)/equivalent with honours in Malay/Malaysian Language or honours in Malay/Malaysian Language of July Paper.

b) The special entry requirements to follow this programme are as follows:

Bachelor's Degree with a CGPA of not less than 3.00 in the field of Computer Science/Information Technology/related fields;

#### OR

Bachelor's Degree with a CGPA of 2.70 – 2.99 in the field of Computer Science/Information Technology/related fields and meet at least one (1) of the following criteria:

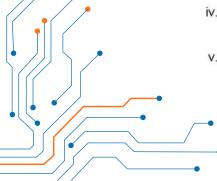
- i. Graduated from Universiti Malaya
- ii. Has at least one (1) year of working experience in a related field
- iii. Has produced publications in the relevant fields
- iv. Scholarship recipient
- v. Is an employee of a government agency
- vi. Pass the faculty's interview; or
- vii. Pass the faculty's special assessment.

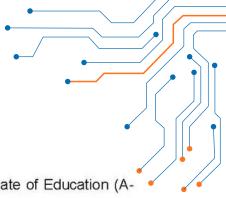
#### OR

Other qualifications approved by the Senate from time to time.

#### AND

- c) English Language Competency Requirements:
  - Non-citizen applicants who obtained their degree from a university or institution of higher learning that does not use English as the medium of instruction for the degree in question, who wish to follow a degree programme and/or to write their dissertation in English, are required to meet the following requirements:
    - A minimum score of 550 for the Paper-Based Test (PBT), a score of 213 for the Computer-Based Test (CBT) or a score of 80 for the Internet-Based Test (IBT) for the Test of English as a Foreign Language (TOEFL);
    - Minimum band 6.0 for the International English Language Testing System (IELTS) (Academic);
    - Scores according to the respective programme standards if higher than i. and
       ii. :
    - iv. For any programme standard that places the TOEFL or IELTS (Academic) score lower than the University's minimum score, those programmes must follow the minimum score that has been set by the University;
    - v. Minimum score of 57 Pearson Test of Academic English (PTE Academic);





- vi. Minimum grade C for English subject in General Certificate of Education (A-Level);
- vii. Minimum grade C in B2 First by Cambridge Assessment English;
- viii. Minimum grade C in C1 Advanced by Cambridge Assessment English; or
- ix. Minimum grade C in C2 Proficiency by Cambridge Assessment English.
- Non-citizen applicants with the following backgrounds are exempt from the prescribed English language qualification requirements:
  - i. Comes from a country where English is the national language;
  - ii. Possess an academic credential from an institution where English is the sole medium of instruction; or
  - iii. Have studied in Malaysia and intend to pursue further education, subject to

#### **Duration of Study**

The recommended study duration is between four (4) to eight (8) semesters.

#### **Programme Structure**

- (1) The Master of Software Engineering (Software Technology) Programme consisting of coursework and dissertation shall consist of forty-two (42) credits comprising two parts, namely:
  - (a) Part I which consists of:
    - (i) **five (5)** core courses, each three credits;

and

- (ii) two (2) elective courses, each three credits.
- (b) Part II which consists of twenty one (21) credits, shall consist of research leading to the submission of a dissertation.
- (2) Details of courses offered are of those approved by the Senate from time to time on the recommendation of the Faculty and shall be made known to the candidates at the start of each session.
- (3) The list of Senate approved courses for the Master of Software Engineering (Software Technology) is as indicated in List 1. Candidates shall be informed of the prescribed combination of courses for this programme prior to registration at the start of their study programme.





#### PROGRAMME EDUCATIONAL OBJECTIVE(S) (PEO)

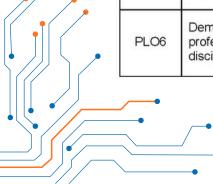
PEO 1	Graduates would have established themselves as practising professionals in software engineering or related areas. (Professionalism)
PEO 2	Graduates able to continuously pursue new knowledge to improve their competency and subsequently work in teams to contribute to the industry or academia in software engineering. (Ongoing Personal Development)
PEO 3	Graduates have contributed to sustainable development and the well-being of the society through professional skills and ethics in the discipline of software engineering. (Societal Engagement).

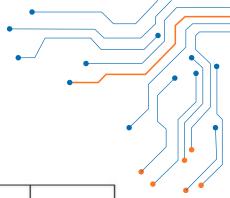
(Assessed after 3 - 5 years after students graduated)

#### PROGRAMME LEARNING OUTCOME(S) (PLO)

At the end of Master of Software Engineering (Software Technology) programme, graduates are able to:

No.	Programme Learning Outcome(s) (PLO)	MQF Cluster of Learning Outcomes	Taxonomy Category (K/P/A)*
PLO1	Master the advanced concepts and the latest theories in software engineering.	CLS1 (Knowledge and Understanding)	К
PLO2	Apply problem solving skills and software engineering knowledge to solve real-world problems.	CLS2 (Cognitive Skills)	К
PLO3	Analyse, design, develop and maintain software solutions by applying software engineering principles, standards, methods, techniques and tools with the aim to engineer quality software.	CLS3A (Practical Skills)	K, P
PLO4	Master the ability to apply mathematical skills in the software development life cycle.	CLS3B (Digital and Numeracy Skills)	K, P
PLO5	Communicate effectively, verbally and in writing, and able to work in team in carrying out software engineering projects	CLS3C (Interpersonal and Communication Skills)	P, A
PLO6	Demonstrate leadership that is consistent with professional code of ethics in software engineering discipline.	CLS3D (Leadership, Autonomy and Responsibility)	P, A



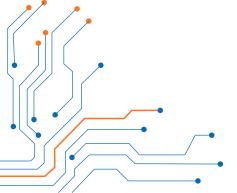


PLO7	Practice technical and societal innovation through software engineering technologies.	CLS4 (Personal and Entrepreneurial Skills)	K, A
PLO8	Demonstrate characters that are in line with professional code of ethics in software engineering discipline.	CLS5 (Ethics and Professionalism)	K, A

<sup>\*</sup>K - Cognitive; A - Affective; P - Psychomotor

#### MATRIX of MAPPING OF PLO to PEO.

PEO PLO	PEO1	PEO2	PEO3
PLO1	<b>√</b>		
PLO2	<b>√</b>		
PLO3		<b>V</b>	
PLO4		√	
PLO5	-11	√	
PLO6			√
PLO7	25 		<b>√</b>
PLO8	5,7		<b>V</b>





### Master of Software Engineering (Software Technology)

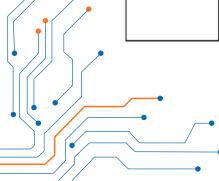
No	Requirement			
1.	Fulfil the minimum candidature duration of 4 semesters.			
2.	Fulfil the University language requirement (Bahasa Malaysia and English) not later than the second (2nd) semester of candidature.			
3.	Fulfil the residential requirement of 6 months.			
4.	Presentation Proposal Defence at the beginning of the research component registration. Present research progress in a Candidature Defence session as required by the Faculty.			

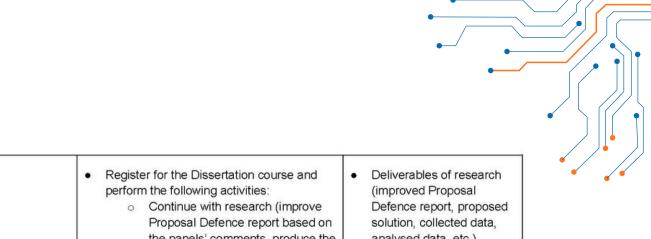


# GRADUATE ON TIME(GOT) SCHEDULE



Semester	Activities	Output/Milestone
1	<ul> <li>Attend Bahasa Melayu course (applicable to international candidates).</li> <li>Complete all core courses offered (including Research Methodology), and 1 or 2 elective courses offered in the current semester.</li> <li>Attend relevant workshops/research seminars (e.g., EndNote, Turnitin).</li> <li>Start thinking of research area for dissertation.</li> </ul>	Completed Bahasa Melayu course (applicable to international candidates). Completed all selected courses. Completed relevant workshops/research seminars. Some idea of research area for dissertation.
2	Complete all core courses offered, and 1 or 2 elective courses offered in the current semester.  Register for the Dissertation course and perform the following activities:  choose a research topic from a list collated by programme coordinator or propose own research topic to potential supervisor. The research topic must include Software  Engineering research element.  Appoint a supervisor for dissertation in the first semester the student registered for the Dissertation course. This is done by submitting the Appointment of Supervisor form (which includes a tentative dissertation topic/title agreed by the supervisor) to the faculty's Postgraduate Office by the stipulated deadline (which is usually no later than the 7th week of a semester).  Prepare for Proposal Defence (report and presentation).  Conduct Proposal Defence presentation.  Re-do Proposal Defence if failed.  Apply for ethics approval if the research involves human participants and/or animals.	Completed all selected courses. Potential research topic Supervisor appointment Completed Proposal Defence report. Presented and passed Proposal Defence. Obtained ethics approval (if applicable). Submitted progress report





- the panels' comments, produce the proposed solution, collect data/conduct experiment, analyse data, etc.).
- Prepare for Candidature Defence (report and presentation).
- Conduct Candidature Defence presentation.
- Re-do Candidature Defence if failed. Failing Candidature Defence twice will cause the student's candidature to be terminated.
- If pass Candidature Defence, prepare draft of dissertation.
- Submit progress report.

- analysed data, etc.).
- Completed Candidature Defence report.
- Presented and Passed Candidature Defence.
- Draft of the dissertation reviewed by supervisor.
- Submitted progress report.

- Register for Dissertation course and perform the following activities:
  - Finalize all chapters of dissertation.
  - Submit dissertation for examination.
  - Make correction based on examiners' feedback if applicable.
  - Submit final dissertation for Senate approval.
  - Submit progress report.

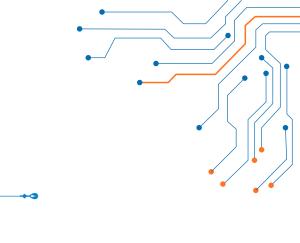
- Submitted dissertation for examination.
- outcome of Committee of Examiners' meeting.
- Submitted final dissertation.
- Received Senate approval letter.
- Submitted progress report.

5 (if applicable)

- Register for the Dissertation course and perform the following activities:
  - Outstanding activities from Semester 4
  - Submit progress report.
- See previous row.
- Submitted progress report.

#### Notes on Proposal Defence and Candidature Defence Panel:

- 1. The supervisor nominates a chairperson and 2 assessors who are experts in the field to serve in the panel. A fourth person may be appointed if necessary.
- The same panel should follow through with the Proposal and Candidature Defence.
- 3. It is strongly recommended that one of the assessors be appointed as the internal examiner.
- 4. The main responsibility of the panel is to advise the student in improving the research.

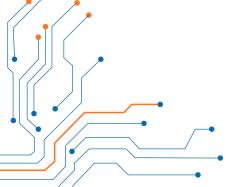


#### **INTAKE SEMESTER I 2025/2026**

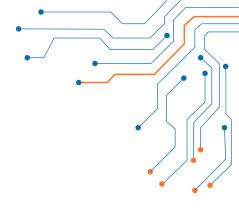
	SOFTWARE ENGINEERING TECHNOLOGY)	Credits	Sem I 2025/2026	Sem II 2025/2026	Sem I 2026/2027
Core Courses			-		
WOX7001*	Research Methodology	3	<b>√</b>		
WOC7004	Architecting Software Systems	3	<b>V</b>		
WOC7014	Framework Based Software Design and Development	3		1	
WOC7015	Software Verification and Validation	3	1		
WOC7016	Software Project Management	3		<b>V</b>	
WOC7024 (P1)**	Dissertation (P1)	9		√ <b>*</b> *	
WOC7024 (P2)	Dissertation (P2)	12			√ <b>*</b> *
Elective Cour	ses [Students are required to	choose an	y 2 courses fro	om the list be	ow]
WOA7015	Advanced Machine Learning	3	1		
WOA7017	Security Risk Analysis and Evaluation	3		1	
WOC7017	Big Data Processing	3		<b>V</b>	
WOC7018	Requirements Engineering	3	1		
WOC7019	User Experience Design Studio	3		<b>V</b>	
WOC7020	Advanced Internet of Things	3	<b>V</b>		

<sup>\*</sup> Students are required to register for the Research Methodology course in their first semester

Note: The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.



<sup>\*\*</sup> Students are only allowed to register for a Dissertation after completing six (6) credits of coursework and have taken or taking WOX7001 Research Methodology.

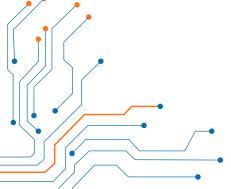


#### **INTAKE SEMESTER II 2025/2026**

	SOFTWARE ENGINEERING TECHNOLOGY)	Credits	Sem II 2025/2026	Sem I 2026/2027	Sem II 2026/2027
Core Courses					
WOX7001*	Research Methodology	3	√		
WOC7004	Architecting Software Systems	3		√	
WOC7014	Framework Based Software Design and Development	3	<b>V</b>		
WOC7015	Software Verification and Validation	3		√	
WOC7016	Software Project Management	3	√		
WOC7024 (P1)**	Dissertation (P1)	9		√**	
WOC7024 (P2)	Dissertation (P2)	12			√**
Elective Cour	ses [Students are required to	choose an	y 2 courses fro	om the list be	low]
WOA7015	Advanced Machine Learning	3		√	
WOA7017	Security Risk Analysis and Evaluation	3	√		
WOC7017	Big Data Processing	3	√		
WOC7018	Requirements Engineering	3		<b>√</b>	
WOC7019	User Experience Design Studio	3	<b>√</b>		
WOC7020	Advanced Internet of Things	3		√	

<sup>\*</sup> Students are required to register for the Research Methodology course in their first semester

Note: The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.



<sup>\*\*</sup> Students are only allowed to register for a Dissertation after completing six (6) credits of coursework and have taken or taking WOX7001 Research Methodology.

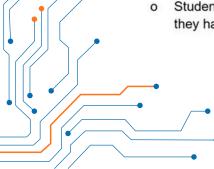
# IMPORTANT NOTES ON MASTER OF SOFTWARE ENGINEERING (SOFTWARE TECHNOLOGY) RESEARCH METHODOLOGY COURSE AND DISSERTATION COURSE

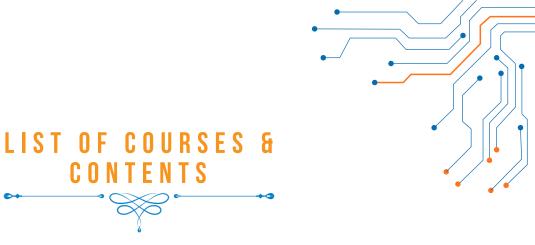
#### \* Research Methodology course (WOX7001):

• Students are required to register for the Research Methodology course in their first semester.

# \*\* Dissertation course (WOC7024 for intake Sem 1 2023/2024 onwards; WOC7021 for intake 2021/2022 and 2022/2023):

- Registration of Dissertation course
  - Students can only start to register to take the Dissertation course if they have fulfilled the following pre-requisite of the Dissertation course:
    - Have passed any two courses (6 credits) (excluding language courses).
    - Have taken or taking WOX7001 Research Methodology.
  - o After registering to take the Dissertation course for the first time, a student has to register for the Dissertation course in every subsequent semester as long as he/she has not submitted the final dissertation for Senate approval, or he has not obtained approval from the faculty for withdrawing from the programme for that semester.
- Appointment of Dissertation Supervisor
  - Students must appoint supervisor for their dissertations in the first semester they register for the Dissertation course.
  - o The Appointment of Supervisor form (which includes a tentative dissertation topic/title agreed by the supervisor) should be submitted to the faculty's Postgraduate Office by the stipulated deadline (which is usually no later than the 7th week of a semester).
  - A student must get the respective supervisor's approval and signature before submitting the Appointment of Supervisor form to the faculty's Postgraduate Office.
  - If a student has registered for the Dissertation course but has not appointed a supervisor for his/her dissertation, the student will not be able to submit his/her Progress Report for Dissertation. See next paragraph.
- Submission of Progress Report for Dissertation
  - o If a student has registered to take the Dissertation course in a particular semester, he/she has to submit the Progress Report for Dissertation for that semester via the Maya system.
  - o The deadline to submit the Progress Report is different in each semester and will be announced by the university/faculty. The students are responsible for monitoring their email accounts to check the email regarding the deadline and have to submit their Progress Report before the deadline.
  - Students who did not submit the Progress Report by the deadline will obtain "Unsatisfactory" for their Dissertation for that semester. This will affect renewal of viva for international students.
- Submission of Dissertation for Examination
  - Students cannot submit their dissertations for examinations if their CGPA is below 3.0 or if they have not completed Part 1 (Coursework).





#### **CORE COURSES**

Code	Course	Credits
WOX7001	Research Methodology	3
WOC7004	Architecting Software Systems	3
WOC7014	Framework Based Software Design and Development	3
WOC7015	Software Verification and Validation	3
WOC7016	Software Project Management	3
WOC7024 (P1)	Dissertation (P1)	9
WOC7024 (P2)	Dissertation (P2)	12

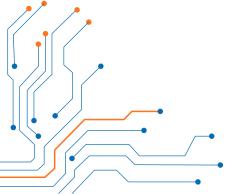
#### **ELECTIVE COURSES**

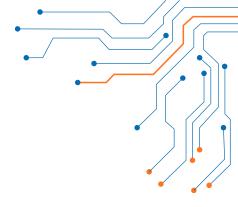
(Note: Students are required to choose any two (2) courses from the list below)

Code	Course	Credits
WOC7017	Big Data Processing	3
WOC7018	Requirements Engineering	3
WOC7019	User Experience Design Studio	3
WOC7020	Advanced Internet of Things	3
WOA7015	Advanced Machine Learning	3
WOA7017	Security Risk Analysis and Evaluation	3

The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.

Please read the "Important Notes on Master of Software Engineering (Software Technology) Research Methodology course and Dissertation course".





#### WOX7001 Research Methodology

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Describe appropriate methodologies used in computer science and information technology research.
- 2. Devise a plan to be carried out within a feasible duration for answering research problems and questions identified.
- 3. Demonstrate attitude and character in line with professional and ethical codes in computer science and information technology research.

#### **Synopsis of Course Content**

This course gives on overview of the dimensions of research in computer science and information technology. Major considerations and tasks in conducting research in the areas such as review of literature, identify problem statement, formulate research questions and objectives, select an appropriate approach or method to the research, plan and manage the research, tools for research, data analysis, and writing and presentation strategies, will be discussed too.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

#### WOC7004 Architecting Software Systems

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Apply different types of architectural styles/patterns in developing software systems.
- Design software architecture.
- 3. Evaluate software architecture in a team

#### Synopsis of Course Content

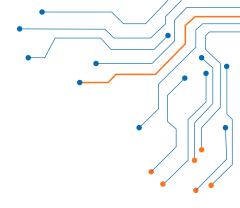
This course covers advanced architecture design of software systems. It reviews the different architectural structures and views, quality attributes, tactics to achieve quality attributes and common architectural styles/patterns (such as layered, broker, client-server, peer-to-peer, service-oriented architecture, and so on). It covers documenting software architecture.

This course also covers methods to design software architecture (e.g. Attribute-Driven Design method) and evaluate software architecture (e.g. ATAM analysis method). It also covers architecting software product lines, architecting in the Cloud, and supporting tool.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%





#### WOC7014 Framework-Based Software Design and Development

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Identify the basic principles of framework-based software design and development.
- 2. Design a framework-based software system.
- Construct a framework-based innovative software project using associated programming language.

#### **Synopsis of Course Content**

This course introduces the design and development of software using framework. It includes specification, implementation and configuration of an innovative software according to a specific framework. Students will learn the framework's programming language as well as the facilities provided by the framework.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WOC7015 Software Verification and Validation

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Discuss the concepts, principles, and techniques of software verification and validation.
- 2. Design test through appropriate evaluation of chosen techniques from requirements and specifications, design artefacts, or the source code.
- 3. Calculate small program code behaviours for checking valid path
- Analyse software system behaviours statically through model checking and probabilistic properties of program codes

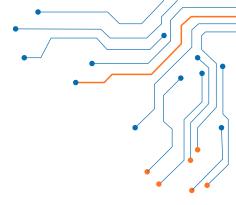
#### **Synopsis of Course Content**

This course introduces the students the concepts, principles, techniques, and tools of software verification and validation within modern software development together with its formal techniques. The course covers from test design and test plan in test driven development of agile to conduct tests using tools. The course also exposes the students the formal approach of static analysis and model checking in verifying uncertainty in software design models and requirements.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%





#### WOC7016 Software Project Management

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Write a software project management plan by addressing the issues of scope, time, cost, resource and quality.
- Manage a software project by demonstrating knowledge of project management techniques and skills.
- 3. Demonstrate attitude and character in line with professional ethics by working on a team project as a project manager or active team member.

#### Synopsis of Course Content

This course provides an overview of project management principles, techniques and skills. This course covers topics to understand the genesis of project, program, and portfolio management and their importance to software projects. In particular, the main tasks involved in initiating, planning, executing, monitoring and controlling, and closing software projects. The topics also include the knowledge areas that can be applied to manage project integration, scope, time, cost, quality, human resource, communications, risk and procurement.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WOC7024 Dissertation

#### Course Pre-requisite(s)/Minimum Requirement(s)

- · Have passed any two courses
- Have taken or taking WOX7001 Research Methodology

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Report the literature review related to the proposed research project in the approved area.
- 2. Implement a detailed research project based on the proposed research.
- 3. Produce a dissertation of the research project.

#### Synopsis of Course Content

The dissertation is concerned with the guidance rendered by the supervisor to the student on the proper way of conducting a software engineering, computer science or information technology research project, which could be in the form of face-to-face discussion, presentation, demonstration and communication. The dissertation also covers the identification of problem statements, understanding and formulation of the research objectives and research methodology to perform the research project.

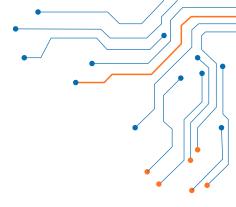
#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

\*Students have to pass candidature seminars (proposal defence and candidature defence) before submittiing dissertation for examination. Results of candidature seminars will be emailed to the students by the faculty.

\*Dissertation will be examined by examiners. Final results will be decided by the committee of examiners.





#### WOC7017 Big Data Processing

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain the concepts of big data technologies
- 2. Apply parallel processing techniques for processing big data.
- Evaluate the suitability of different processing techniques for big data processing

#### Synopsis of Course Content

It becomes more and more difficult to handle the growing amount of data with traditional data processing methods. There are many parallel processing frameworks and systems have been introduced such as MapReduce, Hadoop, Pig, Hive, Spark and Twister. Many of these frameworks and systems can handle different kinds of big data problems. This course will review and analyse various processing systems, architectures, frameworks, programming languages and programming models and their capabilities for large-scale data. This course will also analyze the advantages and disadvantages of these processing paradigms within the scope of the big data.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WOC7018 Requirements Engineering

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Describe current techniques used in core activities in software requirements engineering.
- Use suitable techniques and tools to develop software requirements specification to fulfill user requirements.
- 3. Evaluate relevant research issues in improving requirements engineering process.

#### Synopsis of Course Content

This course covers core activities in requirements engineering process such as requirements elicitation, validation, management and negotiation and techniques, tools and methods for supporting those activities. It also discusses and explores relevant research issues in areas such as requirements prioritization, impact analysis, process change management and requirements traceability.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%



#### WOC7019 User Experience Design Studio

#### Course Learning Outcomes

At the end of the course, students are able to:

- 1. Apply the principles, models and techniques emphasizing the design of user experience (UX) in Human Computer Interactive systems.
- 2. Develop an Interactive Human Computer system that takes into consideration universal accessibility through Agile and LeanUX.
- Evaluate the usability of the interactive Human Computer system which includes ethical, societal and cultural factors.

#### **Synopsis of Course Content**

This course covers advanced topics related to the human cognition, psychology, software engineering formal methods principles, models and techniques to represent user and interactive environment. Development projects uses Agile and LeanUX methodology taking into consideration universal accessibility for different range of users such as novice to experts, children to elderly, normal to people with disabilities.

Design and implementation of projects include web UX, mobile UX and other intelligent systems. Design and implementation concepts go beyond user interfaces to include sensors, controls, autonomous vehicles, ubiquitous computing in the context of Internet of Things (IoT), social data analytics and visualization. Interactive input may involve gestures, voice, eye movement and facial expression.

Evaluation of the implemented Human Interactive system uses techniques such as expert review, heuristics, usability testing, acceptance test, survey, active observation or control environment. Factors that influence UX evaluation are related to ethical, societal and cultural as well as usability goals.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

#### WOC7020 Advanced Internet of Things

#### **Learning Outcomes**

At the end of this course, the students are able to

- 1. Explain the architecture and key technologies of internet of things.
- 2. Identify the challenges in the implementation of internet of things.
- 3. Solve problems related to internet of things in wireless communications.

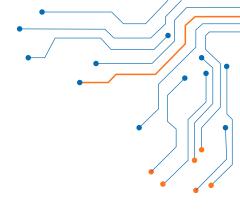
#### Synopsis of Course Content

This course is designed to introduce to students the emerging issues related to internet of things. This course will examine several aspects of internet of things such as application areas related to internet of things technologies, real-time models, local sensors, network components and application-level components. This course also emphasises on solving problems related to wireless communications in developing and deploying internet of things.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%





#### WOA7015 Advanced Machine Learning

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Practice concepts and techniques for machine learning related to digital and numerical methods.
- 2. Report the solution to machine learning problems by devising and listing the steps in machine learning applied to solve different types of problems
- 3. Demonstrate skills and knowledge on machine learning by managing a machine learning project

#### **Synopsis of Course Content**

This course introduces advanced concepts and techniques for machine learning. It covers topics such as linear and logistic regression, decision tree, neural network, and support vector machines as well as reinforcement learning.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

#### WOA7017 Security Risk Analysis and Evaluation

#### Course Learning Outcomes

At the end of the course, students are able to:

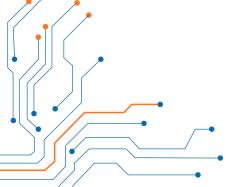
- 1. Explain the concepts of security risk assessment.
- 2. Apply suitable security risk assessment methods.
- 3. Evaluate a particular security risk assessment method.

#### **Synopsis of Course Content**

This course introduces the concepts and techniques used in security risk analysis and evaluation. It includes a comprehensive explanation of the six basic phases of security risk assessment, i.e. project definition, project preparation, data gathering, risk analysis, risk mitigation, and risk reporting and resolution. The course also explains several risk assessment methods and describes techniques to measure the effectiveness of a particular method.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%







### PROGRAMME REQUIREMENTS



### Programme Type

The type of programme offered for the Master in Data Science is a programme consisting of 10 coursework which prepares students for the final capstone project which allows students to apply the knowledge they learned in the taught courses into real world applications.

### 2. Admission

- (a) Qualifications for Admission
  - A Bachelor's degree with Honours in Science stream with a minimum CGPA of 3.30 or equivalent;

### OR

- (ii) A Bachelor's degree with Honours or equivalent in non-Science stream with a minimum CGPA of 3.50 with work experience in related fields for at least three (3) years in:
  - 1. Business and Economics
  - Statistics & Mathematics
  - 3. Accounting & Finance

and meet at least one (1) of the following criteria:

- a. Is a graduate of Universiti Malaya
- b. Has at least one (1) year of work experience in a related field
- c. Has produced publications in a related field
- d. Scholarship recipient
- e. Is an employee of a government agency
- f. Passes the Faculty interview; or
- g. Passes the special assessment by the Faculty

### OR

- (iii) Other qualifications approved by the University Senate.
- (b) English Language Proficiency

International candidates are required to:

(i) At least IELTS Band 6 (Academic) or TOEFL score of 550 (paper based) / 213 (computer based) / 80 (Internet based) / PTE Academic with minimum score 57 / minimum a grade of C for the English subject in the General Certificate of Education (A-level) or Cambridge English: First (FCE) or Cambridge English: Advance (ACE) or Cambridge English: Proficiency (CPE), if their first degree is from a university where English is not the medium of instruction.

### 3. Duration of Study

The programme of study: two (2) semesters + one (1) special semester, to eight (8) semesters.

### 4. Programme Structure

(a) The Master in Data Science Programme through coursework shall have a total of fortytwo (42) credits.

- (b) The programme shall consist of two parts:
  - (i) Part I consists of:
    - six (6) core discipline courses, comprise of three or four credits courses; and
    - three (3) elective courses, each four credits
  - (ii) Part II consists of a ten (10) credits project and shall involve investigation and analysis of a real world case study, leading to the submission of a report.
- (c) Details of courses offered shall be of those approved by the Senate from time to time on the recommendation of the Faculty and shall be made known to the candidates at the start of each session.
- (d) The list of Senate approved courses for the Master in Data Science Programme shall be as indicated in List 1.

## PROGRAMME OBJECTIVES & OUTCOMES



### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Data Scientists who are knowledgeable and able to extract meaningful insights to help organizations cope with challenges and arising issues.
- 2. Data Scientist who possesses interpersonal skills in delivering effective data science solutions for industry or other stakeholders.
- 3. Data Scientist who engages and advocates lifelong learning activities with an entrepreneurial mindset for a successful career
- 4. Data Scientist who can lead and contribute to data science teams in public or private organizations with a full sense of responsibility and good ethics

### PROGRAMME LEARNING OUTCOMES (PLO)

No.	Programme Learning Outcomes	PLOs	Taxonomic Category
1.	Master the important concepts and theories in the field of data science that can be utilized in relevant domains.	PLO1	К
2.	Recommend innovative solutions for problems in data science and scientific computing	PLO2	K
3.	Construct data science solutions and tools in terms of efficiency and effectiveness.	PLO3	Р
4.	Interact with various stakeholders clearly and confidently, to successfully implement group projects or system development efficiently and effectively	PLO4	Р
5.	Communicate effectively with diverse audiences by publishing and presenting data science solutions in the established academic or industrial platform	PLO5	Р
6.	Utilise digital skills to acquire, interpret, and extend knowledge in data science.	PLO6	Р
7.	Apply data analytic skills to acquire, interpret, and extend knowledge in data science	PLO7	P
8.	Demonstrate leadership, teamwork and responsibility in delivering data science solutions	PLO8	Α
9.	Exhibit skills and capabilities to extend relevant knowledge in data science through life-long learning	PLO9	А
10.	Demonstrate ability to adopt an entrepreneurial mindset in the data science discipline	PLO10	А
11.	Practice the philosophy, principles, and high ethical values in professional practices related to data science	PLO11	Α

(List of 11 domains of learning outcomes in accordance with the MQF program.)

### MATRIX OF MAPPING PLO TO PEO

PEO PLO	PEO1	PEO2	PEO3	PEO4
PLO1	X			
PLO2	Х			
PLO3	х			
PLO4		х		
PLO5		х		
PLO6	х			
PLO7				Х
PLO8		х		
PLO9			х	
PLO10			х	
PLO11				Х

### Reference notes:

The Domain of the MQF in Programme Learning Outcomes program (PLO)

РО	Domain
PLO1	Knowledge and Understanding
PLO2	Cognitive Skills
PLO3	Practical Skills
PLO4	Interpersonal Skills
PLO5	Communication Skills
PLO6	Digital Skills
PLO7	Numeracy Skills
PLO8	Leadership
PLO9	Personal Skills
PLO10	Entrepreneurial Skills
PLO11	Ethics and Professionalism

### Reference notes:

### **Taxonomic Category**

K CognitiveA AffectiveP Psychomotor



### INTAKE SEMESTER I 2025/2026

MASTER IN	DATA SCIENCE	Credits	Semester I 2025/2026	Semester II 2025/2026	Semester III 2025/2026			
Core Courses								
WOX7001	Research Methodology	3	<b>V</b>					
WQD7001	Principles of Data Science	3	<b>V</b>					
WQD7003	Data Analytics	3	V					
WQD7004	Programming for Data Science	4	<b>√</b>					
WQD7007	Big Data Management	3		<b>V</b>				
WQD7012	Applied Machine Learning	4		<b>V</b>				
WQD7025	**Data Science Research Project	10		<b>V</b>	<b>V</b>			
Elective Co	urses [Students are re	equired to cl	noose any 3 co	urses from the li	st below]			
WQD7005	Data Mining	4		<b>V</b>				
WQD7008	Parallel and Distributed Computing	4	1					
WQD7009	Big Data Applications & Analytics	4	V	20				
WQD7010	Network and Security	4	1	<b>V</b>				
WQD7013	Statistics for Data Science	4		<b>V</b>				
WQF7007	Natural Language Processing	4		V				

### Note:

\*\*Students are only allowed to register for WQD7025 Data Science Research Project after completing at least three (3) core discipline courses (including WOX7001).

For Data Science Research Project (P1 and P2) must complete the project in consecutive semesters.

#### Example:

- P1 in Semester II and P2 in Special Semester
- P1 in Special Semester and P2 in Semester I
- P1 in Semester I and P2 in Semester II

### **INTAKE SEMESTER II 2025/2026**

MASTER IN	DATA SCIENCE	Credits	Semester II 2025/2026	Semester III 2025/2026	Semester I 2026/2027		
Core Courses							
WOX7001	Research Methodology	3	<b>√</b>				
WQD7001	Principles of Data Science	3	1				
WQD7003	Data Analytics	3	<b>V</b>				
WQD7004	Programming for Data Science	4	1				
WQD7007	Big Data Management	3			√		
WQD7012	Applied Machine Learning	4			<b>V</b>		
WQD7025	**Data Science Research Project	10		√	√		
Elective Cou	ırses [Students are requir	ed to choo	se any 3 cours	es from the list	below]		
WQD7005	Data Mining	4	<b>√</b>		-		
WQD7008	Parallel and Distributed Computing	4			<b>V</b>		
WQD7009	Big Data Applications & Analytics	4			√		
WQD7010	Network and Security	4	√				
WQD7013	Statistics for Data Science	4	1				
WQF7007	Natural Language Processing	4	<b>V</b>				

### Note:

\*\*Students are only allowed to register for WQD7025 Data Science Research Project after completing at least three (3) core discipline courses (including WOX7001).

For Data Science Research Project (P1 and P2) must complete the project in consecutive semesters.

### Example:

- P1 in Special Semester and P2 in Semester I
- P1 in Semester II and P2 in Special Semester
- P1 in Semester I and P2 in Semester II

## LIST OF COURSES & CONTENTS



### **CORE COURSES**

Code	Course	Credits
WOX7001	Research Methodology	3
WQD7001	Principles of Data Science	3
WQD7003	Data Analytics	3
WQD7004	Programming for Data Science	4
WQD7007	Big Data Management	3
WQD7012	Applied Machine Learning	4
**WQD7025	Data Science Research Project	10

### **ELECTIVE COURSES**

(NOTE: Students are required to choose any three (3) courses from the list below)

Code	Course	Credits
WQD7005	Data Mining	4
WQD7008	Parallel and Distributed Computing	4
WQD7009	Big Data Applications & Analytics	4
WQD7010	Network and Security	4
WQD7013	Statistics for Data Science	4
WQF7007	Natural Language Processing	4

### Note:

<sup>\*\*</sup> Students are only allowed to register for WQD7025 Data Science Research Project after completing at least three (3) core discipline courses (including WOX7001).

### WOX7001 Research Methodology

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Analyze the problem solving skills and computer science knowledge to solve real-world problems using the correct research methodology.
- 2. Plan effective communication, verbally and in writing, and be able to work in a team and demonstrate leadership skills in carrying out computer science related projects.
- 3. Show an attitude and character in line with professional and ethical codes in computer science.

### **Synopsis of Course Content**

This course gives an overview of the dimensions of research in computer science and information technology. Major considerations and tasks in conducting research in the areas such as review of literature, identify problem statements, formulate research questions and objectives, select an appropriate approach or method to the research, plan and manage the research, tools for research, data analysis, and writing and presentation strategies, will be discussed too.

### **Evaluation and Weightage**

Continuous Assessment : 100%

### WQD7001 Principles of Data Science

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Use data-driven solutions for domain specific related issues.
- Organize the steps that data scientists follow chronologically in a typical data science project.
- 3. Develop a data product using open source tools.

### Synopsis of Course Content

The course provides a breadth of knowledge, in terms of the what, when, who, where, why and how (5W 1H) in the field of data science. This foundation course is designed to help students discover useful insights from data of various domains. It incorporates the fundamental principles that underlie the algorithms, processes, methods, ethics, and data-analytic thinking in a data science life cycle. The role of data scientist, the knowledge and skills required is also presented. Diverse technologies, programming languages as well as tools in data science are discussed. Students will acquire practical knowledge through hands-on projects to come up with data science solutions and develop data products.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

### WQD7003 Data Analytics

### Course Learning Outcomes

At the end of the course, students are able to:

- 1. Explain the basic concepts for various data analysis techniques
- Determine appropriate data analysis techniques to effectively generate useful information from data
- 3. Design appropriate data analytics processes to solve real-world problems.

### **Synopsis of Course Content**

This course aims to develop students' ability to describe, explore and analyze data using suitable data analytics techniques.

### Evaluation and Weightage

Continuous Assessment : 60% Final Examination : 40%

### WQD7004 Programming for Data Science

### **Course Learning Outcomes**

At the end of this course, the students are able to:

- 1. Solve problems in data science using various data structures and programming concepts.
- 2. Mastering the program libraries and algorithms related to data science.
- 3. Relate studies in the field of data science with the construction of appropriate applications.

### Synopsis of Course Content

This course covers programming languages that are relevant to data science. The course provides students with the necessary programming skills for statistical analysis, exploration of datasets and predictions. These include understanding structures for data organization such as vector, list, matrix, and data frames; basic programming blocks such as operators, control structures, and subsetting; using various libraries for data visualization; run prediction models using various models; and other algorithms.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQD7007 Big Data Management

### **Course Learning Outcomes**

At the end of this course, the students are able to:

- Mastering the processes in the data pipeline.
- 2. Explain database concepts and technologies for big data storage and retrieval.
- 3. Identify appropriate models, tools, and technologies to implement storage, search and retrieval systems for large-scale structured and unstructured information systems.

### Synopsis of Course Content

This course prepares students to deal with large-scale collections of data as objects to be stored, searched over, selected, and transformed for use and reuse. It examines the underlying principles and technologies used to capture data, clean it, contextualize it, store it, and access it for a repurposed use. Data provenance is also examined to determine the trustworthiness of data.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

Course Prerequisite: WQD7001

### WQD7012 Applied Machine Learning

### **Course Learning Outcomes**

At the end of this course, students are able to:

- 1. Explain the concepts and techniques for machine learning.
- 2. Fine tune appropriate machine learning techniques for various datasets.
- 3. Suggest practical solutions to common problems in machine learning.

### Synopsis of Course Content

This course introduces fundamental concepts and techniques for machine learning. It covers topics for both supervised and unsupervised learning approaches such as linear and logistic regression, neural network, decision trees and clustering etc.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

Course Prerequisite: WQD7003

### WQD7025 Data Science Research Project

### **Course Learning Outcomes**

At the end of the course, the student are able to:

- 1. Develop the data science research project in a form of report and presentation
- 2. Prepare the data science research project plan and its results in an organized manner.
- 3. Fine tune data science techniques to solve data science problems in the real world environment.

### **Synopsis of Course Content**

The capstone project allows students to use public data or create data products by applying their knowledge in foundations, theory and methods of data science to address problems in industry and government. During the project, students engage in the entire process of solving a real-world data science project, from collecting and processing data ,to designing the best method to solve identified problems, to applying suitable analytic methods, and finally, to implementing a solution.

### **Evaluation and Weightage**

Continuous Assessment : 100%

Course prerequisite: At least passed 6 credits and accumulated from core courses, including WOX7001

### WQD7005 Data Mining

### **Course Learning Outcomes**

At the end of this course, students are able to

- 1. Mastering the concepts and techniques of data mining.
- 2. Develop the appropriate solution for classification, association rules and clustering problems.
- 3. Design practical solutions to streaming data.

### Synopsis of Course Content

This course covers topics such as Data Warehouse, Pre-mining, Classification, Association Rules and Clustering Algorithms. It explains how to find patterns in a database and emphasises on hands-on experience of data mining tools.

### **Evaluation and Weightage**

Continuous Assessment : 50%

Final Examination : 50%

### WQD7008 Parallel and Distributed Computing

### **Course Learning Outcomes**

At the end of this course, the students are able to:

- 1. Analyse and appraise the basic principles and paradigms of parallel and distributed computing.
- 2. Solve issues and problems in the implementation of parallel and distributed systems.
- 3. Integrate parallel and distributed system.

### Synopsis of Course Content

This course focuses on the design and implementation of parallel and distributed processing systems. This course covers the fundamental concepts of distributed computing and introduces contemporary issues in big-data processing. This course emphasizes both the underlying principles and hands-on experience of data analytic tools.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQD7009 Big Data Applications and Analytics

### **Course Learning Outcomes**

At the end of this course, students are able to:

- Mastering the conceptual frameworks to identify the potential applications of big data in real-world scenarios.
- 2. Design and implement data pipelines to process and integrate data from various sources.
- 3. Explain the significance of big data in contemporary industry and technology.

### **Synopsis of Course Content**

The course will cover Big data applications and analytics, Data Collection, Sampling and Preprocessing, Predictive Analysis, Descriptive analysis, Survival analysis, Social networks analysis, and Case study of Big data Applications.

### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

### WQD7010 Network and Security

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Interpret the basic principles of cryptography, its framework and its application in network security.
- Mastering the new trend in network security, its application, and techniques to solve the network security problem.
- Identify the problems in cryptography and explain the network security protocol.

### Synopsis of Course Content

This course is designed to provide a practical survey of network security applications and standards. The emphasis on applications that are widely used on the internet and for corporate networks, and on standards, especially internet standards that have been widely deployed.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQD7013 Statistics for Data Science

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain statistical concepts in solving problems in the field of data science
- 2. Mastering descriptive statistics and inferential statistics in the field of data science
- Solving data science problems by applying statistical concepts learned using statistics-based software or programming

### Synopsis of Course Content

The course will provide an opportunity for in-depth study of statistics techniques that are useful in data science. Topics relevant to the course include probability distribution, inference and bayesian statistics.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

### WQF7007 Natural Language Processing

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Apply the Natural Language Processing (NLP) techniques in various domains.
- Design a Natural Language Processing (NLP) solution to resolve issues related to unstructured text.
- 3. Develop an NLP application by integrating all processes in the NLP pipeline which are pre-processing, low level task and high level task.

### **Synopsis of Course Content**

Natural language processing (NLP) is one of the most important areas in Artificial Intelligence (AI). This course covers the theory and practice of NLP through techniques for different levels which are pre-processing, low-level and high level. It also covers recent techniques and applications in NLP including Sentiment Analysis, Machine Translation, Topic Modeling and Named Entity Recognition.

### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%



# MASTER OF CYBER SECURITY

### PROGRAMME REQUIREMENTS





### 1. Programme Type

The type of programme offered for the Master of Cyber Security is a programme consisting 10 coursework which prepares students for the final capstone project which allows students to apply the knowledge they learned in the taught courses into real world applications.

### 2. Admission

- (a) Qualifications for Admission
  - (i) Bachelor's degree with a GPA of not less than 3.00 in the field of Computer Science/Information Technology/related fields;

OR

- (ii) Bachelor's Degree with GPA (2.70 2.99) in the field of Computer Science/Information Technology/related fields and meet at least one (1) of the following criteria:
  - · Graduated from the University of Malaya
  - Have at least one (1) year of work experience in a related field
  - · Produce publications in relevant fields
  - · Scholarship recipient
  - · is an employee of a government agency.
  - · Pass the Faculty interview; or
  - · passed the faculty's special assessment.

OR

(iii) Specialist qualification from a recognized professional body;

OR

(iv) Other qualifications approved by the Senate from time to time.





- (b) English Language Competency Requirements
  - (i) Non-citizen applicants who obtained their degree from a university or institution of higher learning that does not use English as the medium of instruction for the degree in question who wish to follow a degree program and/or to write their dissertation in English are required to meet the following requirements:
    - A minimum score of 550 for the paper-based test (PBT), a score of 213 for the computer-based test (CBT) or a score of 80 for the internet-based test (iBT) for the Test of English as a Foreign Language (TOEFL);
    - Minimum band 6.0 for the International English Language Testing System (IELTS) (Academic);
    - Scores according to the respective program standards if higher than (a) and (b);
    - For any program standard that places the TOEFL or IELTS (Academic) score lower than the University's minimum score, those programs must follow the minimum score that has been set by the University;
    - Minimum score of 57 Pearson Test of Academic English (PTE Academic);
    - Minimum grade C for English subject in General Certificate of Education (A-Level);
    - Minimum grade C in B2 First by Cambridge Assessment English.;
    - Minimum grade C in C1 Advanced by Cambridge Assessment English;
    - . Minimum grade C in C2 Proficiency by Cambridge Assessment English; or
    - Minimum band 4 in Malaysian University English Test (MUET).
  - (ii) Non-citizen applicants with the following backgrounds are exempt from the prescribed English language qualification requirements:
    - . Comes from a country where English is the national language;
    - Possess an academic credential from an institution where English is the sole medium of instruction; or
    - Have studied in Malaysia and intend to pursue further education, subject to condition (b).

### Duration of Study

The programme of study: two (2) semesters + one (1) special semester, to eight (8) semesters.

### 4. Programme Structure

- (1) The Master of Cyber Security Programme through coursework shall have a total of forty-three (43) credits.
- (2) Through Coursework
  - (i) The programme shall consist of two parts:
    - (a) Part I comprises:
      - eight (8) core discipline courses, comprise of three or four credits courses; and
      - (ii) two (2) elective courses, each four credits
    - (b) Candidates may be imposed to enrol in other courses and obtain satisfactory results deemed necessary by the Faculty.



- (c) Part II consist of a ten (10) credits project and shall involve investigation and analysis of a real world case study, leading to the submission of a report.
- (3) Details of courses offered shall be of those approved by the Senate from time to time on the recommendation of the Faculty and shall be made known to the candidates at the start of each session.
- (4) The list of Senate approved courses for the Master of Cyber Security Programme shall be as indicated in List 1.





## PROGRAMME OBJECTIVES & OUTCOMES



### PROGRAMME EDUCATION OBJECTIVES (PEO)

- 1. Graduates have advanced knowledge and practical skills, capable of using innovative techniques and digital technologies in the field of cyber security.
- 2. Graduates equipped with professional and ethical practices collaborate with organisations and communities in developing innovative strategies to address present cyber threats.
- 3. Graduates with a positive attitude, entrepreneurial mind set and sustainable practices progress toward lifelong learning for careers and professional development in cyber security.

### PROGRAMME LEARNING OUTCOMES

No.	Programme Learning Outcomes	POs	Taxonomic Category
1.	Critically analyse advanced knowledge and have capability to further develop related disciplines in the cyber security field.	PO1	К
2.	Evaluate emerging scenarios and innovatively solve relevant issues through mastery of knowledge, analytical and critical skills.	PO2	к
3.	Utilize various practical skills and digital technology methods of cyber security solutions to estimate, analyze, interpret and disseminate information	PO3	K,P
4.	Demonstrate abilities to communicate and work effectively with peers, professional bodies and various communities	PO4	K,P
5.	. Design innovative and effective solutions using digital technologies and scientific and numeric skills		P,A
6.	Equip with leadership qualities and interpersonal proficiency to demonstrate responsibility and autonomy in dynamic educational and organizational settings	PO6	P,A
7	Exhibit positive attitude and commitment to lifelong learning with entrepreneurial mind-set and professional development.	PLO7	K,A

Total hours of student learning time for the entire program is 43 credits.

(List of 7 domains of learning outcomes in accordance with the MQF program. Please refer to the attachment. Additional learning outcomes can be given if necessary)



## MATRIX OF PROGRAMME LEARNING OUTCOMES (PEO) AGAINST PROGRAMME EDUCATIONAL OBJECTIVE (PEO)

Programme Learning	Programme Educational Objectives (PEO)				
Outcomes (PLO)	PEO1	PEO2	PEO3		
PLO 1	Х				
PLO 2	Х				
PLO 3	Х	Ţ			
PLO 4		Х			
PLO 5	Х				
PLO 6		Х			
PLO 7			Х		
PLO 8			Х		



### Reference notes:

The Domain of the MQF in Programme Learning Outcomes program (PO)

### **PO Domain**

PO1 Knowledge

PO2 Practical Skills

PO3 Social Skills and Responsibility

PO4 Values, Attitudes and Professionalism

PO5 Communication, Leadership and Team Skills

PO6 Problem Solving and Scientific Skills

PO7 Information Management and Life Long Learning Skills

PO8 Managerial and Entrepreneurial Skills

### Reference notes:

**Taxonomic Category** 

- K Cognitive
- A Affective
- P Psychomotor

## COURSE PLAN



### INTAKE SEMESTER I 2025/2026

MASTER OF	CYBER SECURITY	Credits	Semester I 2025/2026	Semester II 2025/2026	Semester III 2025/2026		
Core Courses							
WOX7001	Research Methodology	3	<b>V</b>	31 3			
WQE7001	Cyber Security	3	4				
WQE7002	Advanced Network Security Programming	4	1				
WQE7007	Network Technology and Security	3	<b>V</b>	10			
WQE7003	Cryptography and Information Hiding	3		1			
WQE7004	Information Assurance	3		<b>√</b>			
WQE7005	Advanced Digital Forensics	3		<b>V</b>			
WOC7020	Advanced Internet of Thing	3		<b>V</b>			
WQE7006	Cyber Security Research Project	10		<b>V</b>	<b>V</b>		
WQE7023	Cyber Security Research Project	10		1	V		
Elective Cou below]	irses [Students are required to	choose an	y 2 courses f	rom the list			
WQE7008	Wireless Networking and Mobile Computing	4	1				
WQE7011	Advanced Computer Penetration and Defense	4	1	77			
WQE7009	Emerging Cyber Security Trends	4		<b>V</b>			
WQE7010	Cloud Computing	4		<b>V</b>			

#### Note

\*Students are only allowed to register for the WQE7006/WQE7023 (commencement of the 2023/2024 academic year) Cyber Security Research Project after completing at least three (3) core discipline courses (including WOX7001)

The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.



## COURSE PLAN



MASTER OF	CYBER SECURITY	Credits	Semester II 2025/2026	Semester III 2025/2026	Semester I 2026/2027
Core Course	es				
WOX7001	Research Methodology	3	<b>V</b>		
WQE7001	Cyber Security	3	. Italian		<b>√</b>
WQE7002	Advanced Network Security Programming	4	o 11		<b>V</b>
WQE7007	Network Technology and Security	3	3	1	<b>V</b>
WQE7003	Cryptography and Information Hiding	3	<b>√</b>		
WQE7004	Information Assurance	3	<b>V</b>		
WQE7005	Advanced Digital Forensics	3	1		
WOC7020	Advanced Internet of Thing	3	<b>V</b>		
WQE7006	Cyber Security Research Project	10		<b>V</b>	1
WQE7023	Cyber Security Research Project	10		1	1
Elective Cou below]	irses [Students are required to	choose ar	y 2 courses f	rom the list	
WQE7008	Wireless Networking and Mobile Computing	4			<b>V</b>
WQE7011	Advanced Computer Penetration and Defense	4	2 11		<b>V</b>
WQE7009	Emerging Cyber Security Trends	4	<b>V</b>		
WQE7010	Cloud Computing	4	<b>V</b>	1	



\*Students are only allowed to register for the WQE7006/WQE7023 (commencement of the 2023/2024 academic year) Cyber Security Research Project after completing at least three (3) core discipline courses (including WOX7001)

The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.

## LIST OF COURSES & CONTENTS



### **CORE COURSES**

Code	Course	Credits
WOX7001	Research Methodology	3
WQE7001	Cyber security	3
WQE7002	Advanced Network Security Programming	4
WQE7003	Cryptography and Information Hiding	3
WQE7004	Information Assurance	3
WQE7005	Advanced Digital Forensics	3
WQE7007	Network Technology and Security	3
WOC7020	Advanced Internet of Thing	3
WQE7023	Cyber Security Research Project	10

### **ELECTIVE COURSES**

(NOTE: Students are required to choose any two (2) courses from the list below)

Code	Course	Credits
WQE7008	Wireless Networking and Mobile Computing	4
WQE7009	Emerging Cyber Security Trends	4
WQE7010	Cloud Computing	4
WQE7011	Advanced Computer Penetration and Defense	4

### Note:

\*\* Students are only allowed to register for the WQE7023 Cyber Security Research Project after completing at least three (3) core discipline courses (Including WOX7001)



### WOX7001 Research Methodology

### **Course Learning Outcomes**

At the end of the course, students are able to:

- Describe appropriate methodologies used in computer science and information technology research.
- 2. Devise a plan to be carried out within a feasible duration for answering research problems and questions identified.
- 3. Demonstrate attitude and character in line with professional and ethical codes in computer science and information technology research.

### **Synopsis of Course Content**

This course gives on overview of the dimensions of research in computer science and information technology. Major considerations and tasks in conducting research in the areas such as review of literature, identify problem statement, formulate research questions and objectives, select an appropriate approach or method to the research, plan and manage the research, tools for research, data analysis, and writing and presentation strategies, will be discussed too.

### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

### WQE7001 Cyber Security

### **Course Learning Outcomes**

At the end of this course, students are able to:

- 1. Understand cybersecurity operations, network principles, roles, and responsibilities as well as the related technologies, tools, regulations, and frameworks available.
- 2. Integrate network monitoring tools to identify attacks against network protocols and services.
- 3. Apply knowledge and skills to monitor, detect, investigate, analyse, and respond to security incidents.

### Synopsis of Course Content

This course introduces the core security concepts and skills needed to monitor, detect, analyse, and respond to cybercrime, cyberespionage, insider threats, advanced persistent threats, regulatory requirements, and other cybersecurity issues facing organizations. It includes skills needed to practice cybersecurity operations knowledge in a controlled environment.

### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

### WQE7002 Advanced Network Security Programming

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Determine the network security methods that can defence against cyber-attacks.
- 2. Develop a secure network solution to mitigate the cyber threat.
- 3. Synthesize ne'twork in terms of the exposure to potential threats, vulnerability and security.

### Synopsis of Course Content

This course covers the networking and security challenges and the use of programming to defence against cyber-attacks and cyber threats. These include the procedures of network connection and endpoint protection. You will also learn how to assess a network's vulnerabilities and develop a secure network solution with the help of Python scripting.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

### WQE7003 Cryptography and Information Hiding

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain the principles and mechanism used in cryptography and information hiding.
- 2. Analyse the cryptographic and information hiding algorithms for their strengths and weaknesses.
- 3. Evaluate the practical applications of cryptographic and information hiding mechanisms.

### **Synopsis of Course Content**

This course consists of developing an understanding of cryptography, cryptanalysis, Symmetric and Asymmetric cryptographic algorithms (classic and modern algorithms), Introduction to Number Theory, Hash Functions, Message Authentication and Digital Signatures. This course also introduces the concepts and techniques used in information hiding which focuses mainly on watermarking and steganography. Topics includes spatial and transform domain embedding, media specific information hiding and attacks on watermarking and steganography.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQE7004 Information Assurance

### **Course Learning Outcomes**

At the end of this course, the students are able to:

- 1. Analyze the challenges and solutions in Information Assurance involving the triad of people, processes and technologies.
- Evaluate security solutions to meet security needs for a meaningful society in accordance with the principles in information security.
- Ideate security solutions based on current challenges and issues in the topic of information security.

### Synopsis of Course Content

This course covers and provides a practical view of security that involved the triad of people, policies and procedures and technology, which include: Information Assurance strategy, policy, concepts, Information Assurance planning, risk mitigation, Information Assurance detection and recovery process and application of Information Assurance in selected industries.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

### WQE7005 Advance Digital Forensics

### **Course Learning Outcomes**

At the end of the course, the students are able to:

- 1. Demonstrate the processes, methodologies, laws and regulations that have a significant relationship with the digital forensic domain.
- 2. Plan all stages of digital evidence procedures (e.g., collection, recovery, preservation, identification, analysis and presentation).
- 3. Relate the concept of digital forensics, anti-forensics, network and mobile forensics Find frequent item sets using FP-growth.

### **Synopsis of Course Content**

The student will learn and understand the concept of digital forensics, computer crimes and criminals, acts and laws that have a significant relationship with digital forensic studies; international and local. Students will learn the process of collecting, preserving, recovering and analysing digital evidence. In order to present them in a proper presentation for non-Information Technology practitioners, students will practice the procedure of presenting digital evidence and building a cybercrime case. They also will learn the digital forensic methodologies, anti-forensics and network forensics as well as mobile forensics.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQE7007 Network Technology and Security

### Course Learning Outcomes

At the end of the course, students are able to:

- 1. Identify the basic technologies that support the implementation of high-speed networks.
- 2. Plan, configure, verify and integrate the implementation of various LAN and WAN routing protocols, and security.
- 3. Identify and solve the issues in the implementation of network and security aspects.

### **Synopsis of Course Content**

The course will provide knowledge and practical view of network technology. It includes technologies and advanced issues in IPv4 and IPv6, routing protocols, router, switches, network monitoring, high-speed networks and security in devices and routing.

### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

### WQE 7008 Wireless Networking and Mobile Computing

### **Course Learning Outcomes**

At the end of this course, students are able to

- 1. Explain the architecture and key technologies of Wireless Networks and Mobile Computing.
- 2. Identify the challenges in the implementation of Wireless Networks and Mobile Computing.
- 3. Solve problems related to Wireless Networks and Mobile Computing communications.

### Synopsis of Course Content

This course is designed to introduce to students the emerging issues related to Wireless Networks and Mobile Computing. This course will examine several aspects of Wireless Networks and Mobile Computing such as application areas related to Wireless Networks technologies, wireless network components and application-level in Wireless Networks and Mobile Computing. This course also emphasises on solving problems related to Wireless Networks and Mobile Computing communications.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQE7009 Emerging Cyber Security Trends

### Course Learning Outcomes

At the end of this course, students are able to:

- 1. Identify the emerging trends in cybersecurity issues, attacks, threats and risks.
- 2. Analyse the emerging approaches in mitigating and defending networks from the cyber-attacks.
- Apply the suitable approaches in analysing and synthesizing the emerging cyber-attacks and threats.

#### Synopsis of Course Content

This course covers the understanding of the emerging issues, attacks, threats and risk in cyber security. The topic is not limited to the existing issues, but also covers the possible issues in the near future. This include to analyse and understand how the latest technologies can be used to mitigate and defense the network from the cyber-attacks. This course extends the coverage by applying the suitable approaches in analysing and synthesizing the latest cyber-attacks and threats.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

### WQE7010 Cloud Computing

### Course Learning Outcomes

At the end of the course, students are able to:

- 1. Recognize the architecture and various basic concepts related to cloud computing technologies.
- 2. Demonstrate cloud virtualization, cloud storage, data management and data visualization.
- 3. Design cloud computing security using access control strategies.

### **Synopsis of Course Content**

This course covers topics and technologies related to cloud computing various basic concepts and architecture models (such as laaS, PaaS, SaaS). It also discusses the important features of cloud computing such as cloud virtualization, cloud storage, clustering, data management and data



visualization. The theoretical knowledge and practical sessions will be applied to design cloud computing security using access control strategies.

### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

### WQE7011 Advanced Computer Penetration and Defense

### **Course Learning Outcomes**

At the end of this course, the students are able to:

- 1. Identify the principles and techniques to hack and defend computer systems.
- 2. Apply the concepts and techniques to hack and defend computer systems.
- 3. Analyze the weaknesses in computer systems and their countermeasures.

### Synopsis of Course Content

This course introduces the concepts and techniques used to hack and defend computer systems with a focus on ethical hacking. The contents of this course cover aspects of hacking such as network scanning, exploitation of vulnerabilities, gaining access to systems, and penetration testing.

### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

### WOC7020 Advanced Internet of Things

### **Course Learning Outcomes**

At the end of this course, students are able to:

- 1. Explain the architecture and key technologies of internet of things.
- 2. Identify the challenges in the implementation of internet of things.
- 3. Solve problems related to internet of things in wireless communications.

### **Synopsis of Course Content**

This course is designed to introduce to students the emerging issues related to internet of things. This course will examine several aspects of internet of things such as application areas related to internet of things technologies, real-time models, local sensors, network components and application-level components. This course also emphasises on solving problems related to wireless communications in developing and deploying internet of things.

### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

### WQE7023 Cyber Security Research Project

### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Apply cyber security techniques to solve cyber security problems in real world environment
- 2. Present the project plan and results professionally
- 3. Write a project report





A research project is a medium-scale project to enable students to do research related to cyber security. Research projects allow students to use public data or create applications by applying knowledge in the basics, theories and scientific methods to solve problems related to cyber security. During the project, students will engage in the overall process of general research, starting with identifying problems, collecting and processing data, recommending solution methods, applying appropriate scientific methods and ending with implementing affordable solutions and evaluations.

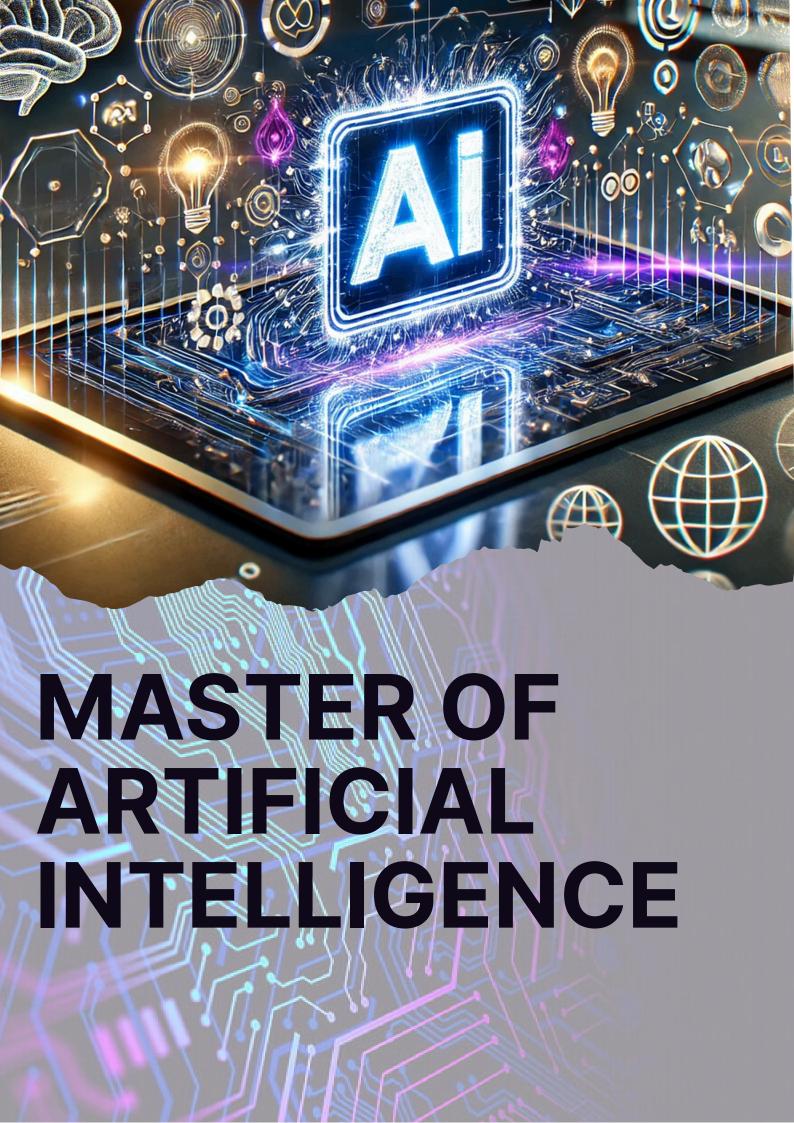
### **Evaluation and Weightage**

Continuous Assessment:100 %

Final Examination: 0%

Course Prerequisite: WOX7001





### PROGRAMME REQUIREMENTS



### 1. Programme Type

The type of programme offered for the Master of Artificial Intelligence is a programme consisting of 10 courseworks that prepares students for the final capstone project which allows students to apply the knowledge they learned in the taught courses to real-world applications.

### 2. Admission

University's General Requirement	Met the University's General Requirement	
Bachelor's Degree Qualification	Possess a Bachelor's Degree (Honours)	
Equivalent Qualification	-	
Related Field	Computer Sciences or Information Technology field.	
Special Requirements		

### University's General Entry Requirements:

Possess a Bachelor's Degree with a CGPA of 3.00/4.00.

OR

Possess a Bachelor's Degree with a CGPA of 2.50 - 2.99 and;

The applicant must fulfil at least one (1) of the following criteria:

- · Universiti Malaya graduate or;
- Has at least one (1) year of work experience in related fields or;
- · Has produced publications in related fields or;
- · A scholarship recipient or;
- A staff member of a government agency or;
- Pass an interview conducted by the Faculty or;
- Pass a special evaluation by the Faculty.

### **English Language Competency Requirements**

MUET	B4.0
IELTS	6.0
TOEFL iBT (Center-based)	60
TOEFL Essential (Online)	8.5
Pearson Test of English (PTE) Academic	59
B1 Preliminary, B2 First, C1 Advanced, C2 Proficiency	169

### 3. Duration of Study

The programme of study: two (2) semesters + one (1) special semester, to eight (8) semesters.

### 4. Programme Structure

The Master of Artificial Intelligence Programme through coursework shall have a total of forty-two (42) credits.

- (1) Through Coursework
  - (i) The programme shall consist of two parts:
    - (a) Part I comprises:
      - Eight (8) core discipline courses, comprised of three or four credits courses; and
      - (ii) two (2) elective courses, each three credits
    - (b) Candidates may be imposed to enrol in other courses and obtain satisfactory results deemed necessary by the Faculty.
    - (c) Part II consists of a ten (10) credit project and shall involve the investigation and analysis of a real-world case study, leading to the submission of a report.
- (2) Details of courses offered shall be of those approved by the Senate from time to time on the recommendation of the Faculty and shall be made known to the candidates at the start of each session.
- (3) The list of Senate-approved courses for the Master of Artificial Intelligence Programme shall be as indicated in List 1.

## PROGRAMME OBJECTIVES & OUTCOMES



### PROGRAMME EDUCATION OBJECTIVES (PEO)

This programme will be able to:

- Prepare graduates who can demonstrate the ability to apply artificial intelligence techniques theoretically and practically in a variety of situations.
- 2. Develop graduates who can contribute their skills in the practical development of artificial intelligence for the well-being of society and the development of sustainability.
- 3. Develop graduates who can demonstrate professional attitudes and ethics in producing science and technology solutions through innovative artificial intelligence.

### PROGRAMME LEARNING OUTCOMES (PLO)

No.	Programme Learning Outcomes	PLOs	Taxonomic Category
1.	Demonstrate the mastery of knowledge and thorough understanding of technological and scientific principles in the field of Artificial Intelligence.	PLO1	K
2.	Recommend innovative solutions that are at the forefront of developments in Artificial Intelligence.	PLO2	K
3.	Evaluate Artificial Intelligence solutions and tools in terms of their usability, efficiency and effectiveness.	PLO3	Р
4.	Communicate and interact effectively within a group and with diverse stakeholders by publishing and presenting technical materials in the fields of Artificial Intelligence.	PLO4	Р, А
5.	Apply various tools and techniques to design, analyze, interpret and validate knowledge related to the field of Artificial Intelligence.	PLO5	P
6.	Demonstrate leadership, teamwork, autonomy and responsibility in delivering services in Artificial Intelligence.	PLO6	Р, А
7.	Exhibit capabilities to extend knowledge through life- long learning with an entrepreneur's mindset in Artificial Intelligence.	PLO7	А
8.	Uphold professional and ethical practices in conducting research and delivering services in Artificial Intelligence.	PLO8	А

### MATRIX OF MAPPING PLO TO PEO

PEO	PEO1	PEO2	PEO3
PLO1	<b>A</b>		in a
PLO2	<b>A</b>		
PLO3	<b>A</b>		
PLO4		4	
PLO5		掛	
PLO6		4	
PLO7			₩
PLO8			4

### Reference notes:

### The Domain of the MQF in Programme Learning Outcomes program (PLO)

PO Domain PLO<sub>1</sub> Knowledge PLO<sub>2</sub> Practical Skills PLO<sub>3</sub> Social Skills and Responsibility PLO<sub>4</sub> Values, Attitudes and Professionalism PLO<sub>5</sub> Communication, Leadership and Team Skills PLO6 Problem Solving and Scientific Skills PLO7 Information Management and Life Long Learning Skills PLO8 Managerial and Entrepreneurial Skills

### Reference notes:

### **Taxonomic Category**

K CognitiveA AffectiveP Psychomotor

### COURSE PLAN



### **INTAKE SEMESTER I 2025/2026**

MASTER OF ARTIFICIAL INTELLIGENCE		Credits	Semester I 2025/2026	Semester II 2025/2026	Semester III 2025/2026
Core Courses					
WOX7001	*Research Methodology	3	<b>V</b>	<b>V</b>	
WOA7015	Advanced Machine Learning	3	√		
WQF7002	Artificial Intelligence Techniques	3	1	7	
WQF7006	Computer Vision and Image Processing	3	<b>V</b>		
WQF7007	Natural Language Processing	4		<b>V</b>	
WQF7003	Intelligent Computation	4		√	
WQF7004	Data Analytics in Artificial Intelligence	3		<b>V</b>	
WQF7005	Data Privacy and Artificial Intelligence Ethics	3		4	
WQF7023	Artificial Intelligence Research Project	10		<b>V</b>	1
Elective Cou	irses [Students are required	l to choose a	ny two (2) course	es from the list l	pelow]
WQF7008	Practical Deep Learning	3		<b>√</b>	
WQF7009	Explainable Artificial Intelligence (XAI)	3	1		
WOA7019	Augmented Reality	3		<b>V</b>	
WQF7010	Robotics and Automation	3		<b>V</b>	
WQF7011	Cognitive Computing	3	√		

#### Note:

\*Students are only allowed to register for the WQF7023 Al Research Project after completing at least three (3) core discipline courses (including WOX7001)

For Artificial Intelligence Research Project (P1 and P2) must complete the project in consecutive semesters.

#### Example:

- P1 in Semester II and P2 in Special Semester
- P1 in Special Semester and P2 in Semester I
- P1 in Semester I and P2 in Semester II

The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.

## LIST OF COURSES & CONTENTS



### **CORE COURSES**

Code	Course	Credits
WOX7001	Research Methodology	3
WOA7015	Advanced Machine Learning	3
WQF7002	Artificial Intelligence Techniques	3
WQF7006	Computer Vision and Image Processing	3
WQF7007	Natural Language Processing	4
WQF7003	Intelligent Computation	4
WQF7004	Data Analytics in Artificial Intelligence	3
WQF7005	Data Privacy and Artificial Intelligence Ethics	3
WQF7023	Artificial Intelligence Research Project	10

### **ELECTIVE COURSES**

(NOTE: Students are required to choose any two (2) courses from the list below)

Code	Course	Credits
WQF7008	Practical Deep Learning	3
WQF7009	Explainable Artificial Intelligence (XAI)	3
WOA7019	Augmented Reality	3
WQF7010	Robotics and Automation	3
WQF7011	Cognitive Computing	3

### Note:

\*Students are only allowed to register for the WQF7023 Al Research Project after completing at least three (3) core discipline courses (including WOX7001)

The courses that will be offered every semester are subject to change, depending on the availability of staff and the number of students registering.

#### WOX7001 Research Methodology

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Describe appropriate methodologies used in computer science and information technology research.
- Devise a plan to be carried out within a feasible duration for answering research problems and questions identified.
- 3. Demonstrate attitude and character in line with professional and ethical codes in computer science and information technology research.

#### **Synopsis of Course Content**

This course gives an overview of the dimensions of research in computer science and information technology. Major considerations and tasks in conducting research in the areas such as review of literature, identify problem statement, formulate research questions and objectives, select an appropriate approach or method to the research, plan and manage the research, tools for research, data analysis, and writing and presentation strategies, will be discussed too.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

#### WOA7015 Advanced Machine Learning

#### **Course Learning Outcomes**

At the end of this course, students are able to:

- 1. Practice concepts and techniques for machine learning related to digital and numerical methods.
- Report the solution to machine learning problems by devising and listing the steps in machine learning applied to solve different types of problems
- 3. Demonstrate skills and knowledge of machine learning by managing a machine learning project.

#### Synopsis of Course Content

This course introduces advanced concepts and techniques for machine learning. It covers topics such as linear and logistic regression, decision trees, neural networks, and support vector machines as well as reinforcement learning

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

#### WQF7002 Artificial Intelligence Techniques

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Explain what constitutes Artificial Intelligence and identify systems with Artificial Intelligence elements.
- 2. Analyse the applications of Artificial Intelligence techniques in intelligent agents, expert systems, artificial neural networks, and other machine learning models.
- 3. Apply basic principles of Artificial Intelligence in problem solving, inference, perception, knowledge representation, and machine learning.

#### **Synopsis of Course Content**

This course introduces the core artificial intelligence concepts and skills that allow machines to mimic human intelligence. It contains a theory component about the concepts and principles that underlie modern Al algorithms, and a practice component to relate theoretical principles with practical implementation. Coverage includes knowledge representation, logic, inference, problem solving, search algorithms, game theory, perception, learning, planning, and agent design

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WQF7006 Computer Vision and Image Processing

#### Course Learning Outcomes

At the end of this course, the students are able to:

- Evaluate suitable image processing techniques to solve artificial intelligence problems.
- 2. Evaluate performances of image processing methods for a given artificial intelligence scenario.
- 3. Design and develop image processing systems in the artificial intelligence domain

#### Synopsis of Course Content

This course explores image processing techniques in solving artificial intelligence problems. Image formation and image models are initial steps involved, It covers pixel and object level operations including histogram, edge, and segment. Image enhancement and restoration are compared. Image registration and image transform operations are included. Finally, image features and recognition processes are given. Deep learning approach for computer vision is included

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WQF7007 Natural Language Processing

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Apply the Natural Language Processing (NLP) techniques in various domains.
- Design a Natural Language Processing (NLP) solution to resolve issues related to unstructured text
- 3. Develop an NLP application by integrating all processes in the NLP pipeline which are pre-processing, low level task and high level task.

#### Synopsis of Course Content

Natural language processing (NLP) is one of the most important areas in Artificial Intelligence (AI). This course covers the theory and practice of NLP through techniques for different levels which are pre-processing, low-level and high level. It also covers recent techniques and applications in NLP including Sentiment Analysis, Machine Translation, Topic Modeling and Named Entity Recognition.

#### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

#### WQF7003 Intelligent Computation

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Explain how mathematical theories help in solving Al problems.
- 2. Solve Al problems with formal reasoning.
- 3. Combine mathematical techniques in solving artificial intelligence problems.

#### Synopsis of Course Content

This course covers fundamental mathematical theories that support the development of artificial intelligence. Topics covered include logic and reasoning, linear algebra, graph theory and search algorithms, and probability theory.

This course finds relation with other courses in the program, such as: Advanced Machine Learning where linear algebra, graph theory and search algorithms are used heavily; Computer Vision and Image Processing where linear algebra and probability theory finds their applications; and Natural Language Processing which has relation with graph theory and search algorithms, as well as logic and reasoning. The content of this course is also the fundamental of courses like Practical Deep Learning and Artificial Intelligence Techniques.

#### **Evaluation and Weightage**

Continuous Assessment : 50% Final Examination : 50%

#### WQF7004 Data Analytics in Artificial Intelligence

#### **Course Learning Outcomes**

At the end of this course, students are able to:

- 1. Explain the basic concepts of data analytics in Artificial Intelligence in various domains.
- 2. Design domain-based data analytic pipeline to solve real world Artificial Intelligence problems.
- 3. Apply suitable data analytics techniques to solve real world problems for Artificial Intelligence.

#### Synopsis of Course Content

This course aims to develop students' ability to describe, explore and analyse various types of data (tabular, text and images) using suitable data analytics techniques and do predictive modelling by using different Machine Learning techniques.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%



#### WQF7005 Data Privacy and Artificial Intelligence Ethics

#### **Course Learning Outcomes**

At the end of this course, the students are able to:

- Assess the importance of data privacy and ethical concepts in the development of Artificial Intelligence system.
- 2. Check current smart systems and technologies that are less concerned with ethical issues and data privacy.
- 3. Design Artificial Intelligence technology to be more responsible and in line with the needs of industry and society

#### **Synopsis of Course Content**

The course describes the concepts and philosophy of data privacy and ethics in Artificial Intelligence technologies. All strategies for developing a more responsible Artificial Intelligence system will be explained in more detail. The course also analyse and critique issues of data privacy violations or unethical values in current smart systems and technologies

#### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

#### WQF7023 Artificial Intelligence Research Project

#### **Course Learning Outcomes**

At the end of this course, students are able to:

- Design solution using artificial intelligence techniques for real world problems.
- 2. Develop Artificial Intelligence-based solution formulated on project objectives.
- 3. Explain solution in oral and written presentation related to artificial intelligence research.

#### Synopsis of Course Content

A research project is a medium-scale project to enable students to do research related to artificial intelligence. Research projects allow students to use actual data from industry partners or public data to create applications by applying knowledge in the basic, theories and scientific methods to solve problems related to artificial intelligence. During the project, students will engage in the overall process of general research, starting with identifying problems, collecting and processing data, recommending solution methods, applying appropriate scientific methods and ending with implementing affordable solutions and evaluations. At the end of the course, students are required to submit a project report and perform a project presentation.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

Course Prerequisite: WOX7001

#### WQF7008 Practical Deep Learning

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Unifies the knowledge on the fundamentals and architectures of deep learning, and the need for parallel and distributed computing for deep learning.
- Integrate and develop the requirements for cloud computing infrastructure, GPU and relevant software as well as tools for setting up, modelling, debugging and serving of deep learning projects.
- 3. Practice the knowledge and skills to design deep learning based solutions.

#### **Synopsis of Course Content**

This course is closely linked with the Advanced Machine Learning course which is a pre-requisite for this course. It reinforces the knowledge on the fundamental concepts related to deep learning (such as different deep learning architectures) and introduces practical techniques to get started on Artificial Intelligence projects and develop an industry portfolio. Specifically, it will provide the necessary knowledge and skills on how to design a deep learning production system end-to-end: project scoping, data needs, modelling strategies, and system deployment requirements.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

Course Prerequisite: WOA7015

#### WQF7009 Explainable Artificial Intelligence (XAI)

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Categorize the concepts of Explainable Artificial Intelligence (AI) and the current techniques for generating explanations from black-box machine learning methods.
- 2. Design the Explainable Al methods.
- 3. Develop the ability to critically assess the state-of-the-art of Explainable AI methods.

#### Synopsis of Course Content

This course gives an introduction to Explainable AI (XAI), providing an overview of relevant concepts such as interpretability, transparency and black-box machine learning methods. The course provides an overview of state-of-the-art methods for generating explanations, and touches upon issues related to decision-support, human interaction with Al/intelligent systems and their evaluation. In summary, the Explainable AI course covers the following topics: definitions and concepts such as black-box models, transparency, interpretable machine learning and explanations, explainable AI models, methods for Explainable AI, applications and examples.

#### **Evaluation and Weightage**

Continuous Assessment : 60% Final Examination : 40%

#### WOA7019 Augmented Reality

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Describe the technologies related to Augmented Reality.
- 2. Apply the related new technologies in the design of augmented reality applications.
- 3. Develop interactive augmented reality applications for both PC based and mobile devices using a variety of input devices.

#### Synopsis of Course Content

This course is designed to introduce students with knowledge related to augmented reality concepts and technology. This is followed with a discussion on how knowledge about human sensory systems can facilitate in designing ergonomic augmented reality devices that match human perceptual capabilities. Students are then trained to develop an augmented application using a suitable programming language and 3D software. Towards the end of the course, there will be discussions on several examples of augmented reality applications with emphasis on the contributions of the augmented reality technology and future direction of this technology.

#### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

#### WQF7010 Robotics and Automation

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Design robotic and automation systems using parts like sensors, controllers and actuators.
- 2. Infer patterns from data collected.
- 3. Evaluate robotic and automation systems for optimum performance in various applications.

#### Synopsis of Course Content

This course focuses on developing robotic and automation systems by integrating components such as sensors, controllers, motors and actuators. Students apply data acquisition methods, control methods and also program robot sensing, connectivity, mobility and manipulation to achieve automation. Additionally, students can apply artificial intelligence techniques to analyse collected data for informed decision making.

#### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%

#### WQF7011 Cognitive Computing

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Assess the relationship between cognitive computing systems, artificial intelligence and and human interaction.
- 2. Specify requirements and techniques for designing cognitive computing systems.
- 3. Develop cognitive computing systems as a solution for artificial intelligence applications.

#### **Synopsis of Course Content**

The student will learn and understand the concept of cognitive computing systems and its relations with artificial intelligence and big data. Students will also learn the requirements and techniques such as the characteristics, components and architecture needed to design cognitive computing system applications powered by multiple AI technologies encompassing machine learning, reasoning, natural language processing, speech recognition and vision (object recognition), human—computer interaction, dialog and narrative generation. In addition, students will also evaluate how such systems can be used to achieve human-like behaviors that improve the performance of human-machine interactions in various domains

#### **Evaluation and Weightage**

Continuous Assessment : 70% Final Examination : 30%



# PROGRAMME REQUIREMENTS



#### 1. Programme Type

The type of programme offered for the Master of Computer Science by Research is one hundred per cent (100%) research leading to the submission of a dissertation.

### 2. Entry Requirements

For admission into the Master of Computer Science programme, applicants must have at least:

- A Bachelor's degree with Honours or a comparable degree in Computer Science or Information Technology; or
- Other qualifications approved by the University Senate.
- Priority is given to applicants with a CGPA of 3.0 and above or equivalent.

International applicants are required to have:

 At least IELTS Band 6 (Academic) or TOEFL score of 550 (paper-based) / 213 (computer-based) / 80 (Internet-based) if their first degree is from a university where English is not the medium of instruction.

#### Duration of Study

The programme of study: two (2) to eight (8) semesters.

#### 4. Programme Structure

- (i) This programme shall consist of one hundred percent (100%) research work leading to the submission of a dissertation which format shall be stipulated as in Part VII, University of Malaya Regulations (Master's Degree) 2019.
- (ii) Attend and pass a Research Methodology Course WOX7001 (three (3) credits) not later than the second semester of candidature.
- (iii) Candidates may be imposed to enroll in other courses and obtain satisfactory results deemed necessary by the Faculty.

#### Determination of Research Area

Determining the research area shall be done upon the candidate's admission into the programme.

# PROGRAMME LEARNING OBJECTIVES & OUTCOMES



### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- 1. To produce researchers who can contribute to the development and knowledge of computer science
- 2. To produce professionals in computer science research
- 3. To equip graduates with technical and soft skills

#### PROGRAMME LEARNING OUTCOMES (PLO)

No.	Programme Learning Outcomes	PLOs	Taxonomic Category
1.	Apply and integrate knowledge on the latest research issues in computer science and produce state-of-the-art research.		С
2.	Evaluate and analyse computing solutions in terms of usability, efficiency and effectiveness	PLO2	Р
3.	Produce computing solutions and use appropriate tools to analyse the performance of such solutions in meeting the needs of society	PLO3	Р
4.	Apply existing research techniques to acquire, interpret and develop knowledge in computing	PLO4	С
5.	Communicate and work in groups effectively	PLO5	A/P
6.	Provides, publishes and presents technical materials to a wide audience	PLO6	Р
7.	Demonstrate consistent behaviour with a code of ethics and professional responsibility to acquire information and apply knowledge at all times	PLO7	А

(List of 11 domains of learning outcomes in accordance with the MQF program.)

#### MATRIX OF MAPPING PLO TO PEO

PEO	PEO1	PEO2	PEO3
PLO1	х		
PLO2	x		
PLO3	х	19	
PLO4	x		х
PLO5		х	х
PLO6		x	
PLO7		x	

#### Reference notes:

The Domain of the MQF in Programme Learning Outcomes program (PLO)

PO Domain

PLO1 Knowledge and Understanding

PLO2 Numeracy Skills

PLO3 Practical Skills, Digital Skills

PLO4 Cognitive Skills

PLO5 Interpersonal Skills, Communication Skills

PLO6 Leadership, Autonomy and Responsibility

PLO7 Ethics and Professionalism

#### Reference notes:

### **Taxonomic Category**

K Cognitive

A Affective

P Psychomotor

# CANDIDATURE REQUIREMENTS



### Master of Computer Science (Master by Research)

No	Requirement	
1.	Fulfil the minimum candidature of two (2) semesters	
2.	Fulfil the University language requirement-Bahasa Malaysia (International Candidate)	
3.	Fulfil the University language requirement-English Language (International Candidate)	
4.	Research Methodology Course	
5.	Present research proposal at Proposal Defence	
6.	Present research progress at Candidature Defence	
7.	Fulfil the publication requirement according to the criteria set in the publication guideline before graduation.	
8.	Show proof of acceptance for publication of at least one (1) article in journals indexed	

The candidates must fulfil the following publication requirements before the Examination Committee (Board) meeting:

#### **Publication Requirements**

 Master's Degree Candidate pursuing a programme in the field of Science must show proof of acceptance of publication for at least one (1) paper in ISI (WoS) Journals before a Committee of Examiners meeting.

# GRADUATE ON TIME (GOT) SCHEDULE



Semester	Activities	Output/Milestone	Comments
1	Meet the supervisor     Attend Research Methodology Course     Attend Bahasa Melayu course*     Topic Confirmation     Familiarisation with and use of EndNote, Turnitin, editing software, data analysis and research tools     Conduct Literature Review     Proposal Defence preparation and drafting (writing proposal and prepare slides)     Proposal Defence     Prepare for Publication 1     Ethics Approval (if applicable)     Progress Report Submission	<ul> <li>Completed Research Methodology course</li> <li>Fulfilment of language requirements</li> <li>Presented research proposal</li> </ul>	
2	Proposal Refinement based on feedback  Expand research proposal to drafts of chapters 1, 2 & 3  Conduct pilot study/ planning & setting up of experiment/ start data collection  Start Development  Begin data analysis  Prepare and present Candidature Defence	<ul> <li>Completed outline of dissertation</li> <li>Submission of Publication 1</li> <li>Completed Candidature Defence</li> </ul>	
	Submit Publication 1     Progress Report Submission		
3	<ul> <li>Finalised all chapters</li> <li>Review with supervisor(s)</li> <li>Paper Publication outcome (Correct paper and submit if needed)</li> <li>Dissertation Submission</li> <li>Progress Report Submission</li> </ul>	<ul><li>Completed all chapters</li><li>Submission of dissertation</li></ul>	
4	Dissertation correction (based on internal and external examiner)     Journal acceptance	Outcome of Committee of Examiners     Received Senate letter.	

#### Notes: **Monitoring Panel**

- Chairman & 1 member who is an expert in the field and a supervisor. A fourth member is allowed to be appointed if necessary.
- The same panel should follow through with the proposal presentation and Candidature Defense. It is strongly recommended that one member be appointed as an internal examiner. 2.
- 3.
- The primary responsibilities of the panel should include the following:-Advise the student to improve the research proposal.
  - a) Monitor the progress of the student b)
  - Improve the research plan.
- \* Applicable to all international candidates.

  \*\* Applicable to international candidates writing their dissertation in languages other than English.

# LIST OF COURSES & CONTENTS



#### WOX7001 Research Methodology

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- Describe appropriate methodologies used in computer science and information technology research.
- 2. Devise a plan to be carried out within a feasible duration for answering research problems and questions identified.
- 3. Demonstrate attitude and character in line with professional and ethical codes in computer science and information technology research.

#### Synopsis of Course Content

This course gives an overview of the dimensions of research in computer science and information technology. Major considerations and tasks in conducting research in the areas such as review of literature, identify problem statements, formulate research questions and objectives, select an appropriate approach or method to the research, plan and manage the research, tools for research, data analysis, and writing and presentation strategies, will be discussed too.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

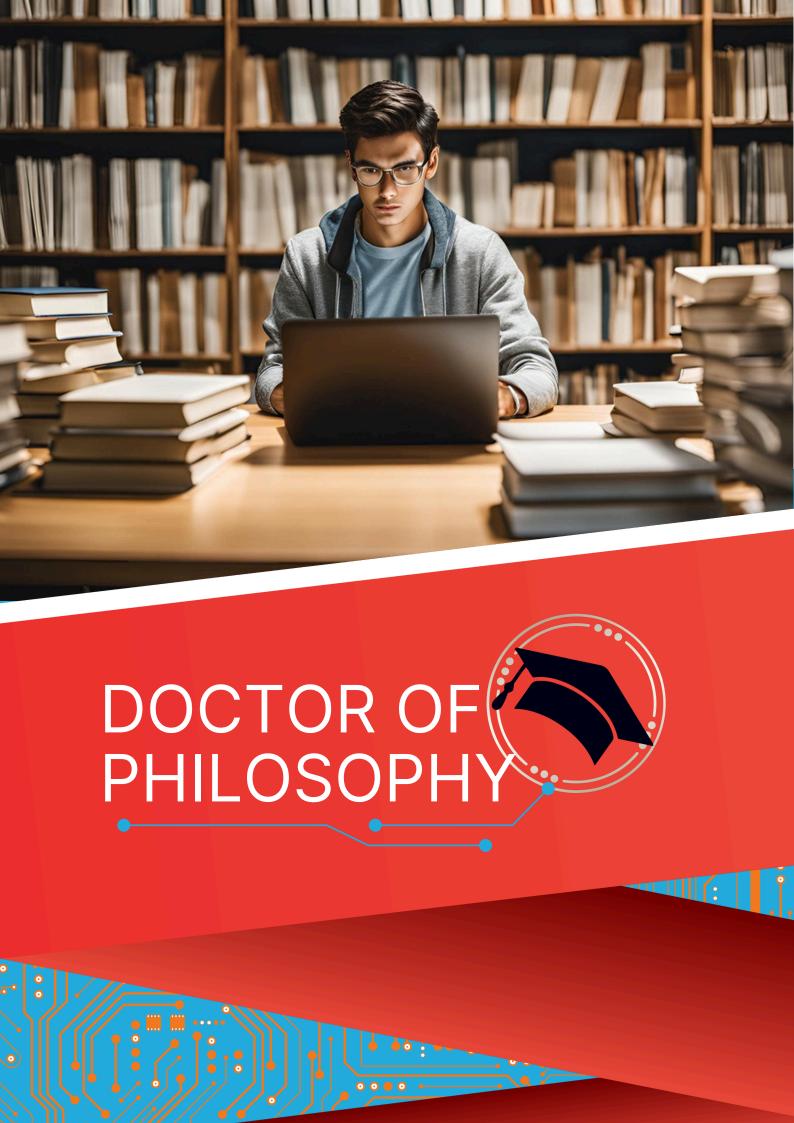
#### WOX7002 Dissertation

#### **Synopsis of Course Content**

The dissertation is the core of the Master of Computer Science by Research, where students conduct independent research under supervision in a chosen area of computer science. Through milestones such as proposal defence, candidature defence, and thesis submission, students demonstrate their ability to solve research problems, apply suitable methodologies, and contribute original findings. Emphasis is placed on scholarly writing, publication, and the development of critical thinking and research skills, preparing graduates for doctoral studies or research-oriented careers.

#### Evaluation

Proposal Defence Candidature Defence Dissertation Report



## COURSE CONTENT



### WVX8001 Advanced Research Methods in Computer Science and Information Technology

#### **Course Learning Outcomes**

At the end of the course, students are able to:

- 1. Describe the epistemological issues underlying research in computer science and information technology.
- 2. Explain the approaches and issues involved in conducting research in computer science and information technology.
- 3. Employ appropriate advanced research designs when conducting computer science and information technology research.
- 4. Apply appropriate statistical techniques when conducting computer science and information technology research.
- 5. Prepare a viable doctoral level proposal for a research degree in computer science and information technology.

#### **Synopsis of Course Content**

This course covers the scope, types, basic skills and methodological aspects of computer science and information technology research. Topics include design of experimental research, survey research, grounded theory and phenomenological research, case study, action research, role of statistics in research and art of preparing a research proposal.

#### **Evaluation and Weightage**

Continuous Assessment : 100% Final Examination : 0%

WVX8002 Thesis

# PROGRAMME EDUCATION OBJETIVES



#### PEO 1:

Foster innovation of new ideas, methods and techniques in relevant research fields

#### PEO 2

Lead research and establish a career as a skilled researcher and/or practitioner

#### PEO 3:

Disseminate research output and provide expert advice through various mechanisms in an ethical and professional manner



- 1. Synthesis and contribute knowledge in the respective research field.
- 2. Adapt appropriate practical skills and research methodologies leading to innovative research.
- 3. Provide expert advice to relevant stakeholders based on respective research output.
- Conduct research independently and adhere to legal, ethical and/or professional codes of practice.
- 5. Display leadership qualities through effective communication and collaboration with peers and stakeholders.
- Address issues in the field of research critically by using appropriate problem solving and/or scientific skills.

# CANDIDATURE REQUIREMENTS



#### Doctor of Philosophy Degree:

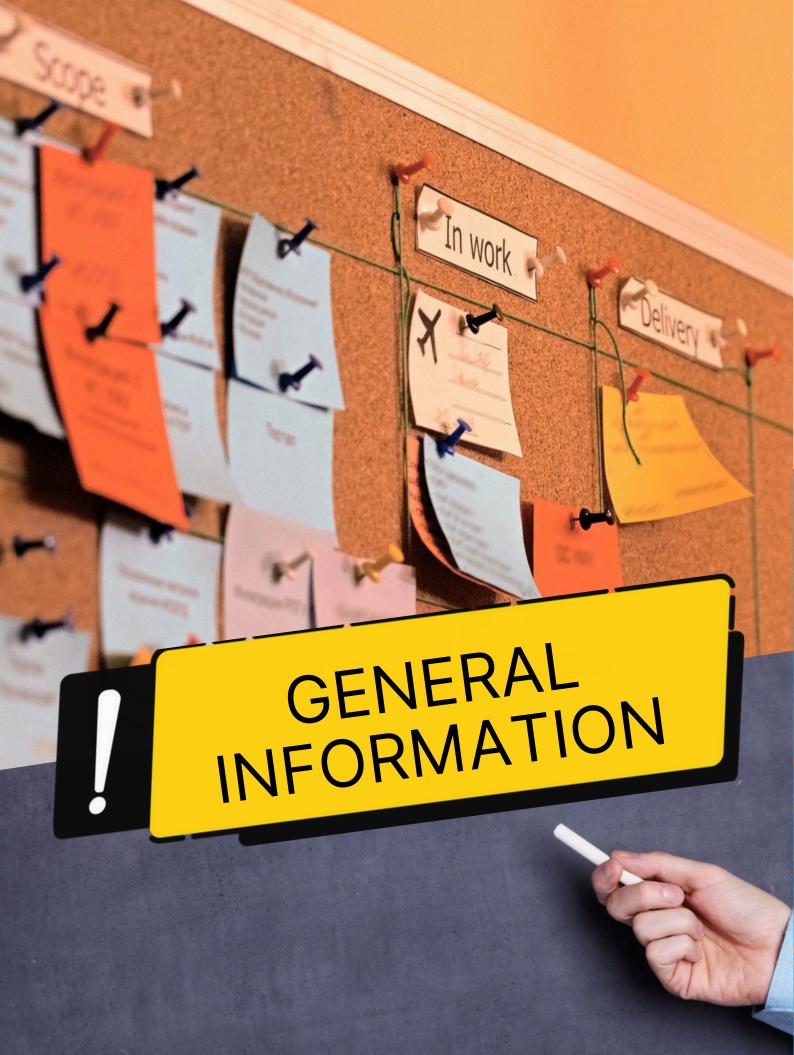
No	Requirement		
1.	Fulfil the minimum candidature duration of 4 semesters.		
2.	Fulfil the University language requirement (Bahasa Malaysia) not later than the second (2 <sup>nd</sup> ) semester of candidature.		
3.	Fulfil the residential requirement of 6 months  Candidates are considered have fulfiled the residential requirement if they have completed requirements 4, 5, 6 and 7 and including the following:  (a) Face-to-face consultation with supervisor(s) as imposed by the faculty; and/or (b) Participation in any faculty activities as required by the faculty.		
4.	Attend at least 3 credits of Research Methodology Course not later than the second (2nd) semester of candidature.		
5.	Present your research proposal at <b>Proposal Defence</b> not later than the second (2nd) semester of candidature.		
6.	Present your research progress at Candidature Defence not later than the fifth (5th) semester of candidature.		
7.	Present your research progress at <b>Thesis Seminar</b> before the submission of thesis for examination.		
	andidates must fulfil the following publication requirement before the Viva-Voce e Examination Committee (Board) meeting:		
8.	Publication Requirements		
	Timing – Publications must be within the candidature of the candidate.		
	<ul> <li>Topics of Publications – Publications must be related and conform to the candidate's research in his/her thesis.</li> </ul>		
	<ul> <li>Affiliation – Publications must carry the affiliation of the department and/or faculty where the candidate is registered.</li> </ul>		

# PROPOSED GRADUATE ON TIME (GOT) SCHEDULE



Semester	Activities	Output/Milestone
1	Meet supervisor(s) Topic Confirmation Attend Research Methodology Course Attend Bahasa Melayu course* Familiarization with and use of EndNote, Turnitin, editing software, data analysis and research tools Conduct Literature Review Proposal Defence preparation and drafting (writing proposal and preparing slides) Proposal Defence Prepare for Publication 1 Ethics Approval (if applicable) Progress report submission	Completed Research Methodology course     Fulfilment of language requirements     Presented research proposal     Submit Progress report
2	Refine proposal based on feedback     Conduct pilot study / plan and set up experiment / start data collection     Start development     Reproduce existing methods     Begin data analysis     Prepare for Candidature Defence     Submit Publication 1     Progress report submission	Workable prototype / existing methods     Generate preliminary results     Submission of Publication 1 (review paper / experimental design)     Submit Progress report
3	Candidature Defence preparation and drafting (writing Candidature Defence document and preparing slides)     Candidature Defence     Paper 1 publication outcome (Correct paper and submit if needed)     Discussion preliminary results with supervisor(s)     Progress report submission	Completed Candidature Defence     Submit Progress report
4	Experimentation and/or data analysis     Thesis write-up (Chapter 1, 2 & 3)	Submission of Publication 2     Completed drafts of three chapters
	<ul> <li>Review with supervisor(s)</li> <li>Prepare and submit for Publication 2</li> <li>Progress report submission</li> </ul>	Submit Progress report
5	<ul> <li>Thesis write-up (complete remaining chapters)</li> <li>Presentation of Thesis Seminar</li> <li>Review with supervisor(s)</li> <li>Paper 2 publication outcome (Correct paper and submit if needed)</li> <li>Progress report submission</li> </ul>	Completed thesis draft     Presented Thesis Seminar     Submit Progress report
6	<ul> <li>Finalize and submit thesis</li> <li>Review with supervisor(s)</li> <li>Prepare for viva voce</li> <li>Thesis correction and final thesis submission (based on internal and external examiners)</li> <li>Journal acceptance</li> </ul>	Submission of thesis     Viva voce     Outcome of Committee of Examiner     Receive senate letter

<sup>\*</sup>Applicable to all international candidates.



# LEGISLATION & PRESCRIBED RULES



#### (1) Master's Programmes

Master's candidates are governed by the Universiti Malaya (Master's Degree) Rules and Regulations, 2019.

#### (2) Ph.D Programme

Ph.D candidates are governed by the Universiti Malaya (Degree of Doctor of Philosophy) Rules and Regulations, 2019. In addition to the above, all postgraduate candidates are also governed by the Universities and University Colleges Act, 1971 Constitution of the Universiti Malaya, and all other statutes, rules and regulations currently applicable in the University including the Universiti Malaya (Discipline of Candidates) Rules 1999.

The full texts of the above rules and regulations are available at <a href="https://umsitsguide.um.edu.my">https://umsitsguide.um.edu.my</a>. As registered candidates of the Universiti Malaya, the candidates have the responsibility to be aware of and abide by the rules and regulations of the University, the policies and requirements of their respective faculties, and the advice contained in this handbook.

# MARKING SCHEME AND GRADE POINT AVERAGE (GPA)



The assessment for the examination of the coursework component is based on the following marking scheme:

MARKS	GRADE	GRADE POINT	MEANING
90.00 - 100.00	A+	4.00	HIGH DISTINCTION
80.00 - 89.99 75.00 - 79.99	A A-	4.00 3.70	DISTINCTION
70.00 - 74.99 65.00 - 69.99	B+ B	3.30 3.00	PASS
60.00 - 64.99	B-	2.70	
55.00 - 59.99	C+	2.30	
50.00 - 54.99	С	2.00	
45.00 - 49.99	C-	1.70	FAIL
40.00 - 44.99	D+	1.50	
35.00 - 39.99	D	1.00	
0.00 - 34.99	F	0.00	



# PROGRESS REPORT



All postgraduate research candidates are to submit a progress report online at the end of each semester as stipulated. The supervisor shall evaluate the progress report and submit the progress report to the Deputy Dean of Higher Degree/Head of Department. A candidate whose progress is satisfactory will be recommended for continuous of his/her candidature.

The Faculty shall terminate the candidature of a candidate whose progress is not satisfactory for **TWO** consecutive semesters. A candidate who fails to submit his progress report within the stipulated period shall be barred from registering for the following semester.

# SUPERVISION POLICY FOR POSTGRADUATE PROGRAMMES



### 1. Purpose

This policy was created with the following objectives:

- (1) To explain the criteria for the appointment of the supervisor and the role and responsibilities of the supervisor to the candidate in the research mode and the coursework and research modes.
- (2) To assist the Responsibility Centre (RC) in making plans for the infrastructure, the workload of the academic staff and intake of candidates.
- (3) To ensure the quality of supervision is assured and that the research produced by the candidate is consistent with the mission and vision of the University.
- (4) As a guide for academic staff and candidates in the Universiti Malaya in executing the responsibilities as a supervisor and research candidate.

### 2. Appointment of Supervisor

The appointment of a supervisor must meet the following criteria:

- (1) It is encouraged to appoint at least two (2) supervisors for each candidate. If only one supervisor is appointed, the supervisor must have the experience of supervising until graduation at least two (2) candidates.
- (2) The appointed supervisor must have a minimum qualification equivalent to the degree or at par with the program registered by the candidate.
- (3) If the supervisor does not have the qualification stated, experience in the research field or related industry can be considered as the criteria for appointment as a Supervisor.
- (4) The appointment of a Supervisor shall take into account the research skills and experiences which are consistent with the research field of the candidate.

- (5) Supervisors suggested by prospective candidates, are given priority to supervise, except in cases where the RC feels that other supervisors are more qualified to supervise.
- (6) Academic staff on sabbatical leave may be allowed to supervise until the end of the leave, provided the leave does not affect the candidate's supervision. However, based on some specific reasons, the Supervisor may apply to not supervise the candidate while on leave and the decision is based on the discretion of the relevant RC.
- (7) For academic staff who will be coming to the end of their services, the RC should ensure that a replacement supervisor is appointed at least six (6) months prior to the end of the service date of the initial supervisor so that both of them can co-supervise without affecting the progress of the candidate's research.
- (8) For academic staff have left the service in Universiti Malaya but is still doing academic work elsewhere, they may be appointed as co- supervisor and the number of candidates supervised shall be limited to five (5) persons, where the candidates must be in their final stage of their studies.
- (9) Appointment of an external party (either academic or non-academic) as cosupervisors can be considered if the external party is able provide research facilities and the expertise which will in turn assist the candidates in their research.
- (10) Academic staff should attend training programs in supervision or enhancement courses prescribed by the Universiti Malaya.
- (11) If the RC would like to appoint a supervisor who is not in compliance with all the criteria of appointment specified in the policy, the RC shall submit a letter of application together with a strong justification to the Dean of Graduate Studies Institute of Graduate Studies for consideration and approval.
- (12) Appointment of supervisors shall be managed by the RC in compliance with all the criteria specified in this policy. Appointment made shall take into account the space, resources and expertise to support and assist candidates, with their research.
- (13) If the appointment of a new supervisor is required for some reason, the appointment shall be made according to merit and this case is considered as a special case. This case cannot be referred to and be an example or a precedent for a case to come.
- (14) In the event of problems of supervision between supervisor and candidate, the RC should address this problem. If the problem cannot be resolved, the matter may be submitted to the Dean, Institute of Graduate Studies for further action.

#### 3. Ratio between Supervisor and Candidate

(1) The maximum ratio for candidates to obtain quality supervision are as follows: -

Research Fellow 1:3 Lecturer 1:5 Senior Lecturer 1:7 Associate Professor 1:10 Jusa C Professor 1:15

Jusa B Professor 1:20

Jusa A Professor 1:25

- (2) RC may approve a higher maximum number of candidates provided that supervisor has shown excellent supervision performance.
- (3) RC can also set a different maximum number of students from above to meet the requirements of relevant professional bodies.
- (4) In calculating the supervisory workload, three (3) candidates of the mixed-mode is equal to two (2) candidates of the research mode.

#### 4. Change of Supervisor

Change of supervisor can be implemented as follows:

- (1) If there is strong justification and excuse, the candidate may apply to change the supervisor, not more than once during the period of candidature.
- (2) If there is a supervisor who did not perform the supervisory duties satisfactorily, the Dean of the RC may appoint any other qualified academic staff to replace the said supervisor.

#### 5. Family Links

- (1) Supervisors appointed shall not have a close family link to the candidate.
- (2) Both the appointed supervisors also must not have any family relationship with each other.

### 6. Role and Responsibilities of the Supervisor

The appointed supervisor shall exercise his/her role and responsibilities as set out in Appendix A.

### 7. Role and Responsibilities of the Candidate

The candidate shall also be responsible for the candidature and research throughout their status as a student in the Universiti Malaya as set out in Appendix B.

#### ROLE AND RESPONSIBILITIES OF THE SUPERVISOR

- Before starting, the supervisor to the candidate will need to know the latest university rules and regulations relating to higher degree programs.
- 2. Supervisors should have adequate knowledge, enhanced theoretical and conceptual framework, and is up to date in the field of research of the candidate.
- Supervisors should be knowledgeable about the work schedule provided for the completion of a research project so that it complies with the provisions of certain degrees. This is to ensure the smooth running of the candidate's research project.
- 4. Supervisors are responsible for providing relevant and adequate guidance and academic support to students during the supervision period to enable the candidate to carry out excellent research and writing. This responsibility includes guiding the careful planning of the research, the background and library research, the need to attend courses to complete the research, including scientific methods. Awareness about the impact of fraud and plagiarism should be informed to the candidate.
- 5. Supervisors should interact with the candidate at least two (2) times per month in the first semester and once (1) a month for the next semester. For the first meeting, the supervisor and the candidate must talk face to face, while, the next meeting may be conducted via other methods such as on- line.
- 6. Supervisors are responsible to ensure that candidates could communicate with relevant experts should the research area requires so. In certain cases, an additional supervisor or consultant may be appointed.
- 7. Each supervisor should be appointed to the candidates should know their responsibilities respectively and explained to the candidates on the aspects that will be monitored. In the event that two (2) supervisors were appointed for each candidate, the effective working relationship between all parties needs to be maintained together.
- 8. Supervisors need to help candidates in the preparation with regards to the presentation at conferences, seminars, meetings and workshops.
- Supervisors are encouraged to record every meeting and discussion with the candidate about the study and research of the candidate by providing and updating the file on record of achievement and progress of research projects for each candidate.

- 10. Supervisors should evaluate the progress of the candidates by getting a written report and monitor the performance in a relative manner according to the quality set for a certain degree. Candidates should be informed if the quality of her work did not reach the required standard. If progress of the candidates is not satisfactory, the supervisor must take action to help the candidates improve their performance. Progress report for each semester for each candidate must be submitted by the supervisor to the Academic / Faculty / Institute / Centre as scheduled.
- 11. Supervisors should help candidates in academic writing, presentations in conferences and submitted for publication. For all the academic papers submitted for publication, written jointly by the supervisor and candidate, both have to agree to publish them together.
- Supervisors need to help manage and secure any funds (example: Vote PPP, UMRG etc.) for research projects.
- Supervisors must ensure work safety rules are followed during the research and are carried out in accordance with health and safety ethics policy specified by the University.
- 14. Supervisors should provide constructive and critical comments on the candidate's drafts of the thesis within a reasonable time and advise the candidate regarding the format of the thesis as specified by the University.
- 15. Supervisors should suggest and advise the Post Graduate Office of the RC in the process of nomination and evaluation of expertise of internal and external examiner. The supervisors also need to ensure that there are no delays in the process.

#### The Role of Supervisor in the Board of Examiners

- The role of supervisor in the Board of Examiners is as the advisor. The supervisor is not involved in any discussions relating to the results of work submitted by the candidate. The supervisor does not function as an examiner.
- The supervisor's attendance in the Board of Examiners shall be by invitation only.
- Supervisors are expected to provide supervision reports in the required format within a specified time to the Post Graduate Office for the Board of Examiners meeting.
- 4. The supervisor should also help the candidates on the corrections to be done based on the comments raised by the Board of Examiners and continue to oversee the candidate in cases where the thesis is referred back for further study.

#### ROLE AND RESPONSIBILITIES OF THE CANDIDATE

- Candidates should understand and fulfil all of the conditions contained in the letter of offer, rules and regulations applicable to the program. Examples are as follows:
  - (A) Book of the Universiti Malaya (Master's Degree) Regulations 2010 and the Universiti Malaya (Master's Degree) 2010;
  - (B) Book of the Universiti Malaya (Degree of Doctor of Philosophy) 2007 and Regulations of the Universiti Malaya (Degree of doctor of Philosophy 2007);
  - (C) Program handbook, and
  - (D) Postgraduate Handbook.
- Candidates should interact with the supervisor at least two (2) times per month in the first semester and once (1) a month the next semester. For the first meeting, the candidate and supervisor should talk face to face, while, the next meeting can be conducted via other methods such as online.
- Candidates shall record meetings and discussions on their research each time they meet with the supervisor.
- Candidates should have a good working relationship with the supervisor.
- Candidates must plan the project schedule and comply with the maximum period of study.
- 6. Candidates should discuss and agree with the supervisor on consultation times.
- 7. Candidates must submit progress as specified without falsifying the research outcome and is free of plagiarism.
- Candidates must notify their supervisor of any problems that may interfere with the research.
- Candidates shall engage in academic activities organized by the department or the RC.
- Candidates must plan and ensure sufficient time to do the research and write the thesis.

- 11. Candidates should ensure that their candidature is always active by renewing their registration each semester.
- 12. A candidate shall give three months' notice to the supervisor or inform the supervisor the date for submission of the thesis for examination purposes, so there is no delay in the appointment of examiners.
- 13. Candidates are solely responsible for the content, the presentation of thesis and viva-voce presentation.
- 14. Candidates are responsible for ensuring that corrections are made in a given period after the Board of Examiner's meeting / viva-voce and the Senate.

# THESIS PREPARATION GUIDELINES



#### **PREFACE**

In the process of completing a postgraduate programme and being awarded the degree by the Universiti Malaya, a candidate may be required to submit a research report or dissertation or thesis, depending on the requirements of the specific programme.

The terms "research report", "dissertation" and "thesis" are defined as follows:

- Research Report refers to the documentation of research prepared and submitted by the candidate for the award of a Master's degree by Coursework or Master's Degree by Clinical which may include research paper, research project, project paper, project report and research outcome concerned known by whatsoever name;
- Dissertation refers to the documentation of the original research prepared and submitted by the candidate for the award of a Master's degree by Research, and Master's Degree by Mixed Mode as well as Doctoral degree by Coursework and Doctoral degree by Clinical;
- Thesis refers to the documentation of the original research prepared and submitted by the candidate for the award of a Doctoral degree by Research and Doctoral degree by Mixed Mode.

This guideline will assist the candidates to meet the minimum format requirements set by the University to complete the final form of a research report, dissertation or thesis. However, the format may differ in each individual Academy/Faculty/Institute/Centre with its own additional requirements. In this guideline, the term 'faculty' will be used to refer to Academy/Faculty/Institute/Centre.

#### **CHAPTER 1: FORMAT OF WRITING**

A research report, dissertation or thesis can be written in one of the following formats:

- · Conventional format;
- Article style format;
- Format of published papers (this option is only available for Doctoral programme by research candidates)

These formats serve as a generic guideline for the postgraduate candidates in writing a research report, dissertation or thesis. Minor variation of the format as recommended by the faculty is allowed. Candidates are advised to discuss with their supervisors to determine which format is best suited for the nature of their research work.

#### 1.1 Conventional Format

The conventional format follows the traditional monograph structure (Table 1.1). This is the most common form of research report/dissertation/thesis used by the candidates.

Table 1.1: The general structure that follows the conventional format

#### Preliminary

- Title Page
- Original Literary Work Declaration
- Abstract
- Abstrak
- Acknowledgements
- Table of Contents
- List of Figures
- List of Tables
- List of Symbols and Abbreviations
- List of Appendices

#### Main Body

- Chapter 1: Introduction
- Chapter 2: Literature Review
- Chapter 3: Methodology
- Chapter 4: Results
- Chapter 5: Discussion
- Chapter 6: Conclusion
- References (A consolidated list of references for all chapters)

#### Supplementary

- List of Publications and Papers Presented
- Appendix

#### 1.2 Article Style Format

Apart from the conventional style of writing, a research report/dissertation/thesis can also be presented in the chapters that are in the format of journal article (Table 1.2). The number of chapters to be included is at the discretion of the author, depending on the suitability of the chapters in answering the research questions.

This format is also applicable to candidates of Doctoral Degree by Research using **Concurrent or Prospective Publication**. The candidate submits a thesis/conspectus¹ which incorporates publications that may have multiple authors since registration. The candidate may also present a portfolio of interconnected, published research papers or articles encapsulated in a coherent thesis/conspectus, demonstrating overall an original contribution to knowledge. Such publications may include papers, chapters, monographs, books, scholarly editions of a text, technical reports, creative work in relevant areas, or other artefacts. The thesis (with the publications or equivalent works) must meet the criteria and outcomes established for a doctoral award and assessed through a *viva voce*.

The article style format should not be confused with the format for thesis by retrospective or prior publication. Similar to the conventional format, a research report/dissertation/thesis in the article style format should be written extensively to elucidate the different aspects of the research work in great details.

The main body of a research report/dissertation/thesis in the article style format should contain the following chapters:

#### (a) General Introduction

The General Introduction gives an overview of the research by outlining the objectives, novelty as well as the research questions addressed. This chapter should also explain the correlation among the articles/chapters.

#### (b) Literature Review

The Literature Review provides extensive background information on past studies and current knowledge pertaining to the research topic.

#### (c) Article 1, Article 2, Article 3 or more

Each article should address a specific research objective or a related topic of the study. Each article forms a separate chapter and must be written in a cohesive manner with a logical and coordinated progression from one article/chapter to the other. The article/chapter should consist of its own sections on Introduction, brief Literature Review, Methodology, Results, Discussion and Conclusion.

#### (d) Conclusion and Recommendation

The Conclusion chapter summarizes the findings in all articles and suggests the future direction for research.

The format specifications of the research report/dissertation/thesis must conform to the general research report /dissertation/thesis requirements as outlined in Chapter 2.

<sup>&</sup>lt;sup>1</sup> A critical review which locates the artefact/s within a coherent theoretical framework and field/s of study.

Table 1.2: The general structure that follows the article style format

# Preliminary

- Title Page
- Original Literary Work Declaration
- Abstract
- Abstrak
- Acknowledgements
- Table of Contents
- List of Figures
- List of Tables
- List of Symbols and Abbreviations
- List of Appendices

# Main Body

- Chapter 1: General Introduction
- Chapter 2: Literature Review
- Chapter 3: Article 1\*
  - 3.1 Introduction
  - 3.2 Literature Review
  - 3.3 Methodology
  - 3.4 Results
  - 3.5 Discussion
  - 3.6 Conclusion
- Chapter 4: Article 2\*
  - 4.1 Introduction
  - 4.2 Literature Review
  - 4.3 Methodology
  - 4.4 Results
  - 4.5 Discussion
  - 4.6 Conclusion
- Chapter 5: Article 3\*
  - 5.1 Introduction
  - 5.2 Literature Review
  - 5.3 Methodology
  - 5.4 Results
  - 5.5 Discussion
  - 5.6 Conclusion
- Chapter 6: Conclusion
- References (A consolidated list of references for all chapters)

#### Note:

\*Article is written with a specific title which normally refers to the research done

# Supplementary

- List of Publications and Papers Presented
- Appendices
- Co-authors Consent

# 1.3 Format of Published Papers

The University also permits the presentation of thesis for the programme of Doctoral Degree by Research i.e. Doctor of Philosophy (PhD) in the format of published and/or submitted papers, where such papers have been published or accepted by high impact journals (e.g. journals indexed by Web of Science), monographs, books, research-based chapters in books and non-traditional research output [NTRO] such as electronic publications, policy paper, creative works, artefacts, performance and exhibitions in the field, before or during the period of candidature (Table 1.3).

Papers submitted as a PhD thesis must be based on a particular theme or focus and form a cohesive research write up. The quality of a thesis by published papers should be in accordance with PhD-level research and must meet the criteria and outcomes established for a doctoral award. The following aspects should be taken into consideration before opting for this format of writing:

# (a) Type of Publications

The thesis may comprise published papers and/or manuscripts accepted for publication by high impact journals (e.g. journals indexed by Web of Science), monographs, books, research-based chapters in books and non-traditional research output [NTRO] such as electronic publications, policy paper, creative works, artefacts, performance and exhibitions in the field which have not been used to obtain other awards or deemed a part of those awards.

## (b) Number of Publications

For candidates under the programme of **Doctoral Degree by Retrospective or Prior Publication**, the minimum number of publications or equivalent productions is at least five (5) and these works must be those published retrospectively within a period not exceeding 10 years from the date of application. However, in some disciplines where a larger number of papers is required to meet the expectations of scope and quality in accordance with PhD-level research, the faculty may specify accordingly.

# (c) Authorship

Where the papers have more than one author, the candidate must be the first author or creator of five (5) of the published works or equivalent productions submitted with the contributions of others clearly defined.

#### (d) Co-authors Consent

Candidates must obtain the consent from other co-authors for all papers and/or manuscripts and/or publications or equivalent production used as part of their PhD thesis.

The consent can be in the form of a verification from the journal publisher or letter or email communication with the co-authors.

## (e) Structure of Thesis

The thesis in the format of published papers shall consist of the following:

- (i) An abstract, which summarises the most important findings presented in each published paper or accepted manuscript or equivalent production. It should indicate how the included works are thematically linked or tied to a particular research framework and how, when considered together, they contribute significantly to knowledge in the discipline.
- (i) The Introduction chapter should include the following:
  - description of research problem investigated;
  - objectives of the study;
  - list of publications and/or accepted manuscripts or production;
  - the account of research progress linking the publications.
    The account of research progress must link together the various papers or production submitted as part of the thesis so that the reader can understand the logic behind the progression of the research programme.
- The Literature Review chapter must contain, in accordance with the relevant discipline's norms, a critical review of relevant literature, identify the knowledge gaps and the relationship of the literature to the area of research.
- (M) The **Methodology** chapter (where applicable).
- (v) The core chapter of the thesis consist of the published papers or accepted manuscripts or production in their original publication format and should NOT be retyped or reformatted. They must be presented coherently in the thesis according to the requirement of the University of Malaya (Doctoral Degree) Regulations (latest version), including any accompanying declarations. The following must be indicated for any jointly written paper:
  - Acknowledgment of co-authors and verification of originality.
  - A clear statement of the contribution made by each author in any joint published work or equivalent production. For example, a statement of contribution from a 3-author academic research publication is as follows:

Tang, J.M.Y., Adli, D.S.H., & Belabut, D. (2011). Histological development of selected neural structures of Dark-sided Chorus Frog,

Microhyla heymonsi (Amphibia: Anura). *Malaysian Journal of Science*, 29(1), 11-18.

Tang, J.M.Y. participated in all experiments, coordinated the data analysis and contributed to the writing of the manuscript. Adli, D.S.H. supervised the development of work and edited the manuscript. Belabut, D. gave technical support and conceptual advice, and helped in data interpretation.

- (vi) The **Discussion** chapter explains the cumulative effect of the papers, the significance of the findings and the knowledge claimed in the thesis.
- (vi) The **Conclusion** summarizes the findings in all published works or equivalent production and suggests the future direction for research.
- (vi) The **References** chapter lists all works and sources that are cited in the Introduction, Literature Review and Conclusion chapters.

In general, the examination process for theses in the format of published papers is similar to that of conventional theses. However the aspects of thesis being evaluated by the examiners may slightly differ.

Candidates under the programme of **Doctoral Degree by Retrospective or Prior Publication** are required to refer to the associated guidelines available.

Table 1.3: The general structure that follows the format of published papers

# Preliminary

- Title Page
- Original Literary Work Declaration
- Abstract
- Abstrak
- Acknowledgements
- Table of Contents
- List of Figures
- List of Tables
- List of Symbols and Abbreviations
- List of Appendices

# Main Body

- Chapter 1: Introduction
- Chapter 2: Literature Review
- Chapter 3: Methodology (where applicable)
- Chapter 4: \*Published Paper 1
  - \*Published Paper 2
  - \*Published Paper 3 and so on

\*Note: Authors' contributions must be indicated for each published paper

- Chapter 5: Discussion
- Chapter 6: Conclusion
- References (List of references for chapters of Introduction, Literature Review and Conclusion)

## Supplementary

- List of Publications and Papers Presented
- Appendices
- Co-authors Consent

#### **CHAPTER 2: SEQUENCE OF CONTENTS**

The structure of the research report, dissertation or thesis is based on a standard format which contains the three main sections; **Preliminary**, **Main Body** and **Supplementary**.

# 2.1 Preliminary

This section consists in order of the following:

- Title Page
- Original Literary Work Declaration Form
- Abstract
- Abstrak
- Acknowledgements
- Table of Contents
- List of Figures
- List of Tables
- List of Symbols and Abbreviations
- List of Appendices

# 2.1.1 Title Page

The title page is the first page after the front cover and should include:

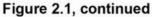
- (a) The final research title which has been approved by the faculty;
- (b) Name of candidate according to the registration records;
- (c) A statement according to the mode of programme (Table 2.1); and
- (d) The year of submission.

Table 2.1: Statement on Title Page according to mode of programme

Master's				
Degree				
Research report	Dissertation (by	Dissertation		
(by Coursework	Mixed mode)	(by Research)		
or by Clinical)				
RESEARCH REPORT	DISSERTATION	DISSERTATION		
SUBMITTED TO THE	SUBMITTED IN PARTIAL	SUBMITTED IN		
(name of the Faculty)	FULFILMENT OF THE	FULFILMENT OF THE		
UNIVERSITI MALAYA, IN	REQUIREMENTS FOR	REQUIREMENTS FOR		
PARTIAL FULFILMENT OF	THE	THE		
THE REQUIREMENTS FOR	DEGREE OF (Name	DEGREE OF (Name		
THE DEGREE OF (Name	of Programme)	of Programme)		
of Programme)				
Doctoral				
	Degree			
Dissertation (by Coursework	Thesis	Thesis (by		
or by Clinical)	(by Mixed mode)	Research)		
DISSERTATION SUBMITTED	THESIS SUBMITTED IN	THESIS SUBMITTED IN		
IN PARTIAL FULFILMENT OF	PARTIAL FULFILMENT OF	FULFILMENT OF THE		
THE REQUIREMENTS FOR	THE REQUIREMENTS FOR	REQUIREMENTS FOR		
THE DEGREE OF (Name	THE DEGREE OF (Name of	THE		
of Programme)	Programme)	DEGREE OF		
		(Name of		
		Programme)		

This page is the first page of Roman numeral page number but it is not numbered. The text should be typed using font type **Times New Roman**, font **size 14 with 1.15 pt. line spacing**.

(a) (b) TITLE OF DISSERTATION TITLE OF RESEARCH REPORT NAME OF CANDIDATE NAME OF CANDIDATE DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE SUBMITTED TO THE GRADUATE REQUIREMENTS FOR THE DEGREE SCHOOL OF BUSINESS AND OF MASTER OF LINGUISTICS ACCOUNTANCY UNIVERSITI MALAYA, IN PARTIAL FULFLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS NAME OF FACULTY / ACADEMY / ADMINISTRATION INSTITUTE / CENTRE UNIVERSITI MALAYA KUALA LUMPUR 202X 202X (c) (d) TITLE OF DISSERTATION TITLE OF DISSERTATION NAME OF CANDIDATE NAME OF CANDIDATE DISSERTATION SUBMITTED IN DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF MANAGEMENT OF MASTER OF PHILOSOPHY NAME OF FACULTY / ACADEMY / NAME OF FACULTY / ACADEMY / INSTITUTE / CENTRE INSTITUTE / CENTRE UNIVERSITI MALAYA UNIVERSITI MALAYA KUALA LUMPUR KUALA LUMPUR 202X 202X



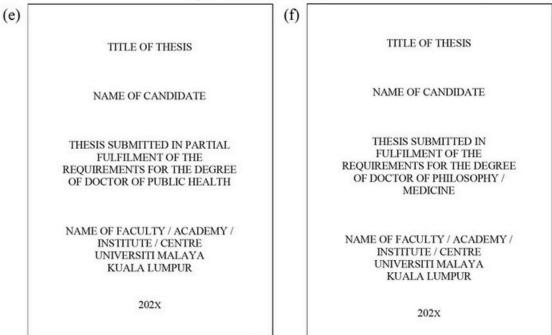


Figure 2.1: Examples of title page

(a) Master's research report by coursework and by clinical, (b) Master's dissertation by Mixed mode, (c) Master's dissertation by research, (d) Doctoral dissertation by coursework and by clinical, (e) Doctoral thesis by mixed mode, and (f) Doctoral thesis by research.

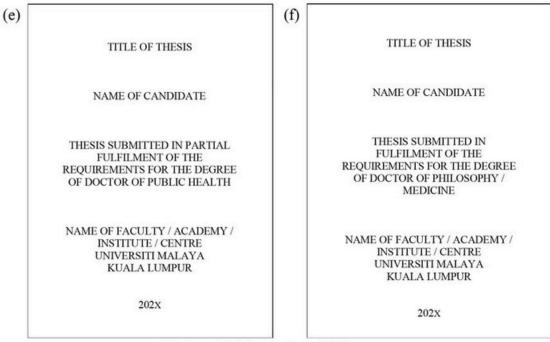


Figure 2.1: Examples of title page

(a) Master's research report by coursework and by clinical, (b) Master's dissertation by Mixed mode, (c) Master's dissertation by research, (d) Doctoral dissertation by coursework and by clinical, (e) Doctoral thesis by mixed mode, and (f) Doctoral thesis by research.

# 2.1.2 Original Literary Work Declaration

This form must be completed by the candidate and signed by a witness (Supervisors or Head of Department/Deputy Dean of Postgraduate). The original signed form must be included in all copies of the research report/dissertation/thesis. The form can be downloaded from the MAYA website in two (2) languages (English and Bahasa Malaysia). If the research report/dissertation/thesis is written in English, hence the English version of the form is used and vice versa.

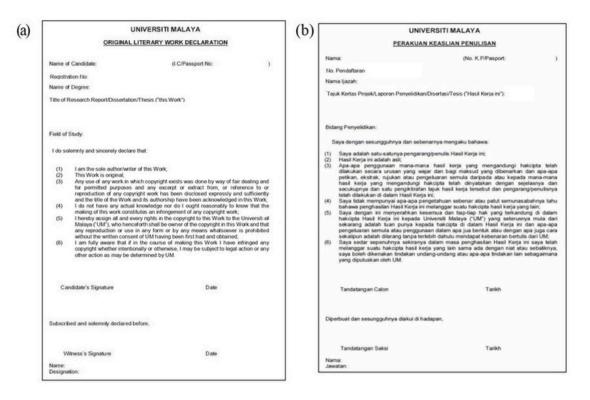


Figure 2.2: Original Literary Work Declaration
(a) English, (b) Bahasa Malaysia

#### 2.1.3 Abstract

An abstract is a short summary of the research report/dissertation/thesis. An abstract should briefly describe the objectives of the research (problem statement), the significance of the research, research methodology, as well as the findings and conclusion of the research.

The Abstract page begins with the title of research report/dissertation/thesis (in uppercase) that is approved by the faculty. Candidates are not allowed to change the title without the approval of the faculty.

An abstract must not exceed 500 words, typed in a single paragraph with double-spacing, and written in Bahasa Malaysia and English language. A maximum of five (5) keywords should also be listed below the abstract (Figure 2.3).

Where the language of the thesis is other than Bahasa Malaysia [Malaysia] or English [United Kingdom], an abstract in that language must also be included. The sequence of abstracts is as follows:

- For research report /dissertation/thesis written in Bahasa Malaysia, the abstract in Bahasa Malaysia is followed by the English version.
- For research report /dissertation/thesis written in English, the abstract in English is followed by the Bahasa Malaysia version.
- For research report /dissertation/thesis written in Arabic, the abstract in Arabic is followed by its version in Bahasa Malaysia and English.

The Abstract page is assigned Roman numeral "iii" and the following pages should be numbered consecutively.

#### [TITLE OF RESEARCH REPORT/DISSERTATION/THESIS]

#### ABSTRACT

The purpose of this aesthetic evaluation is two-fold. First, I examine J.R.R. Tolkien's literary illustration of space, place, and atmosphere in a series of locations across Middle-earth. I focus on the aesthetic facets of the physical environments, the possible aesthetic experiences generated from the visual layers of landscapes and atmospheres, and finally, the philosophical implications obtained through the moments of reflection in those locations. Second, I investigate the possibility of considering Tolkien's depiction of space, place, and atmosphere as literary artifacts and the construction of the whole Middle-earth as an act of artistic creation. The theoretical framework of this doctoral research is formulated based on the combination of seven critical criteria consisting of formalism, framing, historical/biographical information, imagination, the dialectical, engagement, and aesthetic creation theory taken from environmental aesthetics and art philosophy. These critical terms are tools at hand in aesthetically determined forms of evaluation and appreciation, which allows assessing the qualitative-literary-landscapes from multidisciplinary views to interpret their aesthetic and philosophical significance. Results demonstrate that Middle-earth could be observed as an aesthetico-cultural tapestry on which Tolkien materialized his artistic, creative, moral, social, and environmental concerns regarding the grave era in which he lived. He accomplished this task through the depiction of perceptual aesthetic dimensions of the literary environments. Therefore, Middle-earth could stand as more than a mere background of The Lord of the Rings; thus, the shaping of this imagined realm can be identified as an act of art creation. Further, the aesthetic decoration and juxtaposition of the physical environments and artifactual objects in Middle-earth make them eligible to be viewed as literary artifacts. The findings of this research can crucially contribute to our understanding of J.R.R. Tolkien as a literary world-builder who externally depicted the landscapes of Middle-earth with aesthetic features and internally elevated them with philosophical dimensions to convey his moral, philosophical, artistic, and environmental messages. The results could also assist scholars in arts and humanities in illuminating how the representation of imagined geography could be utilized as a powerful aesthetic tool to demonstrate thought-provoking aestheticphilosophical spaces of contemplation.

**Keywords**: J.R.R. Tolkien, Middle-earth, literary Landscapes, Aesthetic Creation, Environmental Aesthetics.

(iii)

Figure 2.3: Example of abstract

#### 2.1.4 Acknowledgements

Most research reports, dissertations or theses include a message to convey appreciation to those who have been involved and provided their assistance directly or indirectly in the preparation of the study.

This is optional and should not exceed a single page, which is numbered in Roman numeral accordingly.

#### 2.1.5 Table of Contents

The Table of Contents lists the chapters, topics and sub-topics together with their page numbers. Sub-topics and topics should be labelled according to the chapter, for example:

**CHAPTER 1: TITLE** 

1.1 Topic 1

1.1.1 Sub-topic 1

**CHAPTER 2: TITLE** 

2.1 Topic 1

**2.1.1** Sub-topic 1

This numbering system provides a clear picture of the relationship between chapters and topics and shows how they are connected.

# 2.1.6 List of Figures

This list contains the titles of figures, together with their page numbers, which are found throughout the text. For example, figures in Chapter 1 are numbered sequentially: Figure 1.1, Figure 1.2 and so on.

#### 2.1.7 List of Tables

This list contains the titles of tables, together with their page numbers, which are listed in the text. The numbering system is according to chapter, for e.g.: tables in Chapter 1 are numbered sequentially: Table 1.1, Table 1.2 and so on.

#### 2.1.8 List of Symbols and Abbreviations

The symbols, abbreviations, nomenclature and terminology that are used in the text must be listed down accordingly.

For further information on spelling and abbreviations, candidates are advised to refer to the latest edition of the Oxford Advanced Learner's Dictionary published by Oxford University Press.

## 2.1.9 List of Appendices

This list is optional and contains the titles of appendices placed in the supplementary section

# 2.2 Main Body

Candidates and supervisors should ensure that the text follows the agreed conventions of the individual faculty. The main body in the research report/dissertation/thesis must be organized following the guidelines as mentioned below:

- Text must be organized in titled chapters.
- The chapter titles must reflect the content of the chapter.
- · Every chapter must begin on a new page.
- Chapters can be divided into sub-chapters with corresponding sub-titles.
- Titles and sub-titles must be numbered.

There is no restriction on the total number of chapters in a research report/dissertation/thesis. The number of chapters differs according to the field of study conducted by the candidate whether it is science-based or social science-based. However the content of the chapters may differ according to the candidate's research or conventions of individual faculty.

Generally, a research report/dissertation/thesis will have the following basic structure:

- INTRODUCTION
- LITERATURE REVIEW
- METHODOLOGY
- RESULTS
- DISCUSSION
- CONCLUSION
- REFERENCES

Items in the structure are divided into separate chapters and the descriptions of these chapters are as follows:

#### 2.2.1 Introduction

This chapter contains the introduction to the issues in which the research is concerned with, the aims and objectives of the study, and the scope or outline of the research approach as well as the structure of the research report/dissertation/thesis.

#### 2.2.2 Literature Review

A literature review is a description of the literature relevant to a particular field or topic of study. It consists of a critically written and comprehensive account of the published works on a topic by accredited scholars and researchers. A critical literature review is a critical assessment of the relevant literature. It is directly related to the research, providing information on theories, models, materials and techniques used in the research. The literature review should be comprehensive and include recent publications which are relevant to the research.

# 2.2.3 Methodology

This chapter describes and explains the materials as well as the research methodology used in the study. The sub-topics for this chapter include the key research questions, the research design, and the research procedures adopted. It may also, where appropriate, indicate sampling methods, research instruments and statistical methods employed. The purpose of this is to inform the reader on the methods used to collect the data and generate the findings reported.

## 2.2.4 Results

This chapter explains the results which are commonly presented in the form of text, figures and tables, complete with data analysis.

#### 2.2.5 Discussion

This chapter contains the interpretation of the results. The findings of the research should be compared and contrasted with those of previous studies presented in the literature review. The purpose of this chapter is to discuss the findings and the outcomes of the research in relation to the results that have been obtained.

#### 2.2.6 Conclusion

In this chapter, the findings are summarized and their implications discussed. This section may include suggestions for future work.

#### 2.2.7 References

All works or studies referred to in the research report/dissertation/thesis in the form of quotations or citations must be included in the references.

The references should be written consistently according to the official citation guide approved by the faculty.

# **APA Format**

Each reference should be written in single spacing format and a double space should be left between references. The list of references must be arranged in alphabetical order and the entries should not be numbered. The list must also have a hanging indentation of 0.5 inch. For example:

Walmsley, Ben. (2019), Audience Engagement in the Performing Arts: A Critical Analysis. Springer Nature.

Wreen, Michael. (2014) "Beardsley's Aesthetics." The Stanford Encyclopedia of Philosophy, edited by Edward N. Zalta, Winter 2014, Metaphysics Research Lab, Stanford University.

Tillson, Victoria G. (2010) "A Nearly Invisible City: Rome in Alberto Moravia's 1950s fiction." *Annali d'Italianistica*, 28: 237-256.

Reference citations in text require the following information:

- last name of the author or as specified in the UM Library APA Formatting and Style Guide (latest edition),
- the year of publication,
- the page number for the reference (direct quotes only).

For summaries or paraphrases, the last name of the author and the year of publication must be included for the in-text reference. For examples:

Kingston and Parker (2012) found the biggest challenges in classroom to be ....

The biggest challenges in classroom were .... (Kingston & Parker, 2012).

For direct quotations (which refers to when the exact words of another author are copied), the last name of the author, the year of publication as well as the page number for the reference must be included for the in-text reference. The quotation has to be enclosed in quotation marks. For examples:

In *Unfinished Tales of Numenor and Middle-earth* (1980), Christopher writes that his father illustrated mallorn trees based on familiar Primary World species.

Gollum enter the damned land of Sauron. Tolkien describes the scenery from the eyes of the hobbits and writes, "slowly and painfully they clambered down, groping, stumbling, scrambling among rock and briar and dead wood in the blind shadows" (*The Lord of the Rings*, 917).

If the quoted citation contains more than 40 words, it should be placed within a paragraph of its own with a 0.5 inch indentation. For example:

Thacker could answer that question too when he contends that "since the early 1990s questions of space and geography have become recognized as legitimate and important topics in many areas of literary and cultural studies, and setting out the sphere of literature, if not life, by some form of map a more familiar hermeneutic strategy" (*The Idea of a Critical Literary Geography*, 57-8). 91 It is, therefore, fruitful to carry out an analysis of Tolkien's watercoloresque melancholic visualization of space, place, and atmosphere and observe them as Tolkien's critique of the destructive nature of modernity that parallels with contemporary environmental concerns.

Please refer to the Universiti Malaya Library APA Formatting and Style Guide. The guide can be downloaded at UM Library website (https://umlibguides.um.edu.my)

#### Other Citation Format

For reference citation in-text and list of references using other than the APA format, please refer to the official citation guide associated. For example, in *American Chemistry Society* (ACS) style, the citation format for in-text citation is as follows:

The mineralization of TCE by a pure culture of a methane-oxidizing organism has been reported (6).

Meanwhile the list of reference that contains full bibliographic information at the end of the research report/dissertation/thesis should appear as one numerical sequence in the order that the material is cited is as follows:

#### References

- 4. Hoppert, M. Microscopic Techniques in Biotechnology; Wiley-VCH: Weinheim, 2003; pp 145-158.
- Klinger, J. Influence of Pretreatment on Sodium Powder. Chem. Mater. 2005, 17, 2755-2768.
- Ford H. L.; Sclafani R. A.; Degregori J. Cell Cycle Regulatory Cascades. In Cell Cycle and Growth Control: Biomolecular Regulation and Cancer, 2nd ed.; Stein G. S., Pardee A. B., Eds.; Wiley-Liss: Hoboken, NJ, 2004; pp 42-67.

# 2.3 Supplementary

Specific items which were not included in the main body of the text, should be put in this Supplementary section. Typically, this section includes the following:

## 2.3.1 List of Publications and Papers Presented

Published works as well as papers presented at conferences, seminars, symposiums etc. pertaining to the research topic of the research report/dissertation/thesis are suggested be included in this section. The first page of the article may also be appended as reference.

# 2.3.2 Appendices

Appendices consist of research instruments, additional illustration of data sources, raw data and quoted citations which are too long to be placed in the text. The appendix section supports the written text of the research report/dissertation/thesis by including materials that can provide additional information. These materials include research data, tables, examples of questionnaires, maps, photos and other materials that are too long to be included in the text or are not directly required to comprehend the text can be included as appendices.

Tables and graphics that are more than two pages long are suggested to be included in the Appendix section.

Appendices are labelled as APPENDIX A, APPENDIX B, etc. and they should correspond to the List of Appendices of Preliminary section.

#### 2.3.3 Co-authors Consent

Please refer to 1.3 (d).

#### **CHAPTER 3: FORMAT SPECIFICATIONS**

# 3.1 Paper Quality, Printing and Duplicating

The research report/dissertation/thesis should be printed, single-sided, on high quality white A4 paper (201 × 297 mm; 80 grams). Computer pin-feed printout paper is not permitted.

The research report/dissertation/thesis, in soft cover copies, must be typed and duplicated by offset printing or good quality photocopying. All copies must be clean and neat in order to ensure easy reading.

#### 3.2 Typing and Printing Quality

Texts in research report/dissertation/thesis should be typed on **one side** of the paper only.

They must be typed using font type **Times New Roman**, **font size 12** (except for tables and figures) and justified, using Microsoft Word version (latest edition) or later, or similar word-processing software. Those written in Arabic should use font type **Traditional Arabic in font size 16**. Words in a language that is different from the language of the research report /dissertation/thesis must be typed in *italics*. For mathematical texts, the use of Equation Editor or LaTeX is advisable. Script fonts are not permitted.

Chapter titles should be typed with capital letters and centered between the left and right margins. Each chapter must begin on a new page. Chapters and subchapters should be also titled. Titles should be typed in bold without underline.

A high-quality laser or ink-jet printer should be used for the printing.

# 3.3 Line Spacing

The body of the text should be typed with **double spacing**. Single-spacing is only permitted in tables, long quotations, footnotes, citation and in the references.

The first sentence of a new paragraph should not start at the bottom of a page if the space available can only fit one line.

# 3.4 Margins

The text should have the following margins:

Top : 2.0 cm or 0.79 inch
 Right : 2.0 cm or 0.79 inch
 Left : 4.0 cm or 1.57 inch
 Bottom : 2.0 cm or 0.79 inch

Additional guidelines regarding margin are as follows:

 Do not type more than one sentence after the bottom margin. If it is necessary to do so, it should only be for a footnote or the completion of the last sentence of the chapter, topic or sub-topic or information in a figure.

- All tables and figures must be placed within the specified margins.
- The last paragraph of the page should contain at least two sentences. If it does not, the paragraph should begin on the next page.

# 3.5 Page Numbering

All page numbers should be printed 1.0 cm from the bottom edge of the page and placed at the right-hand side without any punctuation (Figure 3.1).

The page numbering system must conform to the following rules:

- The page numbers should be placed at the right-hand side without any punctuation.
- Font type Times New Roman and font size 10 recommended for numbers.
- Roman numerals (i, ii, iii, ...) should be used in the Preliminary section. The first page of the thesis, the title page, is an unnumbered page 'i'. Numbering begins on the second page with 'ii' for the Original Literary Work Declaration Form.
- Arabic numerals (1, 2, 3, ...) are used on the pages of the text (starting with the Introduction page) and Supplementary section.

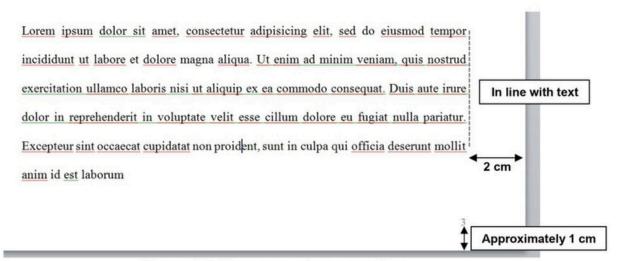


Figure 3.1: Placement of page number

## 3.6 Numbering of Chapters and Sub-chapters

Chapters and sub-chapters must be numbered using Arabic numerals (1, 2, 3 etc). Chapters are numbered CHAPTER 1, CHAPTER 2, CHAPTER 3, and so on. Sub-chapters are nested, but its numbering is not indented, up to a maximum of 4 levels as in the example shown below:

CHAPTER 2: FIRST LEVEL (CHAPTER TITLE)

- 2.1 Level 2 (sub-title);
- 2.1.1 Level 3 (sub-sub-title);
- 2.1.1.1 Level 4 (sub-sub-sub-title)

The use of letters in parenthesis in the main body for e.g., (a), (b), (c) is appropriate as a means of differentiating sub-topics of the same topic. However, it is not required to be listed in the Table of Contents.

If a chapter title or chapter sub-title at any level exceeds a single line, the spacing between the lines must be the same as that of the text (double-spacing). Subsequent sub-chapters beyond the fourth nesting level must be numbered using alphabets; (a), (b), (c), and so on.

#### 3.7 Footnotes

There are differences in the use of footnotes in various disciplines. For example, footnotes are commonly used in Social Sciences research but rarely in Sciences research. However, candidates are advised to limit the use of footnotes unless they are proved necessary to the document. Footnotes are used to elaborate or provide additional information regarding matters discussed in that page.

Footnotes are recorded using Arabic numeric and numbered consecutively. Raised superscript numerals in the text refer to explanatory notes and documented sources appearing either at the bottom of the page as footnotes or at the end of the thesis as endnotes in a notes section. The advantage of using notes is that explanatory type of information can be presented along with source citations on the same page or place.

Footnotes should use a smaller font than the text (font size 8).

When using footnote, a number formatted in superscript is inserted following the punctuation mark in the text. Footnotes should be placed at the bottom of the page on which they appear (Figure 3.2). Please refer to the faculty for the recommended convention for writing of footnotes.

Western ideas of art, civilization, and philosophy was first discussed by Plato in *The Republic* (381 BC). 93

Figure 3.2: Example of footnote

<sup>&</sup>lt;sup>93</sup> Gardner, Sebastian. Routledge Philosophy Guidebook to Kant and the Critique of Pure Reason. Psychology Press. 1999.

#### 3.8 Tables

Tables are printed within the body of the text at the center of the frame and labelled according to the chapter in which they appear. Thus, for example, tables in Chapter 3 are numbered sequentially: Table 3.1, Table 3.2 and so on.

The caption should be placed **above** the table itself (Table 3.1). If the table contains a citation, the source of the reference should be included in the table caption.

Table 3.1: Example of table

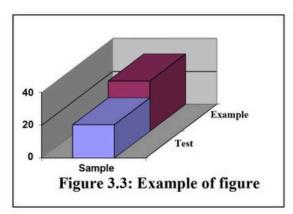
Heading	Heading
Text	Text

If the table occupies more than one page, the continued table on the following page should indicate that it is a continuation, for example: 'Table 3.7, continued'. The header row should also be repeated.

# 3.9 Figures

Figures, like tables are printed within the body of the text at the center of the frame and labelled according to the chapter in which they appear. Thus, for example, figures in Chapter 3 are numbered sequentially: Figure 3.1, Figure 3.2.

Figures, unlike text or tables, contain graphs, illustrations or photographs and their labels are placed at the **bottom** of the figure rather than at the top (using the same format used for tables) (Figure 3.3).



If the figure occupies more than one page, the continued figure on the following page should indicate that it is a continuation: for example: 'Figure 3.7, continued'.

If the figure contains a citation, the source of the reference should be placed after the label.

# 3.10 Binding

Each copy of the research report/dissertation/thesis submitted shall be bound in one (1) volume. The thesis cover must be of A4 size (210mm x 297mm).

For the purpose of examination, research report/dissertation/thesis submitted should be **soft cover or comb** bound with the following colour (Figure 3.4):

Research report: Navy blue

Dissertation: Dark red or maroon

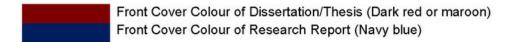
Thesis: Dark red or maroon

For final submission prior to graduation, research report/dissertation/thesis submitted should be compulsorily in soft copy or optionally in hard copy. If the faculty requires hard copy, the document should be hard cover bound in rexine with the following colour (Figure 3.5):

Research project: Navy blue

Dissertation: Dark red or maroon

· Thesis: Dark red or maroon



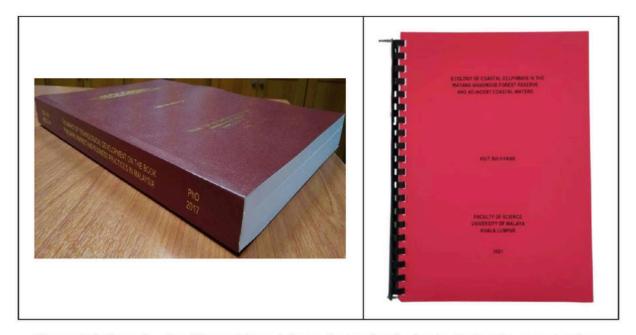
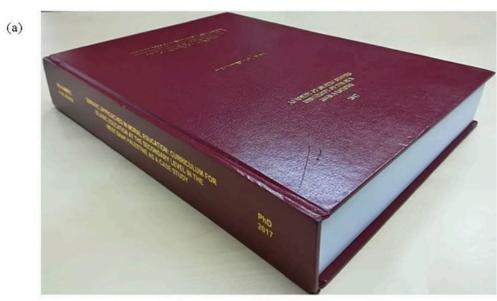


Figure 3.4: Sample of softbound / comb bound copy for first submission for examination



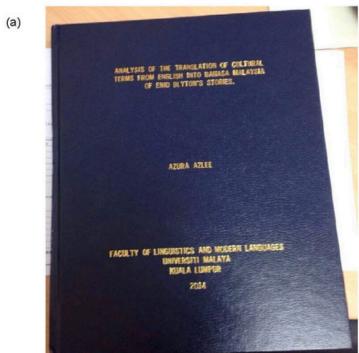


Figure 3.5: Samples of hardbound copy for final submission

- (a) Example of hardbound thesis or dissertation (in dark red or maroon);
  - (b) Example of hardbound research report (in navy blue)

The title of research report/dissertation/thesis, name of author, name of the University and year of submission must be printed on the front cover. The letters for the Front Cover should be printed in **gold letterings** of **font size 16**, **font type Arial Narrow**, **bold and in uppercase letters** (Figure 3.6 and 3.7).

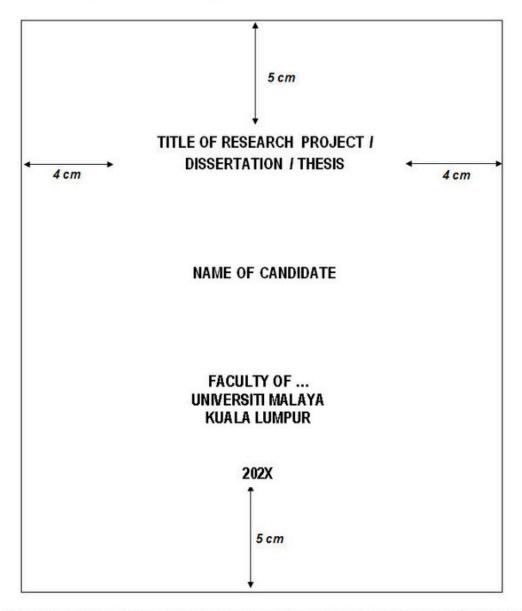


Figure 3.6: Formatting of the front cover of research report/dissertation/thesis

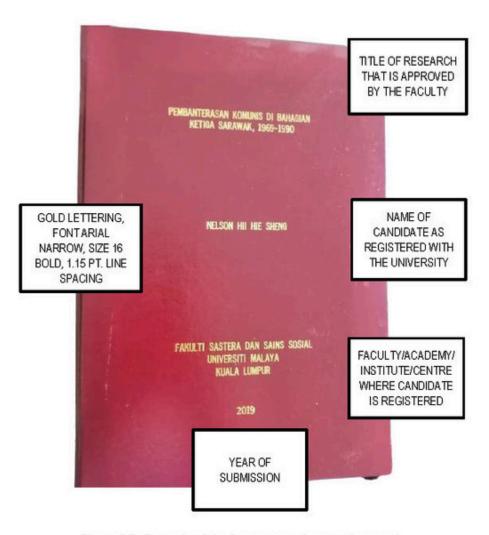


Figure 3.7: Example of the front cover of research report/dissertation/thesis

The spine of the manuscripts should show the title of research report/dissertation/thesis, name of author, year of submission and name of degree. The year of submission must be in accordance with the year when the research report/dissertation/thesis is submitted (Figure 3.8 and 3.9). If the title of the research report/dissertation/thesis exceeds the space of the spine, a smaller font size can be used (i.e. font size 16 to 14) or alternatively the title can be truncated with ellipses (...) (Figure 3.10).

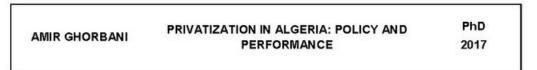


Figure 3.8: Spine format



Figure 3.9: Example of spine format

KWONG SIU YEE	THE EFFECT OF GEOGRAPHICAL REGION ON THE TRANSITION TIME OF CMMI-BASED	PhD 2017

Figure 3.10: Spine format for long title

#### 3.11 Word Limit

The maximum word limit for a submission for examination is shown in Table 3.2.

Master's Programme Research Report Dissertation (by Dissertation (by Coursework Mixed mode) (by or by Clinical) Research) 30,000 words 40,000 words 60,000 words **Doctoral Programme** Thesis Dissertation (by Thesis (by (by Mixed Coursework or Research) mode) by Clinical) 60,000 words 80,000 words 100,000 words

Table 3.2: Maximum word limit

The minimum word limit is determined by the faculty or based on the programme standards according to their respective discipline (if any). The maximum length of words excludes footnotes, references, appendices, tables, figures and prefaces.

Candidates who are unable to meet the word limit set by the University must seek approval from the faculty at least one month before the submission of research report /dissertation/thesis for examination.

#### 3.12 Other Information

A candidate may not resubmit previous research work which he has submitted to this or any other university for the award of a degree. The candidate may, however, incorporate any part of such work, provided that there is a clear indication in the research report/dissertation/thesis of its sources.

The candidate may also include any other printed or published work by an individual or a working group to validate his findings. Where the contribution is from a working group, the candidate is required to provide a statement indicating which part of the work was carried out by the candidate. The statement should be signed by the rest of the group indicating their consent (this may be included in the Appendix).

Approved research report/dissertations/theses or parts of their content are allowed for publication if they are accompanied by a statement that the work was conducted towards the fulfilment of a particular degree.

Candidates of Doctoral degree (all modes) and Master's by research are required to publish papers in Web of Science (WoS) or Scopus or <sup>2</sup>Category A or B refereed journals or book or <sup>3</sup>book chapters publish by publishers listed in the WoS, Universiti Malaya Press, or Dewan Bahasa dan Pustaka or any publishers recognized by the Faculty. Publications must be based on the work during the course of study, and due reference must be made to the University associated guidelines and requirements in all such papers.

#### **CHAPTER 4: SUBMISSION**

#### 4.1 Prior to Submission

Postgraduate candidates are required to obtain approval from the supervisor(s) and faculty via MAYA before online submission. This is to allow timely nomination of examiners for research report/dissertation/thesis.

Submission of research report/dissertation/thesis for examination has to be done within the candidature period after title approval by the faculty.

Candidates are strongly advised against copying the formatting done by other candidates as previously submitted research report/dissertation/thesis may not conform to the current formatting requirements. Failure to meet the formatting requirements may result in a research report/thesis/dissertation being rejected at the point of submission.

Postgraduate candidates shall submit at least one (1) electronic PDF copy of their research report/dissertations/theses to the Postgraduate Officer of the respective faculty.

# 4.2 Required Documents for Submission

- 4.2.1 Documents required for submission for the purpose of examination are as follows:
  - at least two (2) printed softbound/comb bound copies (or such numbers as may be determined by the faculty) of the research report/dissertation/thesis;
  - one (1) electronic copy (PDF format) which is not under limited/blocked mode; and
  - · Submission of Thesis / Dissertation for Examination/Re-examination form.
- 4.2.2 Documents required for final submission prior to graduation after completing the corrections (if any), are as follows:
  - at least one (1) printed hardbound copy (or such numbers as may be determined by the faculty) of the final research report/dissertation/thesis (subject to the faculty requirement);
  - one (1) electronic copy (PDF format) which is not under limited/blocked mode;
  - · Final Submission of Thesis/Dissertation form;
  - <sup>4</sup>The Candidate's Declaration form;
  - Repository Policy for Universiti Malaya Postgraduate Theses/Dissertation/Research Reports form; and
  - Correction Report form (if applicable).

All the required forms can be downloaded from the MAYA portal in the https://umsitsguide.um.edu.my/index.html.

<sup>&</sup>lt;sup>4</sup> This form shall be labelled according to the year of submission of the thesis/dissertation/research report followed by student ID and the word 'perakuan'. For example: 2023\_170261111\_perakuan.

The submitted electronic copy of the research report/dissertation/thesis (in PDF format) in a USB flash drive or any valid source of electronic copy must be labeled with the following details:

- Name
- Registration no.
- Title of research report/dissertation/thesis
- Faculty/Academy/Institute/Centre
- Year of submission (current year)

Once all the documents required for final submission is completed, the faculty shall submit the documents via email to thesis@365.um.edu.my.

#### **CHAPTER 5: PLAGIARISM**

Postgraduate candidate of the Universiti Malaya are expected to produce original academic work. Plagiarism is defined as an academic fraud arising from the attitude of lying, insincerity, untrustworthiness, dishonesty and disrespect to fellow colleagues. Plagiarism happens when someone else's idea is taken without mentioning the source, and thus giving the impression that the idea is his own. This situation may occur when:

- (1) one's idea, taken word for word from an article or book that has been published.
- (2) The idea of a person from an article or book is taken using his own words.
- (3) A person's idea is taken from discussions whether in conferences, seminars, forums, talks or informal discussions between two parties.
- (4) Data, diagrams, tables, photographs or any other illustrative material derived from others is taken as if it were his own.

Postgraduate candidates are strongly advised to read the Universiti Malaya Guidelines on Handling Plagiarism, which outlines the rules and regulations pertaining to acts of plagiarism.

The University also requires the usage of Turnitin, an online web-based plagiarism detection application to avoid plagiarism and academic dishonesty. In most cases, the similarity index percentage should be between 10% to 30% and/or Artificial Intelligence (AI) writing detection indicator of more than 10%. Please refer to your respective faculty regarding the acceptable similarity index percentage.

# THESIS/DISSERTATION SUBMISSION & EXAMINATIONS



Click: https://fsktm.um.edu.my/examination

# PUBLICATION REQUIREMENT



# PUBLICATION REQUIREMENT FOR POSTGRADUATE CANDIDATES BY RESEARCH (SENATE APPROVAL ON 28.5.2015)

#### **DOCTORAL CANDIDATES**

- (1) Doctoral candidates pursuing programmes in the field of Sciences must show proof of acceptance for publication of at least two (2) articles in journals indexed by Thomson Reuters Web of Science (WoS) (according to the criteria set in the publication guidelines), prior to graduation.
- (2) Doctoral candidates pursuing programmes in the field of Social Sciences must show proof of acceptance for publication as per the following (according to the criteria set in the publication guidelines), prior to graduation:
  - at least one (1) article in journals indexed by Thomson Reuters Web of Science (WoS)

or;

(ii) at least one (1) book published by publishers listed in the Thomson Reuters Web of Science (WoS) Master Book List or by University of Malaya Press or *Dewan Bahasa dan Pustaka* or any publishers recognized by the Faculty

or;

- (iii) at least two (2) publications in Category A or B refereed journals, or book chapters as follows:
  - Articles in Category A journals:
     Journals indexed in the Scopus citation database; or the ERA Journal List (Australian Research Council).
  - Articles in Category B journals:
     Journals published by University or scholarly publishers or listed in MyJurnal (Malaysian Journal Management System). (List of Category B journals must be recognized by the Faculty).
  - Book chapters in different books: Book chapters published by publishers listed in the Thomson Reuters Web of Science (WoS) Master Book List, or by University of Malaya Press or *Dewan Bahasa dan Pustaka* or any publishers recognized by the Faculty. Two (2) book chapters in different books are equivalent to one (1) publication.

# PUBLICATION REQUIREMENT



# PUBLICATION REQUIREMENT FOR POSTGRADUATE CANDIDATES BY RESEARCH (SENATE APPROVAL ON 28.5.2015)

#### MASTERS CANDIDATES

- (1) Master's candidates pursuing programmes in the field of Sciences must show proof of acceptance for publication of at least one (1) article in journals indexed by Thomson Reuters Web of Science (WoS) (according to the criteria set in the publication guidelines), prior to graduation.
- (2) Master's candidates pursuing programmes in the field of Social Sciences must show proof of acceptance for publication as per the following (according to the criteria set in the publication guidelines), prior to graduation:
  - at least one (1) article in journals indexed by Thomson Reuters Web of Science (WoS)

or;

(ii) at least one (1) book published by publishers listed in the Thomson Reuters Web of Science (WoS) Master Book List or by University of Malaya Press or *Dewan Bahasa dan Pustaka* or any publishers recognized by the Faculty

or;

- (iii) at least one (1) publication in Category A or B refereed journals, or book chapters as follows:
  - Articles in Category A journals:
     Journals indexed in the Scopus citation database; or the ERA Journal List (Australian Research Council).
  - Articles in Category B journals:

Journals published by University or scholarly publishers or listed in MyJurnal (Malaysian Journal Management System). (List of Category B journals must be recognized by the Faculty).

Book chapters in different books:

Book chapters published by publishers listed in the Thomson Reuters Web of Science (WoS) Master Book List, or by University of Malaya Press or *Dewan Bahasa dan Pustaka* or any publishers recognized by the Faculty. Two (2) book chapters in different books are equivalent to one (1) publication.

# PUBLICATION GUIDELINES FOR POSTGRADUATE CANDIDATES BY RESEARCH (SENATE APPROVAL ON 28.5.2015)

Publication(s) produced by postgraduate candidates (research mode) in fulfilment of graduation requirements must comply with the following criteria:

CRITERIA	REMARK	
(1) Type of Publications	<ul> <li>Publications accepted must be:</li> <li>full length articles in journals with impact factor, which are listed in:</li> <li>(a) Thomson Reuters Web of Science (WoS) databases (Science Citation Index Expanded™, Social Sciences Citation Index® and Arts &amp; Humanities Citation Index®) or;</li> <li>(b) Category A* or Category B* recognized by the faculty; or;</li> <li>books* or book chapters* published by publishers listed in the ISI Web of Science (WoS) Master Book List, Thomson Reuters or by University of Malaya Press or Dewan Bahasa dan Pustaka or any publishers recognized by the Faculty. One (1) book is equivalent to 2 (two) publications whereas two (2) book chapters in different books are equivalent to 1 (one) publication.</li> <li>*Note: Publications in Category A or Category B refereed journals or books or book chapters are only applicable to candidates pursuing programmes in the field of Social Sciences.</li> </ul>	
(2) Authorship	Publications accepted must be published with the supervisor(s).  The candidate must be the first author, or either the second or subsequent author after the supervisor(s), or the first student author. In the event where two or more candidates co-authored an article, only one candidate is allowed to use this article to fulfil his/her graduation requirement.	
(3) Timing	Publications accepted must be within the candidature of the candidate.	
(4) Topic of publications	Publications accepted must be related and conform to the candidate's research in his/her thesis/dissertation.	
(5) Affiliation	Publications accepted must carry the affiliation of the department and/or faculty where the candidate is registered.	
(6) Blacklisted journals	<ul> <li>Publications in the following journals are NOT accepted:         <ul> <li>Publications in journals blacklisted by the Malaysian Ministry of Education (MoE)</li> <li>Publications in Probable Predatory Journals (http://scholarlyoa.com/individual-journals/) and Publishers (http://scholarlyoa.com/publishers/) and hijacked journals (http://scholarlyoa.com/other-pages/hijacked-journals/) according to Beall's List.</li> </ul> </li> </ul>	

# PLAGIARISM



## AVOIDING PLAGIARISM

As an enrolled student and member of the Universiti Malaya candidates are expected to produce original academic work. Failure to acknowledge the work of others in their work means the candidate is guilty of plagiarism. A candidate who is found to have plagiarized his assignments or any written work that is part of the assessment in a course or programme may be subjected to disciplinary action under the Universiti Malaya.

Candidates are advised to check their work for originality by using the Turnitin software. Details on Turnitin software can be accessed at <a href="https://www.turnitin.com">https://www.turnitin.com</a>

### INTELECTUAL PROPERTY



The UM —Intellectual Property Policyll covers intellectual property (IP) ownership. As an enrolled student of UM, candidates are required to report to the University all IP with commercial potential. This does not mean that candidates lose their IP rights as their invention still belongs to them unless they have previously assigned it to another party. However, UM may make a claim for joint ownership if, for example, candidates are employed by the University to do research. In such a case, the candidates' contract may assign ownership to the Universiti Malaya.



















**UM3MT Competition 2025** 

















Research talk & Exchange MOU ceremony by EUREKA Robotics Centre, Cardiff Metropolitan

















**PHD VIVA** 



#### **TEACHING AND LEARNING FACILITIES**

## FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

#### (A) TEACHING LABS

The Faculty of Computer Science and Information Technology provide 9 laboratories for teaching and learning purposes. The laboratories are as follows:

#### **BLOCK A**

#### Micro Lab 1 (MM1)

This lab has 50 units of computer that are connected to Windows Active Directory servers and the Internet. The operating system for these PCs is Windows 10. This lab is opened to all FSKTM undergraduate students.

#### Micro Lab 2 (MM2)

This lab has 12 units of computer that are connected to Windows Active Directory servers and the Internet. The operating system for these PCs is Windows 10. This lab is opened to all FSKTM undergraduate students.

#### Postgraduate Lab (ML)

This lab has 33 units of computer. All the computers are connected to Windows Active Directory servers and the Internet. The operating system for these PCs is Windows 10. This lab is opened to all FSKTM postgraduate students.

#### CCNA LAB (CCNA)

This lab has 41 units of computer. The operating system for these workstations is Windows 10. There are also 25 units of Cisco 1700 Series Router, 4 units Cisco 1760 Series Router and 12 units switch Cisco 2950 CATALYST Series. This lab is opened to all FSKTM students.

#### Robotic Teaching Lab

The Robotic Teaching Lab @ FCSIT is part of the Department of Artificial Intelligence effort to provide conducive intelligent learning environment to students taking the 'Intelligent Robotics' course. Equipped with six mobile robots, the lab allows space for hands-on and robotic experiments designed to help students understand the concept of robotic intelligence and acquire the needful skills for the course.

#### **BLOCK B**

#### Micro Lab 3 (MM3)

This lab has 60 units of computer that are connected to Windows Active Directory servers and the Internet. This lab is opened to undergraduate and postgraduate students.

#### Micro Lab 4 (MM4)

This lab has 60 units of computer that are connected to Windows Active Directory servers and the Internet. This lab is opened to undergraduate and postgraduate students.

#### Micro Lab 6 (MM6)

This lab has 45 units of computer that are connected to Windows Active Directory

servers and the Internet. This lab is opened to all FSKTM students but priority is given to multimedia courses. Operating system – Windows 10.

#### Stroustrup Lab 1

This lab has 42 units of computer that are connected to the Internet. This lab is opened to undergraduate students. Operating system – Windows 10.

#### (B) RESEARCH LABS

7 research labs to support postgraduate students research activities, managed by various departments in the faculty:

#### BLOCK A

#### Computer Technology Lab

This lab is opened to post-graduate student, priority given to students who are taking courses related to the field Computer Technology.

#### BLOCK B

#### VLSI Research Lab

The VLSI Research Lab, located on the second floor of Block B, is an open-concept lab that is not restricted to students from a specific field. All students can use the space and facilities provided in the lab, with permission for access.

#### Computer Systems and Network Research Lab

Focus on data security research through networking, ability of protocols and ATM studies.

#### Stroustrup Lab 2

This lab has 18 units of computer that are connected to the Internet. This lab is opened to undergraduate students taking courses related to electronic circuit.

#### Wisma R&D (15th floor):

## Knowledge Engineering Lab Web Based Information System Lab

Both the Knowledge Engineering Lab and the Web-Based Information System Lab are open-concept labs accessible to all postgraduate students, regardless of their field. Students can use the space and facilities provided in these labs, with permission for access. These labs are located on the 15th floor of Wisma R&D

#### Robotedge Al Robotic Lab

This lab is previously known as Natural Language Processing Lab. This lab is equipped with equipment for Al robotics research and development focusing on environmental, home services, and search and rescue research areas.

#### (C) PROJECT BASED LAB

Al-based Machine Vision essentials. Key objective is to transfer 'Al-based machine vision' knowledge to university lecturers and students.

Wisma R&D (15th floor):

Web Based Information System Lab & Knowledge Engineering Lab (Open-Space Concept)

Both the Knowledge Engineering Lab and the Web-Based Information System Lab are open-space concept labs accessible to all postgraduate students, regardless of their field. Students can use the space and facilities provided in these labs, with permission for access. These labs are located on the 15th floor of Wisma R&D

#### Robotedge Al Robotic Lab

This lab is previously known as Natural Language Processing Lab. This lab is equipped with equipment for Al robotics research and development focusing on environmental, home services, and search and rescue research areas.

# OTHER FACILITIES FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

#### 1. Prayer Room (surau)

Air-conditioned prayer rooms (surau) (one for Men, and the other for Women) are provided in Block A for Muslims to pray. The surau for Men is located at the second floor and surau for women is located at the first floor in the building. Users are not allowed to sleep and eat in the surau. Users are also responsible for the cleanliness of the surau.

#### 2. Vending Machine (Drinks)

There are 4 units of vending machine for cold drinks located at Block A and Block B.

#### 3. Cafeteria

Cafeteria is located at the back of Block A.

#### 4. Postgraduate Lounge & Student Centre

Space provided for student to relaxing their mind, having informal discussion and make a small gathering. A few facilities such as sofas, computers, discussion rooms and pantry are ready to use.

#### 5. Parking Lot

The Faculty also provides parking lots for students to park their car or motorbike. Students can park their car or motorbike at the back of Block A. There are 150 parking lots for the motorbike and 45 for the car. Students are not allowed to park their car in front of both buildings because the parking lots are reserved for the faculty staff and visitors.

#### 6. Water Purifiers

Water purifiers are provided in both buildings and placed at every floor.

#### 7. Internet Access at the building of FCSIT

There are WIFI Internet Access provided to students at every floor in each building. Students must obey the rules and regulations during the usage of these facilities.

#### 8. SPeCTRUM (Student Powered e-Collaboration Transforming UM)

This facility is for easy accessibility for student to upload their notes and information regarding their courses.

All faculties (excluding Faculty of Medicine & Faculty of Dentistry) and PASUM can browse the SPECTRUM website at <a href="https://spectrum.um.edu.my">https://spectrum.um.edu.my</a>

For Faculty of Medicine and Faculty of Dentistry, SPECTRUM website can be browsed a <a href="https://spectrumx.um.edu.my">https://spectrumx.um.edu.my</a>

All queries and suggestions can be directed to <a href="https://helpdesk.um.edu.my">https://helpdesk.um.edu.my</a>

#### 9. Door Access

Students must register for door access for using research labs, Student Center and Postgraduate Lounge.

#### LABORATORY REGULATIONS

- 1. Only registered users are allowed to use the facilities in the lab.
- 2. Effective from 1<sup>st</sup> April 2006, it is compulsory for users to wear the matric card in the lab at all times. Users who do not wear the matric cards are not allowed to enter the lab. Lab staff has the right to ask the user to leave upon refusing to wear or show his/her name tag.
- 3. Ensure use of good quality of CD, thumb drives, external hard disk and virus-free data. The faculty reserves the right to examine before use.
- Users are strictly prohibited from making copies of software without the knowledge of the staff on duty.
- 5. Users are prohibited from installing any software onto the hard disk without the knowledge of the staff on duty (eg; KAZAA, BitTorent, P2P software). The faculty reserves the right to remove such installations without any prior notice.
- Any hardware problems must be reported to the staff on duty. The faculty will not be responsible for any accidents or damage because of negligence and misuse of the equipment by users.
- 7. Users are prohibited from playing games, chat or browse the web for pornography materials.
- 8. Users are prohibited from bringing in friends or students from other faculties/universities into the lab.
- 9. Users are prohibited from making noise and disturbing others. Any discussions should be conducted outside the lab.
- 10. Smoking, bringing-in bags and foodstuffs is strictly prohibited in the lab.
- 11. Users are responsible for the safekeeping of the data, hardware and cleanliness of other equipment in the lab including tables and chairs.
- 12. Users must be properly attired inside the lab. Slippers, shorts and indecently dressed users are strictly prohibited.
- 13. Users are prohibited to change administrator password as security reason and maintenance work.

Disciplinary action will be taken by the Faculty against those who breached the rules and regulations mentioned above.

#### **ENQUIRIES ON TECHNICAL PROBLEMS**

Users who have problems using the equipment and software can contact the technical staff working in the laboratory as in the table below:

LAB	STAFF ON DUTY	TEL. NO.	EMAIL
Micro Lab 1 (MM1)	Tun Hairul Farid Ton Hamzah	03-79676364	tunhairul@um.edu.my
Micro Lab 2 (MM2)	Jamal Amran	03-79676364	jamalamr@um.edu.my
Postgraduate Lab (ML)	Nor Azura Adnan	03-79676406	azura_adnan@um.edu.my
CCNA Lab (MC)	Wan Mohd. Hasanul Isyraf Wan Yusoff	03-79676394	isyraf@um.edu.my
Micro Lab 3 (MM3)	Haryati Masilan	03-79676391	haryatim@um.edu.my
Micro Lab 4 (MM4)	Mohd Farhan Abdul Rahman	03-79676391	farhan.rahman@um.edu.my
Micro Lab 6 (MM6)	Mohd Annuar Ja'afar	03-79676364	annuar@um.edu.my
Stroustrup Lab 1 (MS1)	Mohd. Farhan Abdul Rahman	03-79676320	farhan.rahman@um.edu.my
Robotic Teaching Lab	Jamal Amran	03-79676364	jamalamr@um.edu.my

#### **Operation Hours:**

DAY	TIME		
	8.00 a.m. – 5.30 p.m.		
Monday -	(extended upon request according to class		
Thursday	timetable)		
	8.00 a.m. – 12.15 p.m.		
Friday	2.45 p.m. – 5.30 p.m.		
	(extended upon request according to class		
	timetable)		

<sup>\*\*</sup> Computer Laboratories will be closed during maintenance work, and public holidays.

#### Disclaimer

Whilst every effort has been made to ensure accuracy of the information contained in this handbook, changes may occur. Students are advised to check the faculty web site http://www.fsktm.um.edu.my for any changes and current information.

The Faculty cannot be held responsible for any errors or omissions in this handbook, and accepts no liability whatsoever for any loss damage howsoever arising.