# UNDERGRADUATE HANDBOOK

Academic Session 2016/2017

Faculty of Informatics and Computing

UNIVERSITI SULTAN ZAINAL ABIDIN

https://www.fik.unisza.edu.my

KNOWLEDGE FOR THE BENEFIT OF HUMANITY

UNDERGRADUATE HANDBOOK
Academic Session 2016/2017
Faculty of Informatics and Computing

Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, Kampus Besut ● 2016

Contents

LOGO DESIGN RATIONALE

MOON AND STAR
These symbols represent Islam as a religion of faith to be upheld and a way of life.

SHIELD
This symbol represent a willingness to defend Islam and knowledge to maintain UniSZA as a point of reference and a leading repository of knowledge.

BOOK
This symbol represent the search and spread of knowledge for the use of mankind based on the Quran, which is pure, clean, and civilised.

RICE FLOWER
This symbol represent a rich Malay culture which has a sovereign king with a pledge of allegiance. The three knots represent the bond of unity between the three major races in Malaysia.

GEOMETRICAL SHAPES (ARABESQUE DESIGN)
There are 8 geometric flower petals that represent the 8 values that serve as a guideline for a successful and balanced life in this world and hereafter. The 8 values are Knowledge, Faith, Practice, Syaja'ah, Qana'ah, Obedience, Tolerance and Consensus.

COLOURS
BLACK
Black represents firmness. It is the official colour of Terengganu.

WHITE
White represents purity, cleanliness, honesty, and sincerity. It is the official colour of Terengganu.

YELLOW
Yellow represents the monarchy.

GREY
Grey represents technology, exclusiveness, and balance.

Foreword by The Vice Chancellor

Assalamualaikum Warahmatullahi wa Barakatuh, greetings and salam 1Malaysia.

I would like to begin by expressing my utmost gratitude to the Almighty for His divine mercy and His grace, this handbook is able to be published.

I would like to welcome and congratulate all students who were chosen to study in UniSZA. Indeed, your presence in UniSZA is the right step to equip and prepare yourself as talented individuals who are knowledgeable, skilled, as well as possess good character and admirable leadership qualities for the sake of our religion, race and country.

The main objective of this handbook is as a reference material for students to understand and be familiar with the faculty, academic system and programmes offered. You are going through an introduction phase to the academic world. It aims to build the mind from philosophical, conceptual, and spiritual aspects as well as strengthen confidence and commitment to fully serve the country.

Finally, congratulations to all parties who worked together to complete the publication of this Undergraduate Handbook. All efforts put into this should be an example to be followed by all staff and students of UniSZA in line with the process of realizing Knowledge for the Benefit of Humanity.

Thank you.

Prof. Dato 'Dr. A. Latif Ahmad Zubaidi
Vice Chancellor
Universiti Sultan Zainal Abidin

Foreword by The Dean

Praise be to GOD, the Most Gracious and the Most Merciful. Peace and blessings be upon Prophet Muhammad and his family.

Assalamualaikum Warahmatullah and greetings.

Praise be to Allah. Congratulations to all students who have successfully entered UniSZA as a platform to continue your studies. Along with UniSZA's goal to become an excellent internationally ranked university, the faculty strives to empower and equip students with academic achievement as well as outstanding and admirable character.

The faculty is always ready to assist students in achieving academic excellence and develop a commendable personality. Excellence and expertise in the academic field can only be achieved through hard work and it is important to have a clear goal as you step into the ivory tower.

Therefore, set the pace and set the strategy for to achieve success for the sake of our religion, race and country. Finally, we hope students can take full advantage of the opportunities that exist as members of the Faculty of Informatics and Computing.

Best wishes.

Thanks.

Dr. Syadiah Nor Wan Shamsuddin
Dean, Faculty of Informatics and Computing
Universiti Sultan Zainal Abidin

Academic Calendar Session 2016/2017

Diploma and Bachelor Programme

Short Semester/Special Semester

Programme	Duration	Date
New Student Enrollment SPM / equivalent Academic Session 2016/2017	1 Day	5 June 2016
Minggu Mesra Siswa (Orientation Week)	6 Days	6 Jun, 2016 - June 11, 2016
Lectures	7 Weeks	12 Jun, 2016 - August 62016
Special Holiday Celebration	1 Week	July 3, 2016 - 9 July 2016
Final Examination	2 Weeks	7 August 2016 - 20 August 2016
Semester Break	2 Weeks	21 2016 - 3 September 2016

Diploma and Bachelor Programme
Semester I

Programme	Duration	Date
New Student Enrollment STPM / Diploma / equivalent Academic Session 2016/2017	1 Day	August 29, 2016
Minggu Mesra Siswa (Orientation Week)	5 Days	30 2016 - 3 September 2016
Lectures	14 Weeks	4 September 2016 - 15 December 2016
Mid-Semester Break	1 Week	30 October 2016 - 5 November 2016
Revision Break	4 Days	December 16, 2016 - December 19, 2016
Final Examination Semester I	3 Weeks	December 20, 2016 - January 7, 2017
Semester Break	2 Weeks	January 8, 2017 - January 21, 2017

Semester II

Programme	Duration	Date
Lectures	14 Weeks	January 22, 2017 - May 4, 2017
Mid-Semester Break	1 Week	March 5, 2017 - March 11, 2017
Revision Break	4 Days	5 May, 2017 - May 8, 2017
Final Examination Semester II	3 Weeks	9 May 2017- May 27 2017
Semester II Break	13 Weeks	28 May 2017 - September 2017

** subject to revision

Universiti Sultan Zainal Abidin at a Glance

The knowledge tradition in Terengganu comes alive with the role of umara' which puts the ulama as advisers at the palace. Looking back through the Islamic history in Terengganu, ulama has been advisers, royal guests, teachers, muftis, and syeikhul ulama since the days of Sultan Zainal Abidin I. Whatever the title given, the close relationship between rulers and ulama sparked the growth of Islam in Terengganu. The height of this growth is during the reign of Sultan Zainal Abidin III, where the palace is used to disseminate religious knowledge. Ulama such as Ku Paloh Tok and Tok Sheikh Duyong shape and paint the Islamic tapestry of Terengganu. The Sultan himself is said to join the knowledge sessions at ulamas' homes and frequents Paloh to study with Tok Ku Paloh.

A number of ulamas and scholars admitted that Sultan Zainal Abidin III was among the most devout Sultan in his day. Sheikh Muhammad bin Ismail al-Fathani (Sheikh Nik Mat Kecik) and Sheikh Ahmad bin Muhammad Zain al Fathani were two scholars from the Malay world, residing in Mecca, who became the point of reference for various problems for the Sultan.

Growth and development of Islam in Terengganu give way to many *'pondok'* institutions founded by Tok Pulau Manis during the reign of Sultan Zainal Abidin I (1726-1733M) as a centre of Islamic studies which led to the establishment of religious schools or Arabic *madrasah*.

In 1925, al-Arabiah *madrasah* was established in Kuala Terengganu and changed its name to Madrasah Sultan Zainal Abidin in 1933. The establishment of this school received support and encouragement from the Sultan at the time, Sultan Zainal Abidin, the 13th Sultan of Terengganu named after the late Sultan Zainal Abidin III who was known for his piety and strong faith in the the teachings of Islam.

In 1980, the state government under the leadership of YAB Dato' Seri Amar Diraja Tan Sri Haji Wan Mokhtar Ahmad as the Menteri Besar of Terengganu at the time established Sultan Zainal Abidin Religious College (KUSZA) in Gong Badak, Kuala Terengganu. Establishing KUSZA has upheld the Islamic-oriented education in Terengganu and Malaysia. KUSZA has produced many scholars who have contributed significantly to the country, especially in the development of human capital.

In 2006, KUSZA was replaced by Universiti Darul Iman Malaysia (UDM) before it changed its name to Universiti Sultan Zainal Abidin on May 13, 2010 by order of Universiti Darul Iman Malaysia (Incorporation) (Amendment) Act, 2010. With this proclamation, it once again perpetuates the name Sultan Zainal Abidin as a pious, noble, and a people's person. May Sultan Zainal Abidin III's legacy and leadership be an example to everyone in UniSZA and puts UniSZA in the international arena.

UniSZA's Vision, Mission, Core Values, Niche, and Motto

VISION

A Globally Acclaimed Preferred University.

MISSION

Inspiring refined individuals proficient in management technology through academic excellence and community engagement.

MOTTO

Knowledge for the Benefit of Humanity

CORE VALUES

Ethical and moral
Competent and skilled
Professional
Collaborative
Creative and Innovative
Customer-focused
Responsible
Caring and Sense of Belonging
Reliable

NICHE

Human Civilisation and Management Technology

University Authorities and Officers

CHANCELLOR

**KEBAWAH DULI YANG MAHA MULIA SULTANAH TERENGGANU
SULTANAH NUR ZAHIRAH**

D.M.N., D.K.(Terengganu), S.S.M.Z., S.S.M.T.(Terengganu),

*Knight Grand Cross (First Class) of the Most Illustrious Order of Chula Com Klao
(Thailand)*
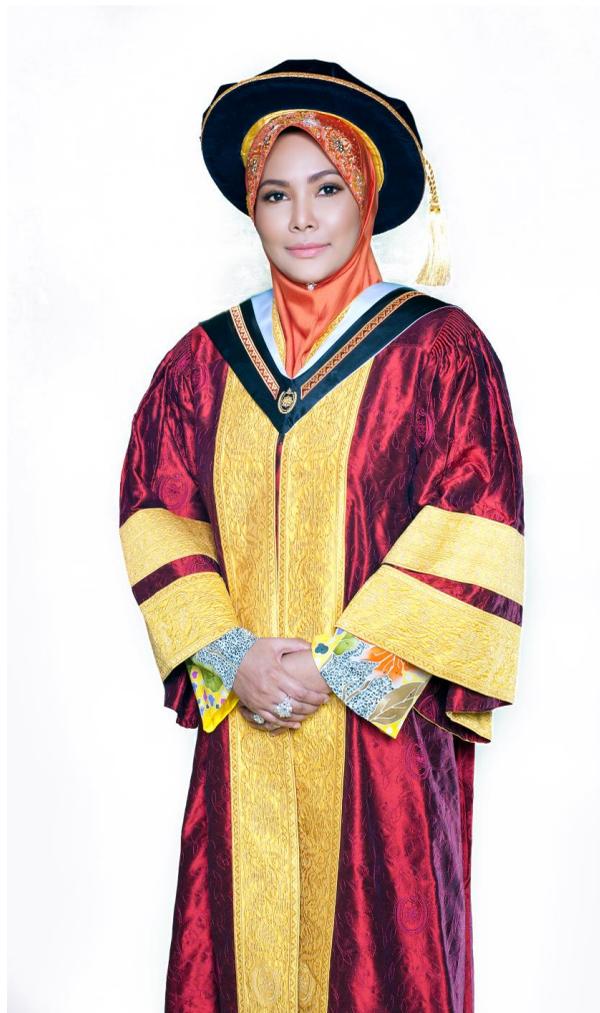
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P.S.M., S.P.M.T., D.S.S.A., J.M.N., P.P.T.
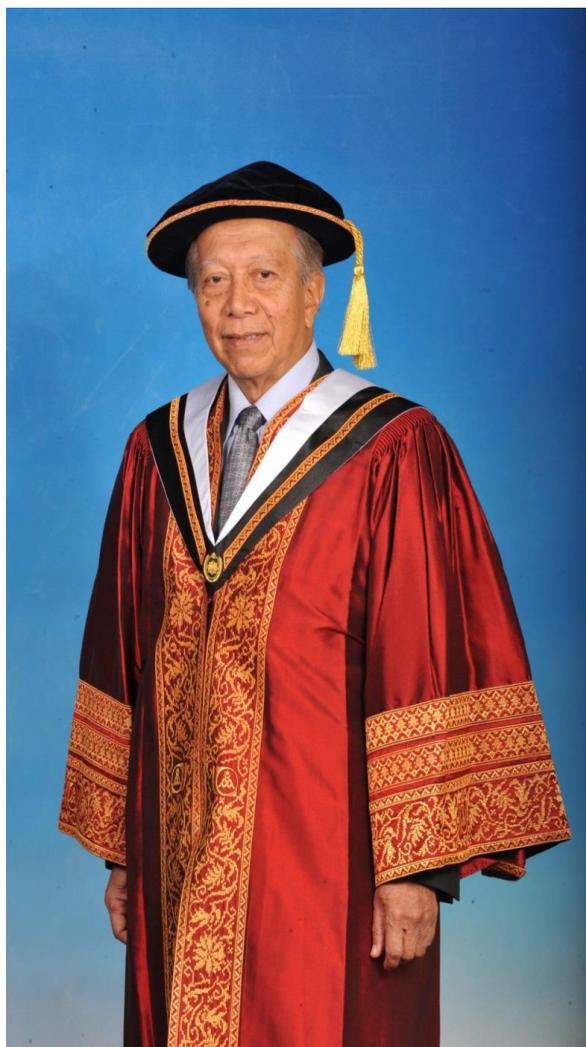
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University's Top Management

Vice Chancellor
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Deputy Vice Chancellor (Students' Affairs & Alumni)
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PhD (UMT), MBA, BSc (UPM)

Registrar
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MBA (UKMalaysia), BA (Malaya)

Bursar
Prof. Madya Ariza Ibrahim
M. Acc (UKMalaysia), B. Acc (UKMalaysia)

Legal Advisor
Prof. Dr. Zuhairah Ariff Abdul Ghadas
PhD in Business Law (UPM), Master in Comparative Law (UIAM, LLB in Business Law (Hons) (University of Huddersfield, West Yorkshire, UK)

Director, Department of Development Management
Ir. Mohd Yasim A.Ghani
B.Eng(Hons) Civil Engineering, Middlesex University UK, Dip Kej. Awam, UTM

Background of The Faculty

Faculty of Informatics and Computing was officially established in June 2006 by the Ministry of Higher Learning. The faculty was established by upgrading the Information Technology Centre, Sultan Zainal Abidin Religious College (KUSZA). The Information Technology centre was officially established on 1st June 1997. The academic programmes related to the field of Information and Communication Technology (ICT) conducted at the time include:

1. Certificate in Information Technology
2. Certificate in Multimedia Technology
3. Certificate in Computer Programming
4. Diploma in Information Technology
5. Diploma in Information Technology (Multimedia)
6. Bachelor of Information Technology (Collaboration with Universiti Malaya)
7. Bachelor of Science in Business Information Systems (Collaboration with the University of East London)

Faculty of Informatics and Computing is now headed by a Dean, assisted by three Deputy Deans and three Heads of School. There are three centres of study in the Faculty of Informatics and Computing approved by the Senate of Universiti Sultan Zainal Abidin (UniSZA). They are the Centre for Computer Science, Centre for Information Technology, and the Centre for Multimedia. The core activities of the faculty consist of teaching and learning, research and development and community service. The faculty has a total of 50 lecturers, 10 assistant lecturers, 1 teacher, and 11 support staff.

Presently, the Faculty of Informatics and Computing offers nine academic programmes related to the field of informatics:

1. Postgraduate
   a) PhD
   b) Master of Science
   c) Bachelor of Information Technology (Informatics Management)

2. Bachelor's Degree with Honours
   a) Bachelor of Computer Science (Software Development)
   b) Bachelor of Computer Science (Computer Network Security)
   c) Bachelor of Computer Science (Internet Computing)
   d) Bachelor of Information Technology (Media Informatics)

3. Diploma.
   a) Diploma in Information Technology
   b) Diploma in Information Technology (Multimedia)

As of 2015, more than 756 graduates have been produced by the Faculty of Informatics and Computing which comprised of 323 graduates from Diploma in Information Technology, 227 graduates from Diploma in Information Technology (Multimedia), and 206 graduates from Bachelor of Computer Science (Software Development) with Honours.

Vision, Mission, and Objectives of The Faculty

Vision
Determined to become an internationally ranked centre of excellence that incubates and develops leaders who spearhead the field of Informatics in line with the vision and mission of UniSZA.

Mission
To enrich knowledge through education, research, and innovation proactively to create and develop leaders with integrity, who are innovative and creative in leading various fields of Informatics.

Objectives
1. To offer academic programmes that meet the human capital needs to realize the country's policies.
2. To produce graduates who has integrity and characteristics of a quality leader and who are competitive and competent.
3. To implement high quality research and innovation that benefit the local community and country.
4. To adopt effective governance and professional management of academic and research development.
5. To provide quality infrastructure and info-structure to support service milestone.

Faculty Management

Dean
Syadiah Nor Wan Shamsuddin
PhD (UK), MIT, BIT (UKMalaysia), Dip. IT (KUSZA)

Deputy Dean (Academic and Postgraduate)
Mumtazimah Mohamad
PhD (UMT) , MSc (UPM), BSc (UKM), Dip. IT (KUSZA)

Deputy Dean (Research and Development)
Mohamad Afendee Mohamed
PhD (UPM), MSc (Glamorgan Univ), BSc (UMIST)

Deputy Dean (Student Affairs and Alumni)
Mohd Fadzil Abdul Kadir
PhD (Jepun), MSc (UUM), BEng (Mie Univ)

Head of Computer Science School
Suhailan Dato' Hj. Safei
PhD (UTEM), MSc, BSc, Dip. Comp. Sc (UTM)

Head of Information Technology School
Aznida Hayati Zakaria @ Mohamad
PhD (UMT), MSc (KUSTEM), BIT(UUM)

Head of Multimedia School
Azilawati Rozaimee
MSc, BSc (UPM)

Coordinator of Facilities and Technical Management
Mohd Khalid Awang
MSc (UUM), BSc (IU Bloomington)

Coordinator of Data and Industrial Training
Nurnadiah Zamri
PhD, MSc, BSc (UMT)

Coordinator of Quality Assurance and E-Learning
Azrul Amri Jamal
PhD (Bangor University, Wales, UK), M.Eng Electronics & Information Science, B.Eng Computer Science (Takushoku University)

Coordinator of Postgraduate Programme
Abd. Rasid Mamat
MSc (UUM), BIT (UKMalaysia)

Coordinator of Computer Science Programme
Nor Surayati Mohamad Usop
MSc, BSc., Dip. Comp. Sc (UPM)

Coordinator of Information Technology Programmme
Roslinda Muda
MSc, BSc., Dip. Comp. Sc (UTM)

Coordinator of Multimedia Programme
Maizan Mat Amin
MSc (UPM), BIT (UKMalaysia), Dip. IT (KUSZA)

Senior Assistant Registrar
Nurul Liyana Mohamad Yusof
BBA (UniSZA)

Members of The Faculty

Computer Science School

Proffesor
Mohd Nordin Abdul Rahman
PhD (UMT), MSc, BIT (UKMalaysia)

Associate Proffesor
Fadhilah Ahmad
PhD (UMT), MSc (Leeds), BSc (Shefield Hallam)

Mokhairi Makhtar
PhD (UK), *MIT, BIT (UKMalaysia), Dip. IT (KUSZA)*

Senior Lecturer
Ahmad Nazari Mohd Rose
PhD (UTHM), MSc (Brunel Univ), BSc (Ohio Univ)

Mohamad Afendee Mohamed
PhD (UPM), MSc (Glamorgan Univ), BSc (UMIST)

Syarilla Iryani Ahmad Sany
PhD (UPM), MIT (UKMalaysia), BSc (California State Univ)

Wan Nor Shuhadah Wan Nik
PhD (Australia) , MSc (UMT), BSc (UKM)

Zarina Mohamad
PhD (UTHM), MSc (UMT), BSc (UPM), Dip. Comp. Sc (UiTM)

Aznida Hayati Zakaria @ Mohamad
PhD (UMT), MSc (KUSTEM), BIT(UUM)

Azrul Amri Jamal
PhD (Bangor University, Wales, UK), M.Eng Electronics & Information Science, B.Eng Computer Science (Takushoku University)

Wan Suryani Wan Awang
PhD (Cardiff University), MSc (UMT), Pg.Dip Adv. Comp. (Bristol Univ) , BSc (Sheffield Hallam Univ)

Mohd Isa Awang
MIT (UKMalaysia), Pg Dip System Eng (UWCC), BSc (USM)

Mohd Kamir Yusof
MSc, BSc, Dip. Comp. Sc (UTM)

Mohd Khalid Awang
MSc (UUM), BSc (IU Bloomington)

Lecturer
Norlina Udin @ Kamaruddin
MIT (UKMalaysia), BIT (UKMalaysia), Dip. IT (KUSZA)

Rohana Ismail
MSc, BSc (UPM)

Fatimah Ghazali
MSc (UPM), B.IT (UKMalaysia), Dip. IT (KUSZA)

Information Technology School

Proffesor
Mustafa Mamat
PhD (UMT), MSc (UPM), BSc Hons (UM)

Associate Proffesor
Fatma Susilawati Mohamad
PhD (UTM), MIT (UKMalaysia), BSc (Oklahama Cit Univ), Dip. Marketing (KUSZA)

Senior Lecturer
Engku Fadzli Hasan Syed Abdullah
PhD (UK), MSc (UTM), BMIS (UIAM)

Mohd Fadzil Abdul Kadir
PhD (Jepun), MSc (UUM), BEng (Mie Univ)

Mumtazimah Mohamad
PhD (UMT) , MSc (UPM), BSc (UKM), Dip. IT (KUSZA)

Nurnadiah Zamri
PhD, MSc, BSc (UMT)

Zahrahtul Amani Zakaria
PhD (UTM), BSc (UTM)

Suhailan Dato' Hj. Safei
PhD (UTEM), MSc, BSc, Dip. Comp. Sc (UTM)

Che Mat Ismail
MSc , Ad.Dip. Comp.Sc (UTM) ,BSc (UM)

Hasni Hasan
MSc (UiTM), BEng (South Australia)

Abd. Rasid Mamat
MSc (UUM), BIT (UKMalaysia)

Wan Dagang Wan Ali
MSc (Coventry Univ), Pg.Dip Comp.Sc (UTM) , B.Sc (UKMalaysia)

Lecturer
Fauziah Ab. Wahab
MSc (UPM), BIT (UUM), Dip. IT (KUSZA)

Nor Surayati Mohamad Usop
MSc, BSc., Dip. Comp. Sc (UPM)

Roslinda Muda
MSc, BSc., Dip. Comp. Sc (UTM)

Siti Dhalila Mohd Satar
MSc (UTM), BIT (UKMalaysia)

Multimedia School

Senior Lecturer
Syadiah Nor Wan Shamsuddin
PhD (UK), MIT, BIT (UKMalaysia), Dip. IT (KUSZA)

Maizan Mat Amin
MSc (UPM), BIT (UKMalaysia), Dip. IT (KUSZA)

Norkhairani Abdul Rawi
MIT, BIT (UKMalaysia), Dip. IT (KUSZA)

Lecturer
Azilawati Rozaimee
MSc, BSc (UPM)

Irma Shayana Samaden
MSc (UKM), BA (Hons) Art And Design Graphic, BA Art And Design In Graphic (UiTM)

Mat Atar Mat Amin
MSc (UTM), BIT (UKMalaysia), Dip. IT (KUSZA)

Mohd Sufian Mat Deris
MEd , BSc., Dip. Comp. Sc (UTM)

Vocational instructor
Zaami Mohamad
Dip. Eng (UTM)

Study Leave
Raja Hasyifah Raja Bongsu
MSc (UPM), BSc (UKMalaysia)

Julaily Aida Jusoh
MSc (UMT), BSc (UPM)

Wan Malini Wan Isa
MSc, BSc (UPM)

Nazirah Abd Hamid
MSc (UTM), BIT (UUM)

Normala Rahim
MSc (UKM), BA In Photography And Creative Imagine (UiTM)

Wan Mohd Rizhan Wan Idris
MSc (UMT), BIT (UKMalaysia),   Dip. IT (KUSZA)

Azwa Abdul Aziz
MSc (UMT), BSc, Dip. Comp. Sc (UiTM)

Elissa Nadia Madi
MSc, BSc(UMT)

Nor Aida Mahiddin
MSc (UPM), BSc, (UKMalaysia), Dip. IT (SAL College)

Study Programme

Bachelor of Computer Science (Software Development) with honours (BCS-SD)

Bachelor of Computer Science (Software Development) with honours first offered in Session July 2006/2007. The programme has received the quality certificate from the Malaysian Qualifications Agency (MQA 11180). This program is unique and different from the programs offered by other universities .

Bachelor of Computer Science (Software Development) with Honours is a full-time study. The programme duration is three and half years covering SEVEN SEMESTER consisting of six (6) regular semester and six (6) months of industrial training . Teaching and learning methods for each course is through lectures, tutorials, practical, presentations, projects and industrial training.

Programme Aims

The program aims to foster talented, resilient and responsible software technocrats who will promote universal responsibility through software development, in supporting the national and global aspirations of the Digital Economy.

Programme Educational Outcomes

PEO 1   Computer practitioners who synthesize and apply the knowledge and understanding to provide technical solutions for the software development industries locally and globally.

PEO 2   Computer technocrats who ethically and professionally provide computer solutions to fulfil social responsibilities of the diverse Malaysian community.

PEO 3   Computer practitioners who lead and collaborate in teams through effective communication in solving problems scientifically..

PEO 4   Computer practitioners who continually enhance personal and professional know-how, and venturing new business opportunities.

Programme Learning Outcomes

PLO 1   Acquire and apply knowledge of essential facts, concepts, principles, and theories of Computer Science, focusing on software development

PLO 2   Applying computingskills in analyzing ,modelling, designing, developing, programming and evaluating efficient computing solutions in software development

PLO 3   Fulfill obligations and social responsibilities using appropriate social skills

PLO 4   Practice the value, attitude and professionalism in line with the related code of conduct

PLO 5   Communicate effectively with peers, clients, superiors and society at large; with appropriate leadership and team work skills

PLO 6   Utilize scientific skills to analyze algorithms as well as designing optimal solution to software development problems

PLO 7   Manage information and engage in lifelong learning for academic and career development

PLO 8   Possess managerial and entrepreneurship skills in business and real world perspectives

Career Prospects

- Software Engineer / Systems Engineer
- Information Systems Officer
- Computer Programmer / Web Programmer
- Database Administrator
- Computer Network Engineer
- System Analyst
- Entrepreneurs ICT technocrats
- Researchers

Entry requirements

i. STPM CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Persekolahan Malaysia (STPM) with at least a CGPA 2.00 and obtained at least grade C (NGMP 2.00) in three (3) subjects including General Studies.

PROGRAMME REQUIREMENTS

4. Pass in STPM)/ equivalent qualification with at least a CGPA 2.00

AND

5. Obtain at least grade C (2.00) at the STPM level in any TWO (2) subjects.

AND

6. At least a distinction grade C at the STPM level in any Mathematics (T) OR Mathematics (M).

OR

At least a distinction grade C at the SPM level in Additional Mathematics or equivalent.

AND

7. Get at least level 2 (Band 2) in MUET

ii. MATRICULATION/FOUNDATION CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Matriculation Foundation with at least a CGPA 2.00;

PROGRAMME REQUIREMENTS

4. At least a CGPA 2.00 at the matriculation level/ recognized Foundation.

 AND

5. Obtain at least grade C (2.00) of any TWO (2) subjects at the matriculation level excluding Mathematics.

AND

6. At least a distinction grade C at the Matriculation/ Foundation level in Mathematics.

OR

At least a distinction grade C at the SPM level in Additional Mathematics.

AND

7. At least level 2 (Band 2) in MUET

iii. DIPLOMA/ EQUIVALENT CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Graduated with a Diploma or other equivalent qualification recognized by the Malaysian Government and approved by the University Senate;

PROGRAMME REQUIREMENTS

4. Obtained at least CGPA 2.50 at Diploma level of Computer Science/ Information Technology/ Software Engineering/ Information Systems or equivalent field.

AND

6. Obtained at least distinction grade C at the SPM level in Additional Mathematics.

AND

7. Get at least level 2 (Band 2) in MUET

iv. STAM CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Agama Malaysia (STAM) with at least the rank of Jayyid.

PROGRAMME REQUIREMENTS

4. At least a rank Jayyid in STAM level

AND

5. At least a distinction grade C at the SPM level in Additional Mathematics.

AND

6. At least level 2 (Band 2) in MUET.

Curriculum Details and Structure

Curriculum Structure According To Course Classification

Eligibility to be awarded the degree of Bachelor of Computer Science (Software Development) with honours, each student is required to pass at least 123 credit hours of courses. These courses are classified into 6 sections as follows:

Table 1. Curriculum structure according to course classification

No	Components	Credit Hours	Percentage (%)
1.	University Courses	19	15
2.	Core Courses	42	34
3.	Specialization Courses / Programme Elective Courses	30	24
4.	Free Module Courses	12	10
5.	Final Year Project	8	7
6.	Industrial Training	12	10
	Total	**123**	**100%**

University Courses

Table 2. University courses (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU32012	English For Communication I	2
2.	MPU32022	English For Communication II	2
3.	MPU32032/ MPU32042	Bahasa Arab / Bahasa Asing	2
4.	MPU33012/ MPU33022	Ilmu Wahyu dan Sains (Islam)/ Moral & Etika II (Bukan Islam)	2
5.	MPU31022	Tamadun Islam Dan Tamadun Asia	2
6.	MPU31012	Hubungan Etnik	2
7.	MPU32092	Asas Pembudayaan Keusahawanan	2
8.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan (Islam)/ Perbandingan Agama II (Bukan Islam)	2
9.	MPU33050/ MPU33060	Talaqqi Qur'an (Islam) / Protokol Dan Pengurusan Majlis (Bukan Islam)	AUDIT
10.		Kokurikulum	3
	Total		**19**

* Pre requisite:
- MPU32022 is course MPU32012

Core Courses

Table 3. Core courses (42 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 11603	Discrete Mathematics	3
2.	CSF 21103	Probability and Statistical Data Analysis	3
3.	CSF 11303	Human Machine Interaction	3
4.	CSF 11103	Problem Solving and Computer Programming	3
5.	CSF 11203	Computer Organisation and Architecture	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 21303	Database	3
8.	CSF 11503	Social and Professional Ethics	3
9.	CSF 11703	Operating System	3
10.	CSF 21203	System Analysis and Design	3
11.	CSF 11903	Network and Security Fundamentals	3
12.	CSF 11403	Software Engineering Methods	3
13.	CSF 11903	Data Structure and Algorithms	3
14.	CSF 31103	Artificial Intelligence	3
		Total	**42**

* Pre requisite:
- CSF 11803 is course CSB 11103

Specialization Courses/ Programme Elective Courses (BCS-SD)

Table 3. Specialization courses (24 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSD 23103	Web Application Development	3
2.	CSD 33203	Software Development Workshop	3
3.	CSD 23303	Software Project Management	3
4.	CSD 33103	Software Testing and Analysis	3
5.	CSD 33303	Compiler Development	3
6.	CSD 33503	Data Mining	3
7.	CSD 23203	Requirement Engineering and Software Design	3
8.	CSD 33403	Formal Methods	3
		Total	**24**

Table 4. Programme Elective courses (6 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSD 33603	Special Topics in Software Development	3
2.	CSD 33703	Digital Image Processing	3
3.	CSD 33803	Advanced Database	3
4.	CSD 33903	Artificial Neural Network	3
		Total	**6**

Free Module Courses

At least 12 credits must be taken to make up the free module courses. The course is not limited to the list of options offered by this program only, it can be taken from any of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.

Table 5. Free Module courses (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.		Choose any four non-specialization courses of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.	12
		Total	**12**

Final Year Project

Table 6. Final Year Project (8 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35104	Final Year Project I	4
2.	CSF 35204	Final Year Project II	4
		Total	**8**

* Pre requisite:
- CSF35104 has taken all the core and specialization courses until Year 2.
- CSF35204 is passed CSF35104

Industrial Training

Table 7. Industrial Training (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 47112	Industrial Training	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Curriculum Structure According Semester

Table 8. First Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33050/ MPU 33060	Talaqqi Qur'an (Islam)/ Protokol dan Pengurusan Majlis Rasmi (Bukan Islam)	0
2.	MPU 32012	English For Communication I	2
3.		Ko-kurikulum	3
4.	CSF 11203	Computer Organisation and Architecture	3
5.	CSF 11103	Problem Solving and Computer Programming	3
6.	CSF 11503	Social and Professional Ethics	3
7.	CSF 11303	Human Machine Interaction	3
8.	CSF 11403	Software Engineering Methods	3
		Total	**20**

Table 9. Second Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33012/ MPU 33022	Ilmu Wahyu dan Sains/ Moral & Etika II (Bukan Islam)	2
2.	MPU 32032 / MPU XXXXX	Bahasa Arab / Bahasa Asing	2
3.	MPU 31022	TITAS (Tamadun Islam & Tamadun Asia)	2
4.	MPU 32022	English For Communication II	2
5.	CSF 11603	Discrete Mathematics	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 11903	Network Security and Fundamentals	3
8.	CSF 11703	Operating Systems	3
		Total	**20**

* Pre requisite:
- MPU 32022 is course MPU 32012
- CSF 11803 is course CSF 11103

Table 10. Third Semester (17 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU31012	Hubungan Etnik	2
2.	CSD 23103	Web Application Development	3
3.	CSF 21103	Probability and Statistical Data Analysis	3
4.	CSF 21303	Database	3
5.	CSF 21203	System Analysis and Design	3
6.		Free Module Elective I	3
		Total	**17**

Table 11. Forth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan/ Perbandingan Agama II (Bukan Islam)	2
2.	MPU32092	Asas Pembudayaan Keusahawanan	2
3.	CSD 23303	Software Project Management	3
4.	CSD 23203	Requirements Engineering and Sofware Design	3
5.	CSF 21403	Data Structures and Algorithms	3
6.		Programme Elective I	3
7.		Free Module Elective II	3
		Total	**19**

Table 12. Fifth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSD 33103	Software Testing and Analysis	3
2.	CSD 33203	Software Development Workshop	3
3.	CSD 33303	Compiler Development	3
4.	CSF 31103	Artificial Intelligence	3
5.	CSF 35104	Final Year Project I	4
6.		Free Module Elective III	3
		Total	**19**

* Pre requisite:
- CSF 35104 has take all the core and specialization courses until Year 2

Table 13. Sixth Semester (16 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSD 33403	Formal Methods	3
2.	CSD 33503	Data Mining	3
3.	CSF 35204	Final Year Project II	4
4.		Programme Elective II	3
5.		Free Module Elective III	3
		Total	**16**

* Pre requisite:
- CSF35204 is passed CSF35104

Table 14. 7th Semester (12 credit hours)

No	Course code	Course Name	Credit Hours
1.	CSB47112	Latihan Industri	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Bachelor of Computer Sciences (Computer Network Security with honours (BCS-CNS)

Bachelor of Computer Sciences (Computer Network Security) with honours first offered in Semester 1 Session 2012/2013. The programme has received the quality certificate from the Malaysian Qualifications Agency with reference number MQA / PA0516 starting 1 September 2012.

Bachelor of Computer Sciences (Computer Network Security) with Honours is a full-time study. The programme duration is three and half years covering SEVEN SEMESTER consisting of six (6) regular semester and six (6) months of industrial training . Teaching and learning methods for each course is through lectures, tutorials, practical, presentations, projects and industrial training.

Programme Aims

The program aims to foster talented, resilient and responsible network assurance technocrats who will promote universal responsibility through computer network security, in supporting the national and global aspirations of the Digital Economy.

Programme Educational Outcomes

PEO 1   Computer practitioners who synthesize and apply the knowledge and understanding to provide technical solutions for the computer network security industries locally and globally.

PEO 2   Computer technocrats who ethically and professionally provide computer solutions to fulfil social responsibilities of the diverse Malaysian community.

PEO 3   Computer practitioners who lead and collaborate in teams through effective communication in solving problems scientifically.

PEO 4   Computer practitioners who continually enhance personal and professional know-how, and venturing new business opportunities.

Programme Learning Outcomes

PLO 1   Acquire and apply knowledge of essential facts, concepts, principles, and theories of Computer Science, focusing on computer network security

PLO 2   Applying computing skills in analyzing ,   modelling, designing, developing, programming and evaluating efficient computing solutions in computer network security

PLO 3   Fulfill obligations and social responsibilities using appropriate social skills

PLO 4   Practice the value, attitude and professionalism in line with the related code of conduct

PLO 5   Communicate effectively with peers, clients, superiors and society at large; with appropriate leadership and team work skills

PLO 6   Utilize scientific skills to analyze algorithms as well as designing optimal solution to computer network security problems

PLO 7   Manage information and engage in lifelong learning for academic and career development

PLO 8   Possess managerial and entrepreneurship skills in business and real world perspectives

Career Prospects

- Computer Network Engineer
- Information Systems Officer
- Computer Programmer / Web / Networking
- Computer Network Engineer
- System Analyst
- Computer Forensics Officer
- Computer Security Officer
- Cryptanalyst
- Analysts Network System
- Researchers
- Entrepreneurs ICT technocrats

Entry requirements

i. STPM CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Persekolahan Malaysia (STPM) with at least a CGPA 2.00 and obtained at least grade C (NGMP 2.00) in three (3) subjects including General Studies.

PROGRAMME REQUIREMENTS

4. Pass in STPM)/ equivalent qualification with at least a CGPA 2.00

AND

5. Obtain at least grade C (2.00) at the STPM level in any TWO (2) subjects.

AND

6. At least a distinction grade C at the STPM level in any Mathematics (T) OR Mathematics (M).

OR

At least a distinction grade C at the SPM level in Additional Mathematics or equivalent.

AND

7. Get at least level 2 (Band 2) in MUET

ii. MATRICULATION/FOUNDATION CATEGORY

<u>**UNIVERSITY REQUIREMENTS**</u>

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Matriculation Foundation with at least a CGPA 2.00;

<u>**PROGRAMME REQUIREMENTS**</u>
6. At least a CGPA 2.00 at the matriculation level/ recognized Foundation.

   AND

7. Obtain at least grade C (2.00) of any TWO (2) subjects at the matriculation level excluding Mathematics.

AND

6. At least a distinction grade C at the Matriculation/ Foundation level in Mathematics.

OR

At least a distinction grade C at the SPM level in Additional Mathematics.

AND

7. At least level 2 (Band 2) in MUET

iii. DIPLOMA/ EQUIVALENT CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Graduated with a Diploma or other equivalent qualification recognized by the Malaysian Government and approved by the University Senate;

PROGRAMME REQUIREMENTS

4. Obtained at least CGPA 2.50 at Diploma level of Computer Science/ Information Technology/ Software Engineering/ Information Systems or equivalent field.

AND

6. Obtained at least distinction grade C at the SPM level in Additional Mathematics.

AND

7. Get at least level 2 (Band 2) in MUET

iv. STAM CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Agama Malaysia (STAM) with at least the rank of Jayyid.

PROGRAMME REQUIREMENTS

4. At least a rank Jayyid in STAM level

AND

5. At least a distinction grade C at the SPM level in Additional Mathematics.

AND

6. At least level 2 (Band 2) in MUET.

Curriculum Details and Structure

Curriculum Structure According To Course Classification

Eligibility to be awarded the degree of Bachelor of Computer Sciences (Computer Network Security) with honours, each student is required to pass at least 123 credit hours of courses. These courses are classified into 6 sections as follows:

Table 15. Curriculum structure according to course classification

No	Components	Credit Hours	Percentage (%)
1.	University Courses	19	15
2.	Core Courses	42	34
3.	Specialization Courses / Programme Elective Courses	30	24
4.	Free Module Courses	12	10
5.	Final Year Project	8	7
6.	Industrial Training	12	10
	Total	**123**	**100%**

University Courses

Table 16. University courses (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU32012	English For Communication I	2
2.	MPU32022	English For Communication II	2
3.	MPU32032/ MPU32042	Bahasa Arab / Bahasa Asing	2
4.	MPU33012/ MPU33022	Ilmu Wahyu dan Sains (Islam)/ Moral & Etika II (Bukan Islam)	2
5.	MPU31022	Tamadun Islam Dan Tamadun Asia	2
6.	MPU31012	Hubungan Etnik	2
7.	MPU32092	Asas Pembudayaan Keusahawanan	2
8.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan (Islam)/ Perbandingan Agama II (Bukan Islam)	2
9.	MPU33050/ MPU33060	Talaqqi Qur'an (Islam) / Protokol Dan Pengurusan Majlis (Bukan Islam)	AUDIT
10.		Kokurikulum	3
	Total		**19**

* Pre requisite:
- MPU32022 is course MPU32012

Core Courses

Table 17. Core courses (42 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 11603	Discrete Mathematics	3
2.	CSF 21103	Probability and Statistical Data Analysis	3
3.	CSF 11303	Human Machine Interaction	3
4.	CSF 11103	Problem Solving and Computer Programming	3
5.	CSF 11203	Computer Organisation and Architecture	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 21303	Database	3
8.	CSF 11503	Social and Professional Ethics	3
9.	CSF 11703	Operating System	3
10.	CSF 21203	System Analysis and Design	3
11.	CSF 11903	Network and Security Fundamentals	3
12.	CSF 11403	Software Engineering Methods	3
13.	CSF 11903	Data Structure and Algorithms	3
14.	CSF 31103	Artificial Intelligence	3
		Total	**42**

* Pre requisite:
- CSF 11803 is course CSB 11103

Specialization Courses/ Programme Elective Courses (BCS-CNS)

Table 18. Specialization courses (24 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSA 23203	Network Technology Security and Communications	3
2.	CSA 33103	Network Analysis and Design	3
3.	CSA 33403	Parallel and Distributed Computing	3
4.	CSA 33303	Cryptography	3
5.	CSA 33203	Penetration Testing	3
6.	CSA 23103	Security Management	3
7.	CSA 33503	Computer Forensics	3
8.	CSA 23303	Data Communication Workshop	3
		Total	**24**

* Pre requisite:
- ITM 33203 is course ITM 23303

Table 19. Programme Elective courses (6 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSA 23403	Data Compression	3
2.	CSA 33603	Network Simulation And Performance Modeling	3
3.	CSA 33903	Intrusion Detection and Prevention System	3
4.	CSA 43103	Network Operating System	3
5	CSA 43203	Network Programming	3
6	CSA 43303	Wireless Communication and Network Mobility	3
7	CSA 33703	Digital Logics	3
8	CSA 33803	Network Management	3
		Total	**6**

Free Module Courses

At least 12 credits must be taken to make up the free module courses. The course is not limited to the list of options offered by this program only, it can be taken from any of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.

Table 20. Free Module courses (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.		Choose any four non-specialization courses of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.	12
		Total	**12**

Final Year Project

Table 21. Final Year Project (8 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35104	Final Year Project I	4
2.	CSF 35204	Final Year Project II	4
		Total	**8**

* Pre requisite:
- CSF35104 has taken all the core and specialization courses until Year 2.
- CSF35204 is passed CSF35104

Industrial Training

Table 22. Industrial Training (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 47112	Industrial Training	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Curriculum Structure According Semester

Table 23. First Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33050/ MPU 33060	Talaqqi Qur'an (Islam)/ Protokol dan Pengurusan Majlis Rasmi (Bukan Islam)	0
2.	MPU 32012	English For Communication I	2
3.		Ko-kurikulum	3
4.	CSF 11203	Computer Organisation and Architecture	3
5.	CSF 11103	Problem Solving and Computer Programming	3
6.	CSF 11503	Social and Professional Ethics	3
7.	CSF 11303	Human Machine Interaction	3
8.	CSF 11403	Software Engineering Methods	3
		Total	**20**

Table 24. Second Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33012/ MPU 33022	Ilmu Wahyu dan Sains/ Moral & Etika II (Bukan Islam)	2
2.	MPU 32032 / MPU XXXXX	Bahasa Arab / Bahasa Asing	2
3.	MPU 31022	TITAS (Tamadun Islam & Tamadun Asia)	2
4.	MPU 32022	English For Communication II	2
5.	CSF 11603	Discrete Mathematics	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 11903	Network Security and Fundamentals	3
8.	CSF 11703	Operating Systems	3
		Total	**20**

* Pre requisite:
- MPU 32022 is course MPU 32012
- CSF 11803 is course CSF 11103

Table 25. Third Semester (17 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU31012	Hubungan Etnik	2
2.	CSA 23103	Security Management	3
3.	CSF 21103	Probability and Statistical Data Analysis	3
4.	CSF 21303	Database	3
5.	CSF 21203	System Analysis and Design	3
6.		Free Module Elective I	3
		Total	**17**

Table 26. Forth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan/ Perbandingan Agama II (Bukan Islam)	2
2.	MPU32092	Asas Pembudayaan Keusahawanan	2
3.	CSA 23203	Network Technology Security and Communications	3
4.	CSA 23303	Data Communication Workshop	3
5.	CSF 21403	Data Structures and Algorithms	3
6.		Programme Elective I	3
7.		Free Module Elective II	3
		Total	**19**

Table 27. Fifth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSA 33103	Network Analysis and Design	3
2.	CSA 33203	Penetration Testing	3
3.	CSA 33303	Cryptography	3
4.	CSF 31103	Artificial Intelligence	3
5.	CSF 35104	Final Year Project I	4
6.		Free Module Elective III	3
		Total	**19**

* Pre requisite :
- CSF35104 has taken all the core and specialization courses until Year 2.

Table 28. Sixth Semester (16 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSA 33403	Parallel and Distributed Computing	3
2.	CSA 33503	Computer Forensics	3
3.	CSF 35204	Final Year Project II	4
4.		Programme Elective II	3
5.		Free Module Elective III	3
		Total	**16**

* Pre requisite:
- CSF35204 is passed CSF35104

Table 29. 7th Semester (12 credit hours)

No	Course code	Course Name	Credit Hours
1.	CSB47112	Latihan Industri	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Bachelor of Computer Sciences (Internet Computing with honours (BCS-IC)

Bachelor of Computer Sciences (Internet Computing) with honours first offered in Semester 1 Session 2014/2015. The programme has received the quality certificate from the Malaysian Qualifications Agency with reference number MQA/PA2934 starting 21 July 2014.

Bachelor of Computer Sciences (Internet Computing) with Honours is a full-time study. The programme duration is three and half years covering SEVEN SEMESTER consisting of six (6) regular semester and six (6) months of industrial training . Teaching and learning methods for each course is through lectures, tutorials, practical, presentations, projects and industrial training.

Programme Aims

The program aims to foster talented, resilient and responsible internet technocrats who will promote universal responsibility through internet computing, in supporting the national and global aspirations of the Digital Economy.

Programme Educational Outcomes

PEO 1   Computer practitioners who synthesize and apply the knowledge and understanding to provide technical solutions for the internet computing industries locally and globally.

PEO 2   Computer technocrats who ethically and professionally provide computer solutions to fulfil social responsibilities of the diverse Malaysian community.

PEO 3   Computer practitioners who lead and collaborate in teams through effective communication in solving problems scientifically.

PEO 4   Computer practitioners who continually enhance personal and professional know-how, and venturing new business opportunities.

Programme Learning Outcomes

PLO 1   Acquire and apply knowledge of essential facts, concepts, principles, and theories of Computer Science, focusing on internet computing

PLO 2   Applying computing skills in analyzing,modelling, designing, developing, programming and evaluating efficient computing solutions in internet computing

PLO 3   Fulfill obligations and social responsibilities using appropriate social skills

PLO 4   Practice the value, attitude and professionalism in line with the related code of conduct

PLO 5   Communicate effectively with peers, clients, superiors and society at large; with appropriate leadership and team work skills

PLO 6   Utilize scientific skills to analyze algorithms as well as designing optimal solution to computer network security problems

PLO 7   Manage information and engage in lifelong learning for academic and career development

PLO 8   Possess managerial and entrepreneurship skills in business and real world perspectives

Career Prospects

- Developers of computer applications / web / information systems / e-commerce
- Information Systems Officer
- e-Business Analyst
- Engineers Database
- Computer Network Engineer
- System Analyst
- Computer Security Engineer
- Entrepreneurs ICT technocrats
- Researchers

Entry requirements

i. STPM CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Persekolahan Malaysia (STPM) with at least a CGPA 2.00 and obtained at least grade C (NGMP 2.00) in three (3) subjects including General Studies.

PROGRAMME REQUIREMENTS

4. Pass in STPM)/ equivalent qualification with at least a CGPA 2.00

AND

5. Obtain at least grade C (2.00) at the STPM level in any TWO (2) subjects.

AND

6. At least a distinction grade C at the STPM level in any Mathematics (T) OR Mathematics (M).

OR

At least a distinction grade C at the SPM level in Additional Mathematics or equivalent.

AND

7. Get at least level 2 (Band 2) in MUET

ii. MATRICULATION/FOUNDATION CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Matriculation Foundation with at least a CGPA 2.00;

PROGRAMME REQUIREMENTS
8. At least a CGPA 2.00 at the matriculation level/ recognized Foundation.

AND

9. Obtain at least grade C (2.00) of any TWO (2) subjects at the matriculation level excluding Mathematics.

AND

6. At least a distinction grade C at the Matriculation/ Foundation level in Mathematics.

OR

At least a distinction grade C at the SPM level in Additional Mathematics.

AND

7. At least level 2 (Band 2) in MUET

iii. DIPLOMA/ EQUIVALENT CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Graduated with a Diploma or other equivalent qualification recognized by the Malaysian Government and approved by the University Senate;

PROGRAMME REQUIREMENTS

4. Obtained at least CGPA 2.50 at Diploma level of Computer Science/ Information Technology/ Software Engineering/ Information Systems or equivalent field.

AND

6. Obtained at least distinction grade C at the SPM level in Additional Mathematics.

AND

7. Get at least level 2 (Band 2) in MUET

iv. STAM CATEGORY

UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Agama Malaysia (STAM) with at least the rank of Jayyid.

PROGRAMME REQUIREMENTS

4. At least a rank Jayyid in STAM level

AND

5. At least a distinction grade C at the SPM level in Additional Mathematics.

AND

6. At least level 2 (Band 2) in MUET.

Curriculum Details and Structure

Curriculum Structure According To Course Classification

Eligibility to be awarded the degree of Bachelor of Computer Sciences (Internet Computing) with honours, each student is required to pass at least 123 credit hours of courses. These courses are classified into 6 sections as follows:

Table 30. Curriculum structure according to course classification

No	Components	Credit Hours	Percentage (%)
1.	University Courses	19	15
2.	Core Courses	42	34
3.	Specialization Courses / Programme Elective Courses	30	24
4.	Free Module Courses	12	10
5.	Final Year Project	8	7
6.	Industrial Training	12	10
	Total	**123**	**100%**

University Courses

Table 31. University courses (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU32012	English For Communication I	2
2.	MPU32022	English For Communication II	2
3.	MPU32032/ MPU32042	Bahasa Arab / Bahasa Asing	2
4.	MPU33012/ MPU33022	Ilmu Wahyu dan Sains (Islam)/ Moral & Etika II (Bukan Islam)	2
5.	MPU31022	Tamadun Islam Dan Tamadun Asia	2
6.	MPU31012	Hubungan Etnik	2
7.	MPU32092	Asas Pembudayaan Keusahawanan	2
8.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan (Islam)/ Perbandingan Agama II (Bukan Islam)	2
9.	MPU33050/ MPU33060	Talaqqi Qur'an (Islam) / Protokol Dan Pengurusan Majlis (Bukan Islam)	AUDIT
10.	******	Kokurikulum	3
	Total		**19**

* Pre requisite:
- MPU32022 is course MPU32012

Core Courses

Table 32. Core courses (42 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 11603	Discrete Mathematics	3
2.	CSF 21103	Probability and Statistical Data Analysis	3
3.	CSF 11303	Human Machine Interaction	3
4.	CSF 11103	Problem Solving and Computer Programming	3
5.	CSF 11203	Computer Organisation and Architecture	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 21303	Database	3
8.	CSF 11503	Social and Professional Ethics	3
9.	CSF 11703	Operating System	3
10.	CSF 21203	System Analysis and Design	3
11.	CSF 11903	Network and Security Fundamentals	3
12.	CSF 11403	Software Engineering Methods	3
13.	CSF 11903	Data Structure and Algorithms	3
14.	CSF 31103	Artificial Intelligence	3
		Total	**42**

* Pre requisite:
- CSF 11803 is course CSB 11103

Specialization Courses/ Programme Elective Courses (BCS-IC)

Table 33. Specialization courses (24 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSW 23103	Internet Architecture and Programming	3
2.	CSW 33503	Business Intelligence	3
3.	CSW 33403	e-Commerce	3
4.	CSW 33203	Distributed Computing Systems	3
5.	CSW 23203	Mobile Computing	3
6.	CSW 33103	Web Services	3
7.	CSD 23103	Web Application Development	3
8.	CSW 33303	Cloud Computing	3
		Total	**24**

Table 34. Programme Elective courses (6 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSW 33803	Internet-based System Development Methodology	3
2.	CSW 33603	Online Multimedia Technologies	3
3.	CSW 33703	Internet of Things	3
		Total	**6**

Free Module Courses

At least 12 credits must be taken to make up the free module courses. The course is not limited to the list of options offered by this program only, it can be taken from any of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.

Table 35. Free Module courses (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.		Choose any four non-specialization courses of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.	12
		Total	**12**

Final Year Project

Table 36. Final Year Project (8 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35104	Final Year Project I	4
2.	CSF 35204	Final Year Project II	4
		Total	**8**

* Pre requisite:
- CSF35104 has taken all the core and specialization courses until Year 2.
- CSF35204 is passed CSF35104

Industrial Training

Table 37. Industrial Training (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 47112	Industrial Training	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Curriculum Structure According Semester

Table 38. First Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33050/ MPU 33060	Talaqqi Qur'an (Islam)/ Protokol dan Pengurusan Majlis Rasmi (Bukan Islam)	0
2.	MPU 32012	English For Communication I	2
3.		Ko-kurikulum	3
4.	CSF 11203	Computer Organisation and Architecture	3
5.	CSF 11103	Problem Solving and Computer Programming	3
6.	CSF 11503	Social and Professional Ethics	3
7.	CSF 11303	Human Machine Interaction	3
8.	CSF 11403	Software Engineering Methods	3
		Total	**20**

Table 39. Second Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33012/ MPU 33022	Ilmu Wahyu dan Sains/ Moral & Etika II (Bukan Islam)	2
2.	MPU 32032 / MPU XXXXX	Bahasa Arab / Bahasa Asing	2
3.	MPU 31022	TITAS (Tamadun Islam & Tamadun Asia)	2
4.	MPU 32022	English For Communication II	2
5.	CSF 11603	Discrete Mathematics	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 11903	Network Security and Fundamentals	3
8.	CSF 11703	Operating Systems	3
		Total	**20**

* Pre requisite:
- MPU 32022 is course MPU 32012
- CSF 11803 is course CSF 11103

Table 40. Third Semester (17 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU31012	Hubungan Etnik	2
2.	CSF 21103	Probability and Statistical Data Analysis	3
3.	CSF 21303	Database	3
4.	CSF 21203	System Analysis and Design	3
5.	CSD 23103	Web Application Development	3
6.		Free Module Elective I	3
		Total	**17**

Table 41. Forth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan/ Perbandingan Agama II (Bukan Islam)	2
2.	MPU32092	Asas Pembudayaan Keusahawanan	2
3.	CSF 21403	Data Structures and Algorithms	3
4.	CSW 23103	Internet Architecture and Programming	3
5.	CSW 23203	Mobile Computing	3
6.		Programme Elective I	3
7.		Free Module Elective II	3
		Total	**19**

Table 42. Fifth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35104	Final Year Project I	4
2.	CSF 31103	Artificial Intelligence	3
2.	CSW 33103	Web Services	3
3.	CSW 33203	Distributed Computing System	3
4.	CSW 33303	Cloud Computing	3
6.		Free Module Elective III	3
		Total	**19**

* Pre requisite:
- CSF 35104 has take all the core and specialization courses until Year 2

Table 43. Sixth Semester (16 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35204	Final Year Project II	4
2.	CSW 33403	e-Commerce	3
3.	CSW 33503	Business Intelligence	3
4.		Programme Elective II	3
5.		Free Module Elective III	3
		Total	**16**

* Pre requisite:
- CSF35204 is passed CSF35104

Table 44. 7th Semester (12 credit hours)

No	Course code	Course Name	Credit Hours
1.	CSB47112	Latihan Industri	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Bachelor of Information Technology (Informatics Media) with honours (BIT-IM)

Bachelor of Information Technology (Informatics Media) with honours first offered in Semester I Session 2016/2017. The programme aims to produce professionals in the field of information technology, innovative and critical and creative thinking to lead the information technology industry and has a high culture and high moral character.

The programme has received the quality certificate from the Malaysian Qualifications Agency with reference number MQA / PA 5123 starting October 19, 2014. Bachelor of Information Technology (Informatics Media) with Honours is a full-time study. The programme duration is three and half years covering SEVEN SEMESTER consisting of six (6) regular semester and six (6) months of industrial training . Teaching and learning methods for each course is through lectures, tutorials, practical, presentations, projects and industrial training.

Programme Aims

The programme aims to foster talented, resilient and responsible information technology professionals who will promote universal responsibility through creative industries in supporting the national and global aspirations of the Digital Economy.

Programme Educational Outcomes

PEO 1   Information technology professionals who synthesize, apply the knowledge and understanding to solve information technology and creative technology problems critically and innovatively, through sustainable approach in the informatics media profession.

PEO 2   Information technology professionals who ethically and professionally provide computer solutions to fulfil social responsibilities of the diverse Malaysian community.

PEO 3   Information technology professionals who lead and collaborate in teams through effective communication in solving problems scientifically.

PEO 4   Information technology professionals who continually enhance personal and professional know-how, and venturing new business opportunities

Programme Learning Outcomes

PLO 1   Acquire and apply knowledge of essential facts, concepts, principles, and theories of Information Technology, focusing on media informatics

PLO 2   Applying computing skills in analyzing , modelling, designing, developing, programming and evaluating efficient computing solutions in media informatics

PLO 3   Fulfill obligations and social responsibilities using appropriate social skills

PLO 4   Practice the value, attitude and professionalism in line with the related code of conduct

PLO 5   Communicate effectively with peers, clients, superiors and society at large; with appropriate leadership and team work skills

PLO 6   Utilize scientific skills to analyze algorithms as well as designing optimal solution to problems in media informatics

PLO 7   Manage information and engage in lifelong learning for academic and career development

PLO 8   Possess managerial and entrepreneurship skills in business and real world perspectives

Career Prospects

- Multimedia system analyst
- Graphic programmer
- Ilustrator designer
- Content/ Storyboard/Character Designer
- 2D & 3D Animator
- Video game engineer
- Multimedia Developer
- Web system analyst
- Researcher

Entry requirements

i. CATEGORY STPM
UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Persekolahan Malaysia (STPM) with at least a CGPA 2.00 and obtained at least grade C (NGMP 2.00) in three (3) subjects including General Studies.

PROGRAMME REQUIREMENTS

4. Pass in STPM with at least a CGPA 2.00

AND

5. Obtain at least grade C (2.00) at the STPM level in any TWO (2) subjects.

AND

6. At least a distinction grade C at the SPM level in mathematics or equivalent.

AND

7. Get at least 2 level 2 (Band 2) in MUET

ii. MATRICULATION/FUNDAMENTAL CATEGORY
UNIVERSITYREQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Matriculation Foundation with at least a CGPA 2.00;

PROGRAMME REQUIREMENTS

4. At least a CGPA 2.00 at the matriculation level/ recognized Foundation.

AND

5. Obtain at least grade C (2.00) of any TWO (2) subjects at the matriculation level.

AND

6. At least a distinction grade C at the SPM level in mathematics or equivalent.

AND

7. At least level 2 (Band 2) in MUET

iii. DIPLOMA/ EQUIVALENT CATEGORY
UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or Honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM.

AND

3. Graduated with a Diploma or other equivalent qualification recognized by the Malaysian Government and approved by the University Senate;

PROGRAMME REQUIREMENTS

4. Obtained at least CGPA 2.50 at Diploma level of Computer Science/ Information Technology/ Software Engineering/ Information Systems or equivalent field.

OR

5. Any Diploma in science and technology or business studies with a minimum of CGPA 2.50 will be admitted depends on intensive internal evaluation process and credit in mathematics at SPM level or equivalent.

AND

6. Obtained at least distinction grade C at the SPM level in mathematics or equivalent.

* Candidates with CGPA less 2.50 (minimum 2.00) may be considered, provided at least a distinction grade C at the SPM level in mathematics or equivalent may be admitted depending on rigorous internal evaluation process.

AND

7. Get at least level 2 (Band 2) in MUET

iv. STAM CATEGORY
UNIVERSITY REQUIREMENTS

1. Pass in the Sijil Pelajaran Malaysia (SPM)/ equivalent qualification with honours in Bahasa Melayu/ Bahasa Malaysia or honours in Bahasa Melayu/ Bahasa Malaysia Paper July;

AND

2. Pass history (2013 onwards) in SPM

AND

3. Pass the Sijil Tinggi Agama Malaysia (STAM) with at least the rank of Jayyid.

PROGRAMME REQUIREMENTS

4. At least a rank Jayyid in STAM level

AND

5. At least a distinction grade C at the SPM level in mathematics or equivalent.

AND

6. At least level 2 (Band 2) in MUET.

Curriculum Details and Structure

Curriculum Structure According To Course Classification

Eligibility to be awarded the degree of Bachelor of Information Technology (Informatics Media) with honours, each student is required to pass at least 123 credit hours of courses. These courses are classified into six sections as follows:

Table 43. Curriculum structure according to course classification

No	Components	Credit Hours	Percentage (%)
1.	University Courses	19	15
2.	Core Courses	42	34
3.	Specialization Courses / Programme Elective Courses	30	24
4.	Free Module Courses	12	10
5.	Final Year Project	8	7
6.	Industrial Training	12	10
	Total	**123**	**100%**

University Courses

Table 44. University courses (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU32012	English For Communication I	2
2.	MPU32022	English For Communication II	2
3.	MPU32032/ MPU32042	Bahasa Arab / Bahasa Asing	2
4.	MPU33012/ MPU33022	Ilmu Wahyu dan Sains (Islam)/ Moral & Etika II (Bukan Islam)	2
5.	MPU31022	Tamadun Islam Dan Tamadun Asia	2
6.	MPU31012	Hubungan Etnik	2
7.	MPU32092	Asas Pembudayaan Keusahawanan	2
8.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan (Islam)/ Perbandingan Agama II (Bukan Islam)	2
9.	MPU33050/ MPU33060	Talaqqi Qur'an (Islam) / Protokol Dan Pengurusan Majlis (Bukan Islam)	AUDIT
10.	******	Kokurikulum	3
	Total		**19**

* Pre requisite:
- MPU32022 is course MPU32012

Core Courses

Table 45. Core courses (42 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 11603	Discrete Mathematics	3
2.	CSF 21103	Probability and Statistical Data Analysis	3
3.	CSF 11303	Human Machine Interaction	3
4.	CSF 11103	Problem Solving and Computer Programming	3
5.	CSF 11203	Computer Organisation and Architecture	3
6.	CSF 11803	Object Oriented Programming	3
7.	CSF 21303	Database	3
8.	CSF 11503	Social and Professional Ethics	3
9.	ITF 11203	Data Communication and Networking	3
10.	CSF 21203	System Analysis and Design	3
11.	ITF 11103	Information Technology and Its Application	3
12.	ITF 21103	Information Security	3
13.	CSD 23303	Software Project Management	3
14.	CSD 23103	Web Application Development	3
		Total	**42**

* Pre requisite:
- CSF 11803 is course CSB 11103

Specialization Courses/ Programme Elective Courses (BIT-IM)

Table 46. Specialization courses (24 credit hours)

No	Course Code	Course Name	Credit Hours
1.	ITM 13103	Art and Design	3
2.	ITM 23103	Storytelling and Storyboard	3
3.	ITM 23203	Image Editing	3
4.	ITM 33303	Digital Audio and Video Technology	3
5.	ITM 33103	Digital Media Publishing	3
6.	ITM 23303	2D and 3D Modelling	3
7.	ITM 33203	2D and 3D Animation	3
8.	ITM 33403	Multimedia Application Development	3
		Total	**24**

* Pre requisite:
- ITM 33203 is course ITM 23303

Table 47. Programme Elective courses (6 credit hours)

No	Course Code	Course Name	Credit Hours
1.	ITM 23403	Photography Techniques and Technology	3
2.	ITM 23503	Virtual Reality Technology	3
3.	ITM 23603	Interactive Media in Industry	3
4.	ITM 23703	Computer Games Development	3
		Total	**6**

Free Module Courses

At least 12 credits must be taken to make up the free module courses. The course is not limited to the list of options offered by this program only, it can be taken from any of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.

Table 48. Free Module courses (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.		Choose any four non-specialization courses of three credit hours of courses offered by other academic programs either from the Faculty of Informatics and Computing as well as from other faculties in UniSZA.	12
		Total	**12**

Final Year Project

Table 49. Final Year Project (8 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF35104	Final Year Project I	4
2.	CSF35204	Final Year Project II	4
		Total	**8**

* Pre requisite:
- CSF35104 has taken all the core and specialization courses until Year 2.
- CSF35204 is passed CSF35104

Industrial Training

Table 50. Industrial Training (12 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF47112	Industrial Training	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Curriculum Structure According Semester

Table 51. First Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU 33050/ MPU 33060	Talaqqi Qur'an (Islam)/ Protokol dan Pengurusan Majlis Rasmi (Bukan Islam)	0
2.	MPU 32012	English For Communication I	2
3.	*** *****	Ko-kurikulum	3
4.	CSF 11203	Computer Organisation and Architecture	3
5.	CSF 11103	Problem Solving and Computer Programming	3
6.	CSF 11503	Social and Professional Ethics	3
7.	CSF 11303	Human Machine Interaction	3
8.	ITM 13103	Art and Design	3
		Total	**20**

Table 52. Second Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU33012/ MPU 33022	Ilmu Wahyu dan Sains/ Moral & Etika II (Bukan Islam)	2
2.	MPU 32032 / MPU XXXXX	Bahasa Arab / Bahasa Asing	2
3.	MPU 31022	TITAS (Tamadun Islam & Tamadun Asia)	2
4.	MPU 32022	English For Communication II	2
5.	CSF 11603	Discrete Mathematics	3
6.	CSF 11803	Object Oriented Programming	3
7.	ITF 11203	Data Communication and Networking	3
8.	ITF 11103	Information Technology and Its Applications	3
		Total	**20**

* Pre requisite:
- MPU32022 is course MPU32012
- CSF 11803 is course CSB 11103

Table 53. Third Semester (20 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU31012	Hubungan Etnik	2
2.	CSF 21103	Probability and Statistical Data Analysis	3
3.	CSF 21303	Database	3
4.	CSF 21203	System Analysis and Design	3
5.	ITF 21103	Information Security	3
6.	CSD 23103	Web Application Development	3
7.		Elective 1	3
		Total	**20**

Table 54. Forth Semester (19 credit hours)

No	Course Code	Course Name	Credit Hours
1.	MPU33032/ MPU33042	Ilmu Wahyu dan Kemasyarakatan/ Perbandingan Agama II (Bukan Islam)	2
2.	MPU32092	Asas Pembudayaan Keusahawanan	2
3.	CSD 23303	Software Project Management	3
4.	ITM 23103	Storytelling and Storyboard	3
5.	ITM 23203	Image Editing	3
6.	ITM 23303	2D and 3D Modeling	3
7.		Elective II	3
		Total	**19**

Table 55. Fifth Semester (13 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35104	Final Year Project I	4
2.	ITM 33103	Digital Media Publishing	3
3.	ITM 33203	2D and 3D Animation	3
4.	ITM 33303	Digital Audio and Video Technology	3
5.		Free Module I	3
6.		Free Module II	3
		Total	**13**

* Pre requisite :
- ITM 33203 is course ITM 23303
- CSF35104 has taken all the core and specialization courses until Year 2.

Table 56. Sixth Semester (16 credit hours)

No	Course Code	Course Name	Credit Hours
1.	CSF 35204	Final Year Project II	4
2.	ITM 33403	Multimedia Application Development	3
3.		Free Module III	3
4.		Free Module IV	3
		Total	**16**

* Pre requisite:
- CSF35104 has taken all the core and specialization courses until Year 2.

Table 57. 7th Semester (12 credit hours)

No	Course code	Course Name	Credit Hours
1.	CSB47112	Latihan Industri	12
		Total	**12**

* Pre requisite:
- CSF47112 is passed all courses.

Courses Synopsis

University Courses

Course Code   **Course Name**   **Credit hours**
MPU31012   Hubungan Etnik   2
This course focuses on the basic concepts of cultural and ethnic relations in Malaysia. It examines the development of ethnic relations in Malaysia to establish a Malaysian society and forge ties between countries in the ASEAN region. It also tries to understand and address global challenges in cultural and ethnic relations locally and internationally. Finally, it introduces students to ethnic relations from the perspective of Islam.

Course Code   **Course Name**   **Credit hours**
MPU31022   Tamadun Islam dan Tamadun Asia   2
This course discusses civilization studies which include introduction to the science of civilization; interaction between civilizations (Malay, Chinese and Indian); Islam in Malay civilization and its role in building the Malaysian civilization, Islam in Malay civilization; contemporary issues in Islamic and Asian Civilisations; Islam Hadhari and the nation building process.

Course Code   **Course Name**   **Credit hours**
MPU31032   Malaysian Studies   2
This course is about Malaysian nationhood studies. It covers the evolution of the establishment and formation of Malaysia from pre-historic to the present existing state. Besides, it emphasizes on the political, economic and social development agendas of Malaysia, both at national and international levels. This includes the system and structure of government, the concept of parliamentary democracy, Malaysian Constitution, as well as plural society and ethnic relationship. Several national policies like National Development Policy, New Development Policy, Foreign Policy as well as 1 Malaysia Concept will be discussed.

Course Code   **Course Name**   **Credit hours**
MPU32012   English for Communication 1   2
The subject examines a variety of skills needed to perform academic tasks, such as reading strategies and taking notes from written and oral-aural texts. Students are assigned to produce academic assignments and make oral presentations. They will use the skills of looking for and extracting information from various sources and also develop the skills of making notes, paraphrasing, summarizing and integrating information, and presenting information as well as viewpoints in an oral presentation. In order to accomplish these goals, class discussions, group work, in-class writing, and out-of-class assignments will be used as tools for learning. Apart from these, they will develop the skills in time management, team work and group interaction.

Course Code   **Course Name**   **Credit hours**
MPU32022   English for Communication II   2

The subject is designed to introduce students to a variety of communicational skills in the workplace to meet professional needs. Students will work with a variety of the genres of professional communication, such as memos and reports. They will also be taught the skills of making oral presentation. Projects assigned to the students will require them to collect data on topics related to their career. The assignments will require students to put into practice the various skills developed earlier such as collecting, integrating and presenting information, time management, team work and group interaction. Students will also be taught job-hunting skills, that include writing enquiry and job application letters and curriculum vitae as well as preparing for and attending job interviews. Students are also taught to conduct meetings.

Course Code   **Course Name**   **Credit hours**
MPU32032   Bahasa Arab Kebangsaan   2

This course aims to expose students to learn Arabic. Emphasis is given to the four skills: listening, speaking, reading and writing. In addition, attention is also given to meaning of words, sentence construction and basic Arabic grammar.

Course Code   **Course Name**   **Credit hours**
MPU32042   Bahasa Arab Agama   2

This course aims to expose students to learn Arabic. Emphasis is given to the four skills of listening, speaking, reading and writing. In addition, attention is also given to the meaning of the vocabulary, sentence construction means and methods of basic Arabic grammar.

Course Code   **Course Name**   **Credit hours**
MPU32092   Asas Pembudayaan Keusahawanan   2

This course exposes students to the study of entrepreneurship. It covers the concept and development of entrepreneurship, self-analytical entrepreneurial competence, entrepreneurship ethics, and the importance of creativity and innovation in entrepreneurship. It also discusses business opportunities, the ability to start a business, business planning and business project management skills. Students have to undergo practical entrepreneurship by organizing seminars / entrepreneurial forum involving known entrepreneurs and entrepreneurial support agencies. Entrepreneurship practicum students continue to do business as a group on campus or run entrepreneurial work with entrepreneurs of choice. The course ends with the presentation of practical reports, group presentations and reports of individual coursework.

Course Code   **Course Name**   **Credit hours**
MPU33012   Ilmu Wahyu dan Sains   2

This course is offered to students to provide exposure to scientific issues found in Qur'an and Hadith (al-i'jaz al-'Ilm). It focuses on the concept of revelation and science, prominent Islamic scholars, Physical Sciences, Life Sciences, Food Technology, Engineering, Medicine, Architecture, Arts and Architecture, and Geology. Discussion will be on aspects of similarities and differences between scientific discoveries and facts found in the Quran and Hadith as well as related Islamic laws. In addition, students will also explore Islamic scholars who pioneered the field of science and their contributions.

Course Code   **Course Name**   **Credit hours**

MPU33022   Moral & Etika II   2

(For non Muslim students who do not take the faith and morals course)

This course discusses the concept of moral and ethical theories and system of values, religious values and beliefs so that it can be applied in everyday life. The basic concept of values, definitions, functions and types of value will be discussed. The concepts of kindness, happiness, truth, moral status and errors will also be discussed. The question of rights and moral knowledge as well as ethical issues will be examined in greater depth. Religious values and beliefs in society as well as local and universal moral issues will also be emphasized. Some practical issues such as rights of minorities and majority, use of stimulants, promiscuity and such will be fine-tuned with the use of moral principles based on the various ethical theories. The teachings of each religion's moral and ethics will also be discussed. Moral and ethics course not only covers the important aspects in shaping the personality of the individual but also to establish the values of a plural society in Malaysia.

Course Code   **Course Name**   **Credit hours**

MPU33032   Ilmu Wahyu dan Kemasyarakatan   2

This course discusses the social issues found in Quran and Hadith. Students will be exposed to aspects of science and society, the establishment of the Basic Principles of an Islamic Society based on revelation, Element of Establishing an Islamic Society, the Institution of an Islamic Society, Control and Monitoring Elements in an Islamic Society, as well as Issues and Challenges in an Islamic Society. Discussions will focus on guidelines provided in Quran and Hadith and its role in addressing current social issues.

Course Code   **Course Name**   **Credit hours**

MPU33042   Perbandingan Agama II   2

(For the non-Muslim students who do not take the course Fiqh of Worship)

The discussion in this course is to cover various aspects of religion in the world like Hindu, Buddha, Confucianism, Judaism, Christianity and Islam.

Course Code   **Course Name**   **Credit hours**

MPU33050   Talaqqi Qur'an   Audit

This course aims to guide students to read the Quran with proper tajwid based on Hafs from 'Asim. Several surah will be selected to check the reading.

Course Code   **Course Name**   **Credit hours**

MPU33060   Protokol Dan Pengurusan Majlis Rasmi   Audit

(For non Muslim students who do not take the course Talaqqi Qur'an)

This course discusses the procedure for event management and ways to entertain guests. In addition, students are also exposed to the responsibility and role as the operator of official functions and as a protocol officer. Therefore, the principle and practice of protocol and etiquette should be understood, especially when entrusted to carry out tasks related to the protocol. In society, order and decorum must be maintained. Similarly, in a function any delays, defects, and errors will give a negative impact on the organization and the individuals involved.

Core Courses Programs (Bachelor of Computer Sciences)

Course Code	Course Name	Credit hours
CSF 11203	Computer Organisation And Architecture	3

This course discusses the basic concepts of numbering system and logic in a computer system. Further explanation is given regarding the operations of each component and how they are assembled into one computer system. Computer design that contains instruction sets, instruction format, addressing modes, and input output mechanisms will also be covered including organisation of multiprocessor computers.

Course Code	Course Name	Credit hours
CSF 11303	Human Machine Interaction	3

This course introduces the fundamentals of Human Computer Interaction (HCI) by taking into account the aspects on human factors, equipments and the environment. Guidelines, principles, theories, cognitive models, and task analysis are also emphasized. Students will apply these features by evaluating existing interfaces in order to develop a new system. The system being developed will then be evaluated to justify the design.

Course Code	Course Name	Credit hours
CSF 11503	Social And Professional Ethics	3

The Social and Professional Ethics is solely based on lectures which will provide a framework of concepts for social and profesional values, and ethics. This course discusses social values and professional ethics of computing and the elements of intellectual property to enable a person to act in relation to specific code of conducts in society and working environment. Specific issues will be discussed in order to propose apprpropriate solutions to the problems.

Course Code	Course Name	Credit hours
CSF 11603	Discrete Mathematics	3

In this course, students will be introduced to the fundamentals and concepts in logic, algorithm, problem solving, truth table and boolean algebra. Other topics include propositional calculus, propositional logic, quantifiers, predicate calculus (logic of quantifiers), mathematical induction, recursive relations and counting techniques. The topic of graphs includes directed and undirected graphs, isomorphism, and weighted graphs. Topic on trees will cover Spanning Tree and Minimum Spanning Tree (MST), Kruskal's Algorithm, Rooted tree and Depth-First Search Algorithm.

Course Code	Course Name	Credit hours
CSF 11703	Operating Systems	3

This course examines the important problems in operating system design and implementation. The operating system provides an established, convenient, and efficient interface between user programs and the bare hardware of the computer on which they run. The operating system is responsible for sharing resources (e.g., disks, networks, and processors), providing common services needed by many different programs, and protecting individual programs from interfering with one another. This course will focus on three major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems.

Course Code   **Course Name**   **Credit hours**

CSF 11103   Problem Solving And Computer Programming   3

This course aims to develop logic understanding and to design algorithms for problem solving in computer science. It is also intended to explain the techniques for building algorithms, flowcharts and programs in providing solutions to computing problems. Students will be introduced to types of error testing and program documentation using appropriate syntax, variables, data types, conditional statements, repetition statements, functions, arrays, records, files management text and pointer. At the end of the course, students will be assigned to develop a program to solve a selected case study.

Course Code   **Course Name**   **Credit hours**

CSF 11403   Software Engineering Methods   3

This course introduces the concepts, processes and models in sofware engineering that include software process, agile software development, requirements engineering, system modeling, architecture design, design and implementation, software testing and software evolution. At the end of this course, students will be able to apply an appropriate technique to design a model and architecture of a computer system.

Course Code   **Course Name**   **Credit hours**

CSF 11803   Object Oriented Programming   3

This course provides an overview of the techniques used in object oriented programming by discussing the concepts of object-oriented analysis and design. Students will be introduced to the advantages and differences of object oriented programming language in comparison to structured programming languages. Concepts such as class definitions, inheritance, exceptions and multi-threading; and the design and use of graphical user interface will also be covered.

Course Code   **Course Name**   **Credit hours**

CSF 11903   Network And Security Fundamentals   3

This course offers an introduction to the fundamentals of computer network and the basic principles of computer network security by emphasizing on the relationship between network and security. Among the topics are introducton to networking, protocols and standard where students will be able to identify network applications and Local Area Network (LAN). Other topics include interfacing and communication in networks, views on security, principles of a secure design, and identification of identifying threats and attacks to network security. Students will also be introduced to examples of defensive programming and encryption.

Course Code   **Course Name**   **Credit hours**

CSF 21103   Probability And Statistical Data Analysis   3

This course offers an introduction to the basic concepts of statistics along with data presentation and description. The course also emphasizes on probability theory and properties of probability distributions. Introduction to sampling distribution, point and interval estimation of parameters and hypothesis testing are also covered. Data analysis techniques such as correlation, simple linear regression and one-way analysis of variance (ANOVA) are also taught in this course.

Course Code   **Course Name**   **Credit hours**
CSF 21203   System Analysis And Design   3

This course introduces the principles and methods in the analysis and design of information systems. The focus is on system development activities that include analysis and modelling, process design, databases, input and output, and programmable user interface. The process of system implementation and maintenance are reviewed by taking into account important activities in the development life cycle. Emphasis will be placed on object-oriented analysis and design implementation.

Course Code   **Course Name**   **Credit hours**
CSF 21303   Database   3

This course encompasses the theory of database which includes the file system, relational model, normalization and entity relationship diagram. The database skills in developing information system such as analysing, designing, modelling and implementing the database will be introduced. Other topics to be covered are formation rules of relational databases, structured query language, 4GL programming language, and related issues in database.

Course Code   **Course Name**   **Credit hours**
CSF 21403   Data Structures And Algorithms   3

This course covers the fundamental of data structure in order to perform analysis and design of a computing problem that will cope with the complexity of actual applications. The topics covered are basic and essential topics in data structures, array-based lists, linked lists, recursion, binary trees, trees, sorting and searching algorithms, and graphs.

Course Code   **Course Name**   **Credit hours**
CSF31103   Artificial Intellingence   3

This course presents the fundamental concepts of artificial intelligence which include representation of knowledge and computational methods for reasoning. Comparisons among various computational methods of artificial intelligence are covered in order to discover the best system performance. Appropriate artificial intelligence learning algorithms in classification and prediction of specific data will be demonstrated to the students. The development of artificial intelligence models in solving real world problems is also emphasized in this course.

Course Code   **Course Name**   **Credit hours**
CSF 35104   Final Year Project I   4

This course introduces the concept of the research, focusing on developing research skills and standardised documentations such as research proposal for selected problems. Appropriate research methodology that consists of literature review, design, data gathering techniques, and data analysis will be covered. Emphasis will also be given to the guidelines and tips on the preparation of research proposal and appropriate report, taking into account the ethical elements related to the specific code of conducts.

Course Code	Course Name	Credit hours
Course Code	**Course Name**	**Credit hours**
CSF 35204	Final Year Project II	4

This course requires students to work individually on project/research under the supervision of a supervisor. The project should be based on the research proposal that has been proposed in Final Year Project I. Supervisors will provide coaching and guidance to students on various aspects such as the references and research skills required during the development stages. At the end of this course, students will produce reports and present the complete projects to a group of assessors during the Final Presentation.

Course Code	**Course Name**	**Credit hours**
CSF 47112	Industrial Training	4

All students are required to undergo industrial training for a period of six (6) months. Normally, the industrial training is carried out during the final semester of their studies. Placement of students at various companies will be supervised and coordinated by the Industrial Training Committee set up by the Faculty. It is anticipated that the training at the various companies will provide students with adequate exposure to a real working environment including the companies' organization structures, business operations and administrative functions. The hands-on experience in the training will reinforce what has been taught at the University

Programme Core Courses (BIT-IM)

Course Code   **Course Name**   **Credit hours**
ITF 11103   Information Technology And Its Applications   3

This course is designed to provide an overview of these main aspects : discipline of Information Technology (IT) and how it relates to the other computing disciplines. The goal is to help students understand the diverse contexts in which IT is used and the challenges inherent in the diffusion of innovative technology.

Course Code   **Course Name**   **Credit hours**
ITF 11203   Data Communications And Networking   3

This course provides a fundamental concepts in data communication and network models, focusing on communication protocols and standards that used in computer networks; identify the conversion of data and signal at the physical layer; describe bandwidth utilization using multiplexing and spreading; explore about the transmission media for computer networks; identify techniques Data Link Control; classify network topology; describe network addressing and management.

Course Code   **Course Name**   **Credit hours**
ITF 21103   Information Security   3

This course gives a broad overview of essential concepts in information security management. Information risk, information security framework, procedural and technical security control, security in software development and other technical aspect are also covered. The knowledge about this course is strengthen by conducting a group project.

Course Code   **Course Name**   **Credit hours**
CSD 23103   Web Application Development   3

The web uses complex applications that run on heterogeneous browsers that may be built using the latest programming technologies. This course covers how core web technologies work; common security vulnerabilities; and how to build secure web applications that avoid them. Students will be required to build multiple webpages and implement website design that interacts with a database, which will include server-side applications.

Course Code   **Course Name**   **Credit hours**
CSD 23303   Software Project Management   3

This course discusses the roles, responsibilities and methods of project management software from the management perspective. It includes planning, scheduling, budgeting, resource allocation, risk management, monitoring and quality assurance and configuration management of software projects. The uses of CASE tools are required to manage the activities in the project.

Programme Specialization Courses (BCS-SD)

Course Code **Course Name**   **Credit hours**
CSD 23103   Web Application Development   3
The web uses complex applications that run on heterogeneous browsers that may be built using the latest programming technologies. This course covers how core web technologies work; common security vulnerabilities; and how to build secure web applications that avoid them. Students will be required to build multiple webpages and implement website design that interacts with a database, which will include server-side applications.

Course Code **Course Name**   **Credit hours**
CSD 23203   Requirements Engineering And Sofware Design 3
This course covers the software development process, from requirements elicitation and analysis, through specification and design. A variety of concepts, principles, techniques, and tools are presented, encompassing topics such as software processes, software requirements, system models, architectural and detailed design, user interface design. Aspects of the course covers building models of both requirements engineering process and requirements engineering product, concerning both functional and non-functional goals/requirements/specifications, using a systematic decision-making process.

Course Code **Course Name**   **Credit hours**
CSD 23303   Software Project Management   3
This course discusses the roles, responsibilities and methods of project management software from the management perspective. It includes planning, scheduling, budgeting, resource allocation, risk management, monitoring and quality assurance and configuration management of software projects. The uses of CASE tools are required to manage the activities in the project.

Course Code **Course Name**   **Credit hours**
CSD 33103   Software Testing And Analysis   3
This course is a study of software testing and analysis methodologies for object-oriented, component-based, concurrent, distributed, and web software. Topics include approaches to automatic test case generation, coverage analysis, prioritized testing, construction of tools, regression testing and impact analysis. A primary focus will be on software testing process and documentation.

Course Code **Course Name**   **Credit hours**
CSD 33203   Software Development Workshop   3
This course requires students to work in a group to design and develop a functional system using appropriate theories and techniques that have been taught in other classes. This course is supervised by a lecturer that acts as a mentor to each group. Throughout this workshop, students need to do presentations as well as to submit their work progress and final report/documentation.

Course Code **Course Name**   **Credit hours**
CSD 33303   Compiler Development   3
This course discusses the techniques to construct a compiler for programming language . The emphasis is on theoretical analysis of lexical, semantic and syntactic analyses based on the compiler requirements. In addition, students will explore to the tools that can be used in the program development of the compiler. At the end of the course, students will be given a project to develop a functionality that is available in the system compiler.

Course Code	**Course Name**	**Credit hours**
CSD 33403	Formal Methods	3

This course introduces the elements of formal methods, its syntax and semantics and its supporting tools. The aims of the course are to create awareness on the importance of formal methods in software specification, write formal specifications and use a supporting tool to generate the formal specifications. As more complex computational systems are used within critical applications, it is becoming essential that these systems are formally specified. Such specifications are used to give a precise and unambiguous description of the required system. In addition, as computational systems become more complex, formal specifications allow concise and precise definition of the key characteristics of systems.

Course Code	**Course Name**	**Credit hours**
CSD 33503	Data Mining	3

This course covers fundamental knowledge and techniques in Data Mining. Data Mining studies algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data. It is currently regarded as the key element of a more general process called Knowledge Discovery that deals with extracting useful knowledge from raw data. The knowledge discovery process includes data selection, cleaning, coding, using different statistical and machine learning techniques, and visualization of the generated structures. The course will cover all these issues and will illustrate the whole process by examples. Special emphasis will be given to the Machine Learning methods as they provide real knowledge discovery tools for the students to understand the subject matter.

Programme Elective Courses (BCS-SD)

Course Code   **Course Name**   **Credit hours**
CSD 33603   Special Topics In Software Development   3
This course will discuss the topics concerning the contemporary issues in the field of software development and its integration with other fields. Topics in course contents will always change from time to time in line with development and latest technology in academic germination of various fields.

Course Code   **Course Name**   **Credit hours**
CSD 33703   Digital Image Processing   3
This course covers the fundamental concepts of digital image processing. The topics include sampling theory, image representation, image segmentation, filtering and the processing methods such as morphological processing. The theories will be applied in a group project to emphasize the understanding of the topics.

Course Code   **Course Name**   **Credit hours**
CSD 33803   Advanced Database   3
This course introduces the techniques and implementation of advanced database management applications. Advanced data model and database design, database redesign, multiuser database systems, managing SQL server, security, document processing over internet technology, business data analysis and temporal database are the topics to be covered. Students will be required to develop an advanced database system application, especially in the application of business intelligence.

Course Code   **Course Name**   **Credit hours**
CSD 33903   Artificial Neural Networks   3
This course covers Artificial Neural Network (ANN) models. The include biological and artificial neurons, learning theories and their real-world applications including business, medical diagnosis, engineering and information technology domains. The course also includes hands-on experiments for a number of ANN models using commercial and open source tools.

Programme Specialization Courses (BCS-NCS)

Course Code   **Course Name**   **Credit hours**
CSA 23103   Security Management   3
The course provides insights into the principles of information security management that are commonly used in real-world. The course covers the principles of applied information security management and delivers an in-depth understanding of security management in medium to large organisations. Students will be introduced to the commonly used frameworks and methods information security managerment. They will also explore the appropriateness of the methods and frameworks in addressing current security needs in organizations.

Course Code   **Course Name**   **Credit hours**
CSA 23203   Network Technology Security And Communications   3
This course focuses on ensuring information confidentiality, integrity and availability. It covers the aspects of information assurance programs, policies, procedures and architecture; utilizing the concepts of security by design. Network security utilizes proactive techniques, including defense-in-depth and layered security to mitigate or eliminate vulnerabilities in information systems and to protect against potential exploitation. This course provides students with the opportunity to synthesize and apply the vital skills and knowledge necessary to succeed in the workforce.

Course Code   **Course Name**   **Credit hours**
CSA 23303   Data Communication Workshop   3
This course introduces the core concepts, characteristics, evolution, functions, topologies and configurations of switches and routers, and examines the role they play in business network enterprises. It explores the theoretical and practical aspects of constructing and configuring simple networking systems and their associated protocols. It focuses on network and protocols, LAN, WAN, OSI model, cabling, routers, router configuration, Ethernet, IP addressing, network standards, switch and router configurations.

Course Code   **Course Name**   **Credit hours**
CSA 33103   Network Analysis And Design   3
This course covers systematic approach towards designing computer networks. Activities include collecting and analysing computer networks requirements, designing logical and physical computer networks, and implementing the designed network onto final computer networks design. Students will be able to practice computer networks design approaches in real-life computer networks.

Course Code   **Course Name**   **Credit hours**
CSA 33203   Penetration Testing   3
This course provides the funamentals of the underlying principles and techniques associated with cybersecurity practice known as penetration testing. Students will learn about the entire penetration testing process that include planning, reconnaissance, scanning, exploitation, post-exploitation, and results reporting. The course will provide insights to fundamental information associated with each of the methods employed and their corresponding vulnerabilities. Students will develop an understanding of current cybersecurity issues and ways that users, administrators, and programmer errors can lead to exploitable vulnerabilities.

Course Code	**Course Name**	**Credit hours**
CSA 33303	Cryptography	3

The course provides the fundamentals of cryptography and its associated techniques. In particular, students will be introduced to wide range of security objectives, different levels of security that can be achieved and some available cryptographic techniques that can be used. The new security goals in computers and digital communication such as anonymity, authenticity, non-repudiation, authorized wiretapping (called law enforcement), and traceability will also be covered in this course.

Course Code	**Course Name**	**Credit hours**
CSA 33403	Parallel And Distributed Computing	3

This course covers the techniques and implementation of parallel computing applications. System architecture, algorithms design, communication techniques, analytical models and message passing paradigms are the key elements in the development of parallel computing systems that will be introduced to the students. To enhance their understanding, students will explore the practical aspects in the development of parallel computing applications especially in the application of dynamic programming, sorting and searching. In addition, students will also be introduced to a specific MPI library.

Course Code	**Course Name**	**Credit hours**
CSA 33503	Computer Forensics	3

In this course, students will be introduced to the digital forensics environment that incldues the principles and practice of computer forensics. Students will learn best practices for general incidence responses. In addition, they will explore the procedures, methods and tools to conduct computer forensics investigations.

Programme Elective Courses (BCS- NCS)

Course Code   **Course Name**   **Credit hours**
CSA 23403   Data Compression   3
This course provides an overview of classical, modern techniques and algorithms of various types of data compression. It covers lossless and lossy compression algorithms in graphics, video and audio compression. The course will also covers some issues in current compression technologies.

Course Code   **Course Name**   **Credit hours**
CSA 33603   Network Simulation And Performance Modelling   3
This course provides an introduction to the techniques and tools needed to construct and analyze performance models of computer systems and communication networks. Such skills are indispensable for research-related careers. Students also will explore the fundamental theoretical analysis and techniques including probability, stochastic and queuing network techniques. In addition, student will be able to use simulation and modeling tools in order to conduct basic performance modeling and network simulation tasks.

Course Code   **Course Name**   **Credit hours**
CSA 33903   Intrusion Detection And Prevention System   3
This course delivers the technical knowledge, insight and theories to defend the computer networks. Students will learn the underlying theory of preventing and detecting malicious activities. The topics cover include overview of intrusions and state of the art of intrusion detection and prevention system. In addition, students will learn countermeasure techniques to prevent from intrusion into the computer system.

Course Code   **Course Name**   **Credit hours**
CSA 43103   Network Operating System   3
This course introduces students to a broad range of operating system concepts, including installation and maintenance. Topics include operating system concepts, management, maintenance, and resources required. In addition, students will learn to manage users and security groups in an NOS environment. Upon completion of this course, students will have an understanding of OS concepts, installation, management, maintenance, using a variety of operating systems.

Course Code   **Course Name**   **Credit hours**
CSA 43203   Network Programming   3
This course is designed to enhance students' knowledge and practice in the analysis and design of computer networks by focusing on computer network programming. In addition, some advanced network topics including IP Multicast and Remote Method Invocation (RMI) will be introduced in this course. The Java programming language will be used throughout the course.

Course Code   **Course Name**   **Credit hours**
CSA 43303   Wireless Communication And Mobile Network   3
This course provides an overview on the fundamentals of wireless comunication and mobile networks. Among the topics incude an introduction to the different protocols, key issues in the network, and its appropriate solutions. Students will explore various wireless networks and mobile wireless networks such as WAN, MAN, LAN and PAN. The course emphasizes on the concepts and importanceof the networks, the communication protocols, the importance of networks, network applications, and the corresponding advantages and disadvantages of each network.

Course Code   **Course Name**   **Credit hours**
CSA 33703   Digital Logic   3

The main goal of this course is to study the processes in digital circuit design. Starting with an introduction to the basics of number system and Boolean algebra, students will be introduced to the concept of binary logic and logical simplification. Students will be introduced to the techniques for analysis and design of combinatorial and sequential circuits as well as combinations of circuits such as adder / subtractor, Encoder, Decoder, and Magnitude Comparator and Multiplexer. Sequence elements such as latches and flops, memory, memory addressing and logic programming will also be discussed.

Course Code   **Course Name**   **Credit hours**
CSA 33803   Network Management   3

This course prepares students for the management of the network including the basic concepts and the latest technology. Students will be introduced to the design, operation and management, and analysis of data communications network. This course also provides students with knowledge about the types of communications network management system, its strengths and weaknesses in solving various problems of network management.

Programme Specialization Courses (BCS-IC)

Course Code	Course Name	Credit hours
CSD 23103	Web Application Development	3

The web uses complex applications that run on heterogeneous browsers that may be built using the latest programming technologies. This course covers how core web technologies work, common security vulnerabilities and how to build secure web applications that avoid them. Students will be required to build multiple webpages and implement website design that interacts with a database, which will include server-side applications.

Course Code	Course Name	Credit hours
CSW 23103	Internet Architecture And Programming	3

This course will provide students with necessary skills to build structured, maintainable, scalable, and testable web applications using web frameworks, tools, and techniques common to the industry. A web framework is a software framework that is designed to support the development of web applications including web services, web resources and web APIs. Web frameworks aim to alleviate the overhead associated with common activities performed in web development. This course will cover topics that include object oriented programming, the Model-View-Controller (MVC) pattern, Web APIs, Object Relational Mapping (ORM), and application structure. The main focus of the course is on the MVC design pattern employed by modern full-stack web frameworks.

Course Code	Course Name	Credit hours
CSW 23203	Mobile Computing	3

This course provides insights into mobile computing principles and their utilisation to fulfil user requirements. It emphasises on the basic design and development of mobile applications. Students will learn the fundamentals of mobile network infrastructure and standards. Related issues regarding mobile computing usage, environment, and the differences against conventional application development will also be discussed.

Course Code	Course Name	Credit hours
CSW 33103	Web Services	3

This course provides an overview on the concepts and processes in web services, focusing on both the theoretical and the practical aspects. Students will learn components and processes involved in web services during the lectures while in the practical sessions, they will learn how to develop web services. Among the topics to be covered are overview of web services, the creation/development of web services and database manipulation.

Course Code	Course Name	Credit hours
CSW 33203	Distributed Computing System	3

This course covers the aspects of designing and maintaining distributed applications. Students will be introduced to models, logical time, algorithms, distribution, and maintenance of distributed computing. Related issues regarding distributed computing systems such as security, failure detection, and file distribution will be discussed.

Course Code   **Course Name**   **Credit hours**

CSW 33303   Cloud Computing   3

This course provides insights on cloud computing models, techniques, and architectures. Aspects of cloud computing technologies and current practices will also be discussed. Among the topics to be covered are cloud computing models, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), virtualization, security, cloud storage, performance and systems issues in cloud computing implementation

Course Code   **Course Name**   **Credit hours**

CSW 33403   e-Commerce   3

This course focuses on principles of e-commerce from a business perspective. This course provides an overview of business and technology topics, business models, virtual value chain, and innovation and marketing strategies. In addition, some of the major issues associated with e-commerce—security, privacy, intellectual property rights, authentication, encryption, acceptable use policies, and legal liabilities—will be explored.

Course Code   **Course Name**   **Credit hours**

CSW 33503   Business Intelligence   3

This course focuses on business intelligence, an information technology approach to data collection and data analysis to support a wide variety of management tasks. In this course, students will learn analytical components and technologies used to create dashboards and scorecards, and data/text/Web mining methods for trend and sentiment analysis. In addition, artificial intelligence techniques used to develop intelligent systems for decision support will also be covered.

Programme Elective Courses (BCS- IC)

Course Code   **Course Name**   **Credit hours**
CSW 33803   Internet Based System Development Methodologies   3
This course provides insights on the principals and methodologies of internet based system development. Topics to be covered are the aspects of application development activities such as analysis, modelling, architecture, implementation, usability, testing, maintenance, and security. Among the technologies to be discussed will be HTTP, HTTPS, XML, web services, CSS, and internet database.

Course Code   **Course Name**   **Credit hours**
CSW 33603   Online Multimedia Technologies   3
The rapid growth of multimedia usage over the Internet demands new requirements to the internet architecture and protocols. Web Real-Time Communication (WebRTC) is a new standard and industry effort that extends the web browsing model. For the first time, browsers are able to directly exchange real-time media with other browsers in a peer-to-peer fashion. This course is primarily concerned with the problems that arise when carrying audio/video contents over modern communication networks. The course presents an overview of current multimedia applications (e.g., media-on-demand, Internet Telephony) and discuss deployment problems, and study solutions presented in the literature. The course will also examine emerging technologies and open research problems such as quality of service support for networked multimedia applications and streaming in peer-to-peer networks.

Course Code   **Course Name**   **Credit hours**
CSW 33703   Internet of Things   3
The course aims to introduce students to the concepts underlying the Internet of Things (IoT) through a series of lectures on the various topics that are important to understand the state-of-the-art as well as the trends for IoT. The students will be introduced to the history and evolution of IoT, as well as case studies from various industry domains. In addition, students will be required to work in teams to design, build, evaluate and test an innovative IoT system for a specific industry domain, such as sports.
The lectures will be focused around industry domains (the verticals where IoT is applicable, or has been applied), platforms (the hardware or software platforms that are applicable for IoT), protocols (the communication protocols that are applicable to IoT) and services (the types of services that can layer over IoT).

Programme Specialization Courses (BIT-IM)

Course Code	Course Name	Credit hours
ITM 13103	Art And Design	3

In this course, students will be introduced to the concepts of design. The students will also be taught the techniques and intricacies of designing and preparing digital graphics. Students will be involved with sketches, proliferation of knowledge on design, and typographics. The manipulation of graphic elements in order to enhance the quality of display will be part of the syllabus covered during the course.

Course Code	Course Name	Credit hours
ITM 23103	Storytelling And Storyboard	3

This course focuses on storytelling and storyboarding for a multimedia production. Concepts like story structure, composition, visual structure, staging, camera, development of story structure, verbal story telling skills, pitching, story sense and understanding story and character progressions will be covered. Illustrating the narrative, in order to visualize and tell the story, planning shots, drawing panels to demonstrate action and maintain continuity between scenes of an animation requires a thorough understanding of layout, composition, sequential drawing and editing. The aspects that will be addressed in the production of storyboards include format, sketches, character, elements in storyboard and shooting techniques. At the end of the course, it is anticipated that acquired skills during this course would increase the students' marketability in the media industry.

Course Code	Course Name	Credit hours
ITM 23203	Image Editing	3

This course focuses on the principle and theory of image manipulation, such as the use of colours, images, shapes and layers. Digital image manipulation techniques will be demonstrated using suitable image manipulation software. Integration of commercialization values in the production of image manipulation will also be discussed.

Course Code	Course Name	Credit hours
ITM 23303	2D and 3D Modelling	3

This course provides the basic knowledge and principles in the production of 2D and 3D models. Aspects to be emphasized will include texturing, lighting, composition and rendering. Advanced modelling and ethical modelling methods will also be covered. This course also serves as a platform for students to embed commercial values in 2D and 3D modelling.

Course Code	Course Name	Credit hours
ITM 33103	Digital Media Publishing	3

In this course, the concepts; principles and techniques of digital media publishing will be introduced. The aim of the course is to provide a platfrom for the students to develop the required skills in digital media publications. Apart from that, students will also be taught on the commercialization aspects of digital media publishing.

Course Code	**Course Name**	**Credit hours**
ITM 33203	2D and 3D Animation	3

This course emphasizes on the delivery of knowledge and skills related to animations in 2-Dimensional (2D) and 3-Dimensional (3D). Based on the knowledge obtained, students will be required to produce animation projects in 2D or 3D. This course also provides the opportunity for the students to be involved in real animations for multimedia productions according to current industrial needs.

Course Code	**Course Name**	**Credit hours**
ITM 33303	Digital Audio And Video Technology	3

This course provides insights into the fundamentals of digital audio and video technology. Students will be introduced to the audio and video-based project development process that include pre-production, production, and post-production. Strong emphasis will be given on how to produce good quality digital audio and video products based on the format and quality of the compression process, delivery platforms, file type, size and storage hardware. In addition, the students will also be taught on the aspects of professionalism during the production process.

Course Code	**Course Name**	**Credit hours**
ITM 33403	Multimedia Application Development	3

This course covers the concepts and technology of multimedia application development. Based on the acquired knowledge, students should be able to use a variety of tools and elements found in interactive media to develop multimedia applications. This course also serves as the platform for the students to embed commercial values in the developed applications.

Programme Elective Courses (BIT-IM)

Course Code   **Course Name**   **Credit hours**

ITM 23403   Photography Techniques And Technology   3

This course will introduce the concepts, principles and techniques of digital photography to produce photos that meet the required criteria. During the course, students will have the opportunity to lead with appropriate professional skills and take pictures using sophisticated tools of digital photography. In addition, students will also be taught on the commercilization aspects of photography.

Course Code   **Course Name**   **Credit hours**

ITM 23603   Interactive Media In Industry   3

In this course, students will explore current interactive media usage in various industries. The aspects on technology used by professionals in the field of media design, production, education and marketing in major industries will be covered. Students will be required to develop a project according to industrial needs based on current technologies. In addition, they will also be taught on managerial activities related to interactive media industry.

Course Code   **Course Name**   **Credit hours**

ITM 23703   Computer Games Development   3

In this course, students will be introduced to the concepts and technologies in computer games development. The topics that will be discussed are : the concepts, principles and techniques of computer game. It is anticipated that based on the knowledge obtained from this course, students can acquire appropriate skills in the development of computer games using suitable tools.

Course Code   **Course Name**   **Credit hours**

ITM 25303   Virtual Reality Technology   3

This course aims to provide an overview of the concepts and technologies in Virtual Reality (VR). Students will be involved in developing an interactive virtual environment using suitable software. Among the topics to be discussed are the definition and concepts of VR, technologies of computer graphics in VR systems; software and hardware in the development of VR applications; and VR technologies in various fields.

Committee of Undergraduate Handbook For Academic Session 2016/2017

Chairman

Dr. Syadiah Nor Wan Shamsuddin

Committee Member

Dr. Mumtazimah Mohamad

Dr. Ahmad Nazari Mohd Rose

Dr. Mohamad Afendee Mohamed

Dr. Mohd Fadzil Abdul Kadir

Dr. Suhailan Dato' Safei

Dr. Aznida Hayati Zakaria@Mohamad

Azilawati Rozaimee

Dr. Nurnadiah Zamri

Dr. Azrul Amri Jamal

Nor Surayati Mohamad Usop

Roslinda Muda

Maizan Mat Amin

Abd. Rasid Mamat

Mohd. Khalid Awang

Zanariah Mohd Nor @ Abd. Halim

Nurul Liyana Mohamad Yusof