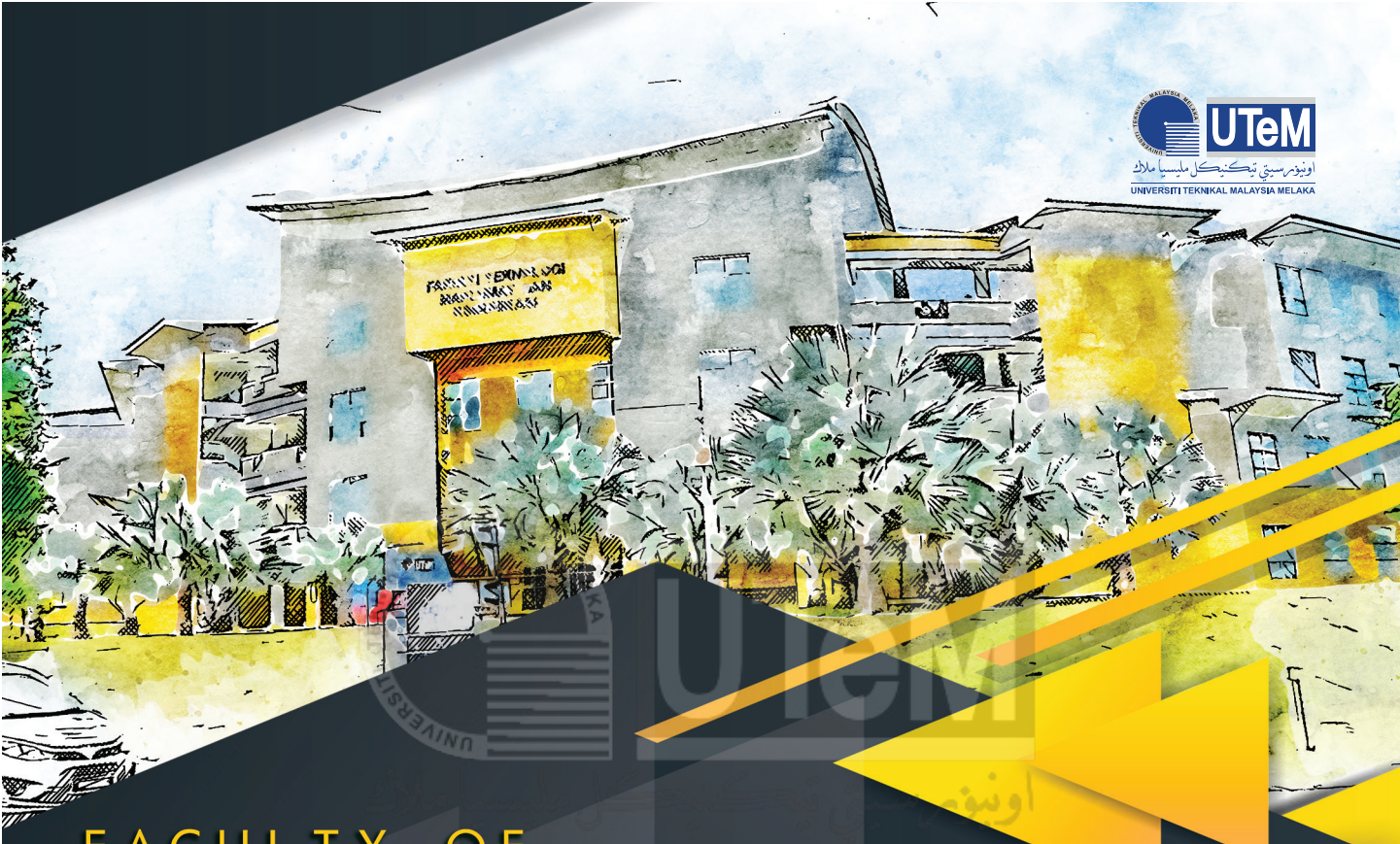


UTeM
اونيۏرسيتي تيکنيکل ملیسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Academic HANDBOOK

SESSION 2019 / 2020

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ACADEMIC HAND BOOK SESSION 2019/2020

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Version August 2019

Faculty of Information and Communication Technology
Universiti Teknikal Malaysia Melaka

FIRST PUBLISHED 2019

Editors
Dr. Norhazwani Md Yunos (Chief)
Ts. Dr. Robiah Yusof

Publication Organizer
Fatonah Salehuddin

Typesetting and Design
Norhayati Yakob

Published and Printed in Malaysia by
Penerbit Universiti
Aras Bawah, Perpustakaan Laman Hikmah
Universiti Teknikal Malaysia Melaka
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia.
Tel: +606 270 1241 Fax: +606 270 1038

CONTENT

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITY MANAGEMENT

PROF. DR. RAHA BINTI ABDUL RAHIM

Vice Chancellor

PROF. DATUK Ts. DR. MOHD RAZALI BIN MUHAMAD

Deputy Vice Chancellor,
Academic & International

PROF. DR. ZULKIFILIE BIN IBRAHIM

Deputy Vice Chancellor,
Research & Innovation

ASSOC. PROF. DR. NURULFAJAR BIN ABD MANAP

Deputy Vice Chancellor,
Student Affairs

PROF. Ts. DR. GOH ONG SING

Assistant Vice Chancellor,
Industry & Community

ASSOC. PROF. Ts. MOHD RAHIMI BIN YUSOFF

Assistant Vice Chancellor,
Development & Facility Management

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

MISSION

UTeM determined to lead and contribute to the wellbeing of the country and the world by:

1. Promoting Knowledge Through Innovative Teaching & Learning, Research and Technical Scholarship
2. Developing Professional Leaders with Impeccable Moral Values
3. Generating Sustainable Development Through Smart Partnership with the Community and Industry

VISION

To Be One of the World's Leading Innovative and Creative Technical Universities.

MOTTO

Excellence Through Competency

EDUCATIONAL GOALS

1. To conduct academic and professional programmes based on relevant needs of the industries.
2. To produce graduates with relevant knowledge, technical competency, soft skills, social responsibility and accountability.
3. To cultivate scientific method, critical thinking, creative and innovative problem solving and autonomy in decision making amongst graduates.
4. To foster development and innovation activities in collaboration with industries for the development of national wealth.
5. To equip graduates with leadership and teamwork skills as well as develop communication and life-long learning skills.
6. To develop technopreneurship and managerial skills amongst graduates.
7. To instill an appreciation of the arts and cultural values and awareness of healthy life styles amongst graduates.

OBJECTIVE

1. To become a creative and innovative learning and knowledge organization that practice and applicatin oriented academic programme in the fields of engineering and technology.
2. To lead in research, development, innovation, commercialization and consultancy activities based on the needs of the industry.
3. To produce competent graduates with moral who will be the preferred choice by the industry.
4. To have competent and highly qualified staff with vast practical experiences.
5. To play and effective role as the main impetus to the industrial development of the nation.
6. To establish cooperation and smart partnership between the university and the industries.
7. To provide insfrastructure and conducive environment to generate and maintain excellence.
8. To implement comprehensive and extensive usage of ICT in both academic activities and managemnent of the university.

DEAN'S MESSAGE

Assalamualaikum and greetings,

On behalf of the faculty members of the Faculty of Information and Communication Technology (FTMK), Universiti Teknikal Malaysia Melaka (UTeM), I welcome you to the FTMK academic handbook.

It has been a privilege that you have chosen FTMK and look ahead to support your success. As a Dean of FTMK, it is my pleasure to serve students and enhance your educational experiences based on industrial needs, hands-on technical education and professional certifications. In fact, your intellectual life in campus will revolve around the curriculum of the undergraduate program that you have selected out of 8 programs we offered.

Moreover, a lecturer who serves as an academic advisor will guide you through your undergraduate program planning of study. The relationship that you develop with your academic advisor will be the utmost importance to your successful pursuit of an undergraduate degree.

Therefore, the academic handbook is arranged to provide you a valuable reference and as a guide to prepare for your study plans. The academic handbook consists of academic regulations, facilities, program education objectives (PEO), academic system (i.e.: CGPA, iCGPA and dean's list awards) and the curriculum structure of the undergraduate programs (i.e.: credit hours, university subjects, program core subjects, course core subjects and elective subjects).

Besides, students are encouraging to have a creative thinking, remain focused on striving on academic success, be actively engaged inside and outside of the classroom, be open to a new challenging experiences, seek assistance if you in need and enjoy the study life while you still have the time. As a member of FTMK community, you will gain a transformational experience which will prepare you well to become a leader in a global community.

Finally, on behalf of the faculty, I would like to express my appreciation to the Committee of Writing and Publication and people who involved in the process of publishing this academic handbook.

Together we can make a difference. Good Luck.

Gs. Dr. Othman Mohd
Dean
Faculty of Information and Communication Technology
Universiti Teknikal Malaysia Melaka

FTMK AT A GLANCE

Faculty of Information and Communication Technology (FTMK) is one of the earliest formed faculty at Kolej Universiti Teknikal Malaysia Melaka (KUTKM) on 1st of December 2000. The Faculty started to operate on 22 June 2001 with its pioneer batch of students of academic session 2001/2002. Since 1st February 2007, Kolej Universiti Teknikal Malaysia Melaka (KUTKM) is known as Universiti Teknikal Malaysia Melaka (UTeM).

The Faculty established five (5) departments as below:

i. Department of Software Engineering
ii. Department of Computer System & Communication
iii. Department of Interactive Media
iv. Department of Intelligent Computing & Analytics
v. Department of Diploma Studies

Courses offered by the faculty for the academic session 2019/2020 are as follows:

DIPLOMA

i. Diploma in Information and Communication Technology (DICT)

BACHELOR'S DEGREE

i. Bachelor of Computer Science (Software Development) with Honours (BITS)
ii. Bachelor of Computer Science (Database Management) with Honours (BITD)
iii. Bachelor of Computer Science (Interactive Media) with Honours (BITM)
iv. Bachelor of Computer Science (Computer Networking) with Honours (BITC)
v. Bachelor of Computer Science (Artificial Intelligence) with Honours (BITI)
vi. Bachelor of Computer Science (Computer Security) with Honours (BITZ)
vii. Bachelor of Information Technology (Game Technology) with Honours (BITE)

MASTER'S DEGREE

By research

i. Master in Information and Communication Technology (MITA)

By coursework

1. **Master of Computer Science**
   i. Master of Computer Science (Internetworking Technology) (MITI)
   ii. Master of Computer Science (Software Engineering) (MITS)
   iii. Master of Computer Science (Database Technology) (MITD)
   iv. Master of Computer Science (Security Science) (MITZ)
   v. Master of Computer Science (Multimedia Computing) (MCSM)

2. **Master of Software Engineering**
   i. Master of Software Engineering (Mobile Development) (MSMD)

3. **Master of Technology**
   i. Master of Technology (Data Science and Analytics) (MTDS)

4. **Master of Information System**
   i. Master of Information System (MIS)

PhD

i. Doctor of Philosophy in Information and Communication Technology (PITA)

FACULTY VISION, MISSION AND OBJECTIVES

FACULTY VISION

To become a creative, innovative and world class centre of excellence in education, research and services of information and communication technology field.

FACULTY MISSION

To develop highly competent professionals with outstanding personalities through a world class technical education on the basis of application-oriented teaching, learning and research with smart partnership with industry and university.

FACULTY OBJECTIVES

i. To create ethical, competent and skilful ICT professionals of local, international and industry's choice.
ii. To spearhead and develop applied research in the ICT field to produce new knowledge and innovative technology needed by the industry which can be commercialized and recognized internationally.
iii. To improve staff professionalism and competence and contribute to university income through consultation, professional training and continuous quality teaching.
iv. To improve ICT understanding, promote ICT culture in the society and provide social services which leads to social well-being and economic development.
v. To create continuous smart partnership with local and foreign industry and institutions of excellence.
vi. To develop high quality infrastructure and faculty administration system and support programme development to achieve faculty objectives.

FACULTY MANAGEMENT

DEAN
Gs. DR. OTHMAN MOHD

OFFICE SECRETARY
NORASMARA MAHMUD

DEPUTY DEAN
(RESEARCH & POSTGRADUATES)
Assoc. Prof. Ts. DR. SABRINA AHMAD

DEPUTY DEAN
(ACADEMIC)
Assoc. Prof. DR. ABD SAMAD HASAN BASARI

DEPUTY DEAN
(STUDENT DEVELOPMENT)
Assoc. Prof. DR. SHARIFAH SAKINAH SYED AHMAD

HEAD OF DEPARTMENT
(SOFTWARE ENGINEERING)
Gs. DR. SAFIZA SUHANA KAMAL BAHARIN

ACADEMIC STAFFS

HEAD OF DEPARTMENT
(COMPUTER SYSTEM & COMMUNICATION)
Ts. DR. MOHD RIZUAN BAHARON

ACADEMIC STAFFS

HEAD OF DEPARTMENT
(INTELLIGENT COMPUTING & ANALYTICS)
Assoc. Prof. Ts. DR. ZURAIDA ABAL ABAS

ACADEMIC STAFFS

HEAD OF DEPARTMENT
(INTERACTIVE MEDIA)
Ts. DR. MUHAMMAD HAZIQ LIM ABDULLAH

ACADEMIC STAFFS

HEAD OF DEPARTMENT
(DIPLOMA STUDIES)
Ts. DR. ASWALIZA ABDULLAH

LAB COORDINATOR
Ts. SUHAIMI BASRAH

ASSISTANT ENGINEERS & TECHNICIANS

DEPUTY REGISTRAR
SHARIFAH NURUL FARIDAH SYED BAKAR

SENIOR ASSISTANT REGISTRAR
NORHIDAYAH MOHD ZAINUDIN

ADMIN STAFFS

DEAN

Gs. Dr. Othman Mohd
Diploma Computer Science (ITM)
BSc Computer Science (UTM)
MSc. Computer Science (UPM)
PhD. in Information and Communication Technology (UTeM)
mothman@utem.edu.my

DEPUTY DEAN (ACADEMIC)

Assoc. Prof. Dr. Abd. Samad Hasan Basari
BSc. Mathematics (Hons.) (UKM)
MSc. IT-Education (UTM)
PhD. in Information and Communication Technology (UTeM)
abdsamad@utem.edu.my

DEPUTY DEAN (RESEARCH & POSTGRADUATE STUDIES)

Assoc. Prof. Ts. Dr. Sabrina Ahmad
BIT (Hons.) (UUM),
MSc. Real-Time Software Engineering (UTM)
PhD in Computer Science (University of Western Australia)
sabrinaahmad@utem.edu.my

DEPUTY DEAN (STUDENT DEVELOPMENT)

Assoc. Prof. Dr. Sharifah Sakinah Syed Ahmad
B.Applied Science (Hons) Computer Modelling
M.Sc. Mathematics (USM)
PhD. in Software Engineering and Intelligent System
(University of Alberta, Canada)
sakinah@utem.edu.my

DEPUTY REGISTRAR

Sharifah Nurul Faridah Syed Abu Bakar
Degree in Law (Hons), LLB (UKM)
Master in Law, LLM (UKM)
nurulfaridah@utem.edu.my

ASISSTANT REGISTRAR

Norhidayah Mohd Zainudin
BBA Human Resource Management (UPM)
norhidayah.zainudin@utem.edu.my

HEAD OF DEPARTMENT (SOFTWARE ENGINEERING)

Gs. Ts. Dr. Safiza Suhana Kamal Baharin
Diploma in Reginal & Town Planning (UTM)
Bsc. Geoinformatic (UTM)
MSc. Geoinformatic (UTM)
PhD. in Information and Communication Technology (UTeM)
safiza@utem.edu.my

HEAD OF DEPARTMENT (INTERACTIVE MEDIA)

Ts. Dr. Muhammad Haziq Lim Abdullah
BIT (Hons) (UKM)
Master of Multimedia
(Swinburne University of Technology, Australia)
PhD in Computer Science
(Queenslands University of Technology, Australia)
haziq@utem.edu.my

HEAD OF DEPARTMENT (COMPUTER SYSTEM & COMMUNICATION)

Ts. Dr. Mohd Rizuan Baharon
BSc. Industrial Mathematics (UTM)
MSc. Mathematics (Pure Mathematics) (UTM)
PhD in Computer Science (Mobile Network and Cloud Security)
(Liverpool John Moores University, UK)
mohd.rizuan@utem.edu.my

HEAD OF DEPARTMENT (INTELLIGENT COMPUTING & ANALYTICS)

Assoc. Prof. Ts. Dr. Zuraida Abal Abas
BSc. Industrial Mathematics (UTM)
MSc. Operational Research (London School of Economics, UK)
PhD. in Mathematics (UTM)
zuraidaa@utem.edu.my

HEAD OF DEPARTMENT (DIPLOMA STUDIES)

Ts. Dr. Noraswaliza Abdullah
BSc (Hons.) Comp. Sc. (USM)
MSc. Comp. Sc. (UPM)
PhD. Computer Science (QUT, Brisbane)
noraswaliza@utem.edu.my

LAB COORDINATOR

Ts. Suhaimi Basrah
BSc. Physics and Mathematics (Alabama, USA)
MSc. MSc. Information Technology (UiTM)
suhaimibasrah@utem.edu.my

PROGRAM COORDINATORS & LAB COORDINATOR

BCS Computer Networking (BITC)
Ts. Dr. Wahidah Md Shah

BCS Database Management (BITD)
Ts. Dr. Norashikin Ahmad

BCS Artificial Intelligence (BITI)
Assoc. Prof. Ts. Dr. Zuraida Abal Abas

BCS Media Interactive (BITM)
Ts. Dr. Muhammad Haziq Lim Abdullah

BCS Software Development (BITS)
Gs. Ts. Dr. Safiza Suhana Kamal Baharin

BCS Computer Security (BITZ)
Ts. Dr. Mohd Rizuan Baharon

BIT Game Technology (BITE)
Assoc. Prof. Ts. Dr. Ahmad Naim Che Pee @ Che Hanapi

Diploma in ICT
Ts. Dr. Noraswaliza Abdullah

Lab Coordinator
Ts. Suhaimi Basrah

STUDENT CLUBS

The establishment of student club is aimed to encourage active involvement of students with co-curricular activities at the department and faculty level. This is in line with the direction of educational development and talent achievement as outlined in the Malaysia Higher Education Development Plan. There are eight (8) student clubs which represent each program in the faculty.

Club Advisor	Club
Dr. Zulisman Bin Maksom:	BITE Club
	Interactive Media Club
Pn. Hidayah Binti Rahmalan:	Database Management Club
	Software Engineering Club
En. Nor Azman Bin Mat Arif:	Computer Network Student Society
	Computer Security Club
Dr. Nur Zareen Binti Zulkarnain:	Artificial Intelligence Club
Ts. Nor Mas Aina Binti Md Bohari:	Diploma Club

FACILITIES

Lab Facilities

Faculty of Information and Communication Technology (FTMK) has been equipped with the state-of- art computers and software and integrated into UTeM Network. These facilities ease the process of teaching and learning in FTMK.

Averages of 36 computers with latest software are located at each lab and studio to ensure application oriented teaching and learning is applicable for the students. Server, router, switches, wireless, digital camera, video, biometric machines are also provided for teaching and learning purposes.

Lab Staffs

The labs in FTMK are administered by the Lab Coordinator assisted by Assistant Engineers to ensure smooth teaching and learning processes. The infrastructure committee members are responsible for maintaining and managing respective clients in FTMK environment.

Loan Facilities on Lab Equipment

Students are allowed to loan the lab equipment to complete their assignments or projects on time. The equipment that are allowed to be used are wireless equipment, video camera, digital camera, biometric tool, GSM and others.

Lab Operational Hours

Semester

Monday to Thursday	8:00am to 6:00pm
Friday	8:00am to 12:15pm
	2:45 pm to 6:00pm

Semester Break

Monday to Thursday	8:00am to 5:00pm
Friday	8:00am to 12:15pm
	2:45 pm to 5:00pm

Saturday-Sunday / Public Holidays Close

NAME	DESCRIPTION
Seminar Hall	The hall is equipped with audio-visual facility for 250 pax at a time
Lecture Rooms	Rooms No. 1 to Room No. 12 with each room for 60 pax
Recording Capture System (ReCap)	Mini Theatre for interactive learning environment for 114 pax
Collaborative Learning Laboratory (CLeAR)	A collaborative learning laboratory with 60 pax capacity
Mini Theatre	The theatre room for student animation presentation for 15 pax
Virtual Reality Studio	Laboratory for motion capture and games development
Photography / Recording Studio	Multimedia recording and editing studio
University-Industry Laboratory	1. Coordinated Malware Eradication and Remediation Project (CMERP) Satellite Laboratory – collaboration with Cyber Security Malaysia
Research Laboratories	Seven (7) research laboratories for postgraduates students based on faculty's research clusters under Centre for Advanced Computing Technology (C-ACT): 1. Innovative Software System & Services (IS3) Laboratory 2. Information Security Forensics and Computer Networking (INSFORNET) Laboratory 3. Optimization, Modelling, Analytics and Simulation (OptiMAS) Laboratory 4. Computational Intelligence and Technologies (CIT) Laboratory 5. Human Centered Computing and Information Systems Lab (HCC-ISL) Laboratory 6. Pervasive Computing & Educational Technology (PET) Laboratory 7. Biomedical and Engineering (BIOCORE) Laboratory

NAME	DESCRIPTIONS
Teaching Laboratories	1. Computer Game Laboratory 2. Software Engineering Lab 1, 2 and 3 3. Programming Laboratory 1, 2, 3 and 4 4. Database Laboratory 1, 2 and 3 5. Network Laboratory 1 and 2 6. CCNA & CCNP Laboratory 7. Fiber Optic Laboratory 8. Security Laboratory 9. System / Hardware Laboratory 10. Wireless Laboratory 11. Virtual Reality Laboratory 12. Multimedia Laboratory 1, 2, 3 and 4 13. Artificial Intelligence Laboratory 1, 2, 3 and 4 14. Student Workshop Laboratory
Other Facilities	1. Visiting Professor Rooms 2. Executive Laboratory 3. Administration Office – Level 2 & 3 4. FICTS Room 5. Surau or Prayer Room 6. Lobby Area 7. Parking Area for students and staffs

Lab Usage Regulation

1. Students must display their matric card at all times in the lab.
2. Students are not allowed to bring in their bags into the lab.
3. Students are not allowed to eat/drink or bring in any foods or drinks into the lab.
4. Students are not allowed to wear sandals in the lab except sandals with back straps for female students and covered sandals for male students.
5. Students are not allowed to wear t-shirt without collar in the lab. UTeM's students' dress code is referred.
6. All lab equipment used must be returned in its original condition.
7. Chairs must be arranged neatly after use.
8. Don't leave used papers or litters in the lab. Please throw it into rubbish bin if it is not needed anymore.
9. All equipment must be switched off after used.
10. Students should not enter the lab without lecturers' or tutors' presence.
11. For after-hours lab usage, students must record their details in the lab record book and submit their matric card to Assistant Engineers in duty.
12. Students are prohibited from playing games, chatting or surfing the net for unrelated content in the lab.
13. Students are not allowed to bring out any lab equipment except with permission from the lecturers or Assistant Engineers in duty.
14. Students are not allowed to bring in laptop, CPU, monitor, mouse, CD, VCD or any computer equipment except with permission from the lecturers or Assistant Engineers in duty.
15. Users are not allowed to do any installation on computers in the lab.
16. All requests for software installation into students' laptop will not be entertained.
17. Students must report immediately to lecturer or Assistant Engineers on duty if any lab equipment got lost or broken during their students' usage.
18. Students must report immediately to lecturer or Assistant Engineers on duty if there is any lab equipment that is lost or broken prior to the students' usage.
19. Research labs are for post graduates' students ONLY. Post-graduate students can get the access by referring to their supervisor.

Lab Rules Outside Teaching and Learning Allocated Times

1. Total users for a lab must comply with the maximum capacity allowed for a particular lab.
2. Students are allowed to use labs outside teaching and learning allocated times with permission from a lecturer. The lecturer will be responsible for lab for the duration of the usage. Students must record their start and end times of usage in the record book provided in the lab.
3. Studios and Recording room usage are strictly by booking only. Students can use the studios or recording room through their lecturer or Assistant Engineer on duty.

DISCIPLINARY ACTIONS WILL BE TAKEN AGAINST ANY STUDENT WHO IS FOUND BREAKING ANY RULE LISTED ABOVE.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

Programme Educational Objectives are broad statements that describe quality that are supposed to be acquired by the graduates upon graduation and after a few years of employment.

PROGRAMME EDUCATIONAL OBJECTIVES FOR BACHELOR OF COMPUTER SCIENCE

The following are the PEO for Bachelor of Computer Science in:

1. Software Development
2. Database Management
3. Interactive Media
4. Computer Networking
5. Artificial Intelligence
6. Computer Security

PEO1 Have strong knowledge of sciences, engineering and technology in their profession.

PEO2 Attain knowledge of contemporary issues in technology through research and life-long learning activities.

PEO3 Ability to function as an effective team player with the capability to lead and appreciate team work and leadership qualities

PEO4 Appreciate and uphold professional attitudes and ethics necessary in fulfilling their responsibilities towards the Almighty, clients and the society.

PROGRAMME EDUCATIONAL OBJECTIVES FOR BACHELOR OF INFORMATION TECHNOLOGY (GAME TECHNOLOGY)

PEO1 Practice broad knowledge and skills in IT and specialist knowledge in game technology to solve problems through gamification.

PEO2 Lead in game industry through innovation and continuous professional development.

PEO3 Demonstrate effective communication and technical leadership through involvement in various ICT projects, consultation and entrepreneurial activities.

PEO4 Demonstrate moral and professional commitment for the betterment of the society.

PROGRAMME EDUCATIONAL OBJECTIVES FOR DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

PEO1 Practice technical knowledge and skills of Information and Communication Technology (ICT) and lead a team of programmers or ICT technicians.

PEO2 Pursue life-long learning and continuous education at bachelor degree or in ICT professional development.

PEO3 Demonstrate effective communicate verbally and written technical solutions in project team and end user.

PEO4 Demonstrate ethical behaviours and interpersonal skills in ICT profession.

PROFESSIONAL CERTIFICATION COURSES

Professional certification courses are designed to enable undergraduate students to obtain professional certificates or at least prepare themselves for professional certificates. This professional certificate will be an added value and increase the employability amongst graduates.

Listed are the professional certificates for each undergraduate programme.

- Cisco Certified Network Associate (CCNA) Professional Certificate Preparation: Year 1 Special Semester
- Cisco Certified Network Associate (CCNA) Security Professional Certificate Preparation: Year 3 Special Semester
- Database Foundations Certified Junior Associate: Year 2 Semester 1
- Java Foundation Certified Junior Associate: Year 2 Semester 2
- Preparation for RapidMiner Analyst Professional Certificate: Year 2 Special Semester
- Web Developer Professional Certificate (HTML5): Year 3 Semester 1

LIST OF DEPARTMENTS

Currently, Faculty of Information and Communication Technology has five (5) departments offering Bachelor's degrees and a Diploma programme as follows:

DEPARTMENT OF SOFTWARE ENGINEERING

Software Engineering is a field of knowledge about computer software development using structured methods, techniques and schemes. In line with this, the Department of Software Engineering offers two bachelor programmes of Computer Science namely Software Development and Database Management. This department plays a major role in producing competent and professional software engineers to design and develop highly sophisticated and complex applications including Intelligent Systems. Our programmes have been designed carefully to produce professionals in software engineering with a combination of various technical aspects, soft skills and ethics. The graduates are expected to understand the users, software and system requirements, competent in applying emerging software technologies design, manage, perform testing, maintain and develop the system with software engineering methodology. We also ensure that our graduates are equipped with project management skills, work ethics, risk management knowledge and the importance of team work in software development processes. The objective of specialization in Database Management is to produce skilled professionals in Database Management. The course equips the graduates with various skills such as database analysis, design and development based on the system specifications. The students will also be exposed to data warehouse and data mining techniques. Application oriented approach could also produce highly competitive and creative software engineers in the job market.

DEPARTMENT OF INTERACTIVE MEDIA

The Department of Interactive Media offers undergraduate and graduate programmes in the area of multimedia. In addition to the basic courses in ICT, the programmes offered by this department focus on the concept of interactivity in the design and development of high-quality multimedia products and web sites. This also includes applying the knowledge of interactivity in the area of computer graphics, animation, digital audio video technology, virtual reality and computer games development. With the emphasis on training and hands-on approach, we believe that the graduates are able to fulfil the job markets in the field of multimedia.

DEPARTMENT OF COMPUTER SYSTEM AND COMMUNICATION

Computer System and Communication is a sub field of computer and telecommunication. The Internet is created based on communication systems that produce a complex computer networks which is built for in-home LAN, LANs, MANs, WANs, mobile networks and massive global Internet in order to share information and having a human conversation with one another. Due to the necessity of computer networks towards the use of Internet in daily activities, Bachelor of Computer Networking and Bachelor of Computer Security are introduced and act as the major bachelor programmes offered by Department of Computer System and Communication, to fulfil the nation's need. Besides, students who have undergo this course are not only be knowledgeable and become expert in the area but also equipped with the professional certification for career advancement such as Cisco Academy certification. Thus, students are more confident, creative and ready to face the challenges in real life in working environment. In addition, throughout this programme, students are provided with fundamental of information technology subjects and are exposed with more advanced subjects that comprises of planning, designing, developing, troubleshooting and managing computer systems, computer networks and network security.

DEPARTMENT OF INTELLIGENT COMPUTING & ANALYTICS

Malaysia's vision to become a developed country must be supported by the profound knowledge in advanced industrial technology. Hence, the Department of Intelligent Computing and Analytics was established to fulfill such aspiration by focusing on ICT applications in intelligent automation and augmented analytics.

Intelligent automation is being used in many fields, from robotics and autonomous vehicles to cognitive computing and controlling quality, efficiency and business functionality that integrates multiple artificial intelligence, as well as machine learning and automation capabilities that tracks and automate business process and workflows.

Augmented analytics on the other hand, is the next wave and the future trend to data and analytics. It is an approach that uses machine learning and natural language processing to automate insights by performing activities which includes data preparation, deciphering data pattern and building model as well as distribute and operationalizing data findings.

Providing knowledge in both topics therefore prepares the students to stay at par with the needs and trends of the industry.

DEPARTMENT OF DIPLOMA STUDIES

Department of Diploma Studies is aimed to produce trained students in the field of computer technology and commercial computer application to meet the high demands from the government and private sectors. The programme is intended to produce students with knowledge in computer applications and programming. The students will also obtain professional certification as CCNA.

DURATION OF STUDIES

Full-time mode:

Type of studies	Duration of studies	
	Minimum	Maximum
Bachelor's Degree (All programme)	7 semesters (3 ½ Years)	11 semesters (5 ½ Years)
Diploma	5 semesters (2 ½ Years)	10 semesters (5 Years)

Part-time mode:

Type of studies	Duration of studies	
	Minimum	Maximum
Bachelor's Degree (BITS, BITC, BITM)	14 trimesters (5 Years)	29 trimesters (10 Years)

Note: Details can be obtained from Lifelong Learning Centre (*Pusat Pembelajaran Sepanjang Hayat*), UTeM.

ACADEMIC SYSTEM

The university has implemented its academic system according to semester system. The semester system is widely used in local higher learning institutions in Malaysia. This Academic System Guidelines explains the implementation of Academic Methods and Rules of the University.

Academic Year

SEMESTER I	**Week(s)**		
Lectures	7		
Mid Semester Break	1		
Lectures	7		
Revision Week	1		
Final Examination	2		
Total	**18**		
Semester Break	**3**		
SEMESTER II	**Week(s)**		
Lectures	7		
Mid Semester Break	1		
Lectures	7		
Revision Week	1		
Final Examination	2		
Total	**18**	**OR**	**Week(s)**
Semester Break	**13**	**Semester Break**	1
		SPECIAL SEMESTER	
		Lectures & Examination	8
		Semester Break	4
TOTAL	**52**		**52**

Student's achievement in courses taken is shown by grades. The Relationship between marks, grades and evaluation points is shown in the following table.

The Relationship Between Grade and Point Value

Marks	Grade	Point Value	Status
80 - 100	**A**	**4.0**	**Excellent**
75 - 79	**A-**	**3.7**	**Excellent**
70 - 74	**B+**	**3.3**	**Very Good**
65 - 69	**B**	**3.0**	**Very Good**
60 - 64	**B-**	**2.7**	**Very Good**
55 - 59	**C+**	**2.3**	**Pass**
50 - 54	**C**	**2.0**	**Pass**
47 - 49	**C-**	**1.7**	**Marginal Pass**
44 - 46	**D+**	**1.3**	**Marginal Pass**
40 - 43	**D**	**1.0**	**Marginal Pass**
00 - 39	**E**	**0.0**	**Fail**

ACADEMIC STANDING

A student's performance is assessed using Grade Point Average, GPA for each semester and Cumulative Grade Point Average, CGPA at the end of every regular semester for the overall semester performance. A student's academic standing is determined at the end of every regular semester based on his/her CGPA as depicted below.

STANDING	CGPA
Good (KB)	**CGPA ≥ 2.00**
Conditional (KS)	**1.70 ≤ CGPA < 2.00**
Fail (KG)	**CGPA < 1.70**

a. GPA

GPA is average points obtained by students at the end of each semester. It is calculated as below:

$$GPA = \frac{JMN}{JKK} = \frac{k_1\ m_1\ +\ k_2\ m_2 +\ k_n\ m_n}{k_1 + k_2 + .. + k_n}$$

Where

Total Point Value, $JMN = k_1\ m_1\ +\ k_2\ m_2 +\ k_n\ m_n$

Total Credit Counted, $JKK = k_1 + k_2 + .. + k_n$

With k_n = Credits for course **n**; m_n = Point value obtained for course **n**.

b. CGPA

CGPA refers to cumulative grade point average obtained for all semester studied. It is calculated as below:

$$CGPA = \frac{JMN_1\ +\ JMN_2 + .. + JMN_n}{JKK_1 + JKK_2 + .. + JKK_n}$$

With JMN_n = Total point value obtained in semester **n**; JKK_n = total credit calculated in semester **n**.

DEAN's LIST AWARD

A student who obtains a GPA of 3.50 and above will be awarded a Dean's List certificate. The list will be published at University notice board and web page. Students' transcripts will carry the Dean's List award notation.

CONFERRAL OF DEGREES

Degree conferral is endorsed in the two regular semesters. Students are only eligible for the conferral of their diploma or degree after meeting the following requirements:

i. Obtain a Good Academic Standing (KB).
ii. Pass all the required courses.
iii. Have applied for a degree conferral and have received the Faculty's approval.
iv. Fulfill other requirements set by the University.

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BITC

BACHELOR OF COMPUTER SCIENCE (COMPUTER NETWORKING) WITH HONOURS

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF COMPUTER SCIENCE (COMPUTER NETWORKING) WITH HONOURS

INTRODUCTION

A bachelor's degree course in Computer Science, B.Sc. (Computer Networking) (Honours) is aimed to produce highly knowledgeable and skilful graduates in the field of information technology and communication. Graduates are competent in advanced specialized knowledge and skill in analysing, developing, installing, administrating, servicing, and controlling the networking system and communication.

PROGRAMME LEARNING OUTCOMES

The aim of FTMK bachelor's degree programme is to produce students with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyse, design and develop ICT applications.
iii. Able to analyse, create, assemble, configure, implement, manage, maintain and administer network infrastructure and security.
iv. Able to develop advanced computer network applications.
v. Able to obtain recognition from professional bodies.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

The graduates can be employed in the government and private sectors as well as undertaking business ventures of their own. The positions suitable for the graduates including Information System Executive, System Analyst, Computer Security Executive, Network Project Administrator, Network Programmer and Network Engineer. Graduates are also having the opportunity to continue their studies in master and PhD level.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Computer Networking). The programme components as follows:

BACHELOR'S DEGREE COMPUTER SCIENCE Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	45
Specialisation	K	30
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (45 credits)

BITI 1113	Artificial Intelligence (*Kepintaran Buatan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 1113	Multimedia System (*Sistem Multimedia*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1113	Programming Technique (*Teknik Pengaturcaraan*)
BITP 1123	Data Structure and Algorithm (*Struktur Data dan Algorithma*)
BITP 1323	Database (*Pangkalan Data*)
BITP 2213	Software Engineering (*Kejuruteraan Perisian*)
BITP 3113	Object Oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITU 2913	Workshop I (*Bengkel I*)

SPECIALISATION (30 credits)

BITS 2313	Local Area Network (*Rangkaian Komputer Setempat)*
BITS 2323	Wide Area Network (*Rangkaian Komputer Meluas)*
BITS 2333	Network Analysis and Design (*Analisa dan Rekabentuk Rangkaian)*
BITS 3313	Network Administration and Management (*Pentadbiran dan Pengurusan Rangkaian)*
BITS 3323	Network Project Management (*Pengurusan Projek Rangkaian)*
BITS 3333	Multimedia Networking (*Rangkaian Multimedia)*
BITS 3413	Information Technology and Network Security (*Keselamatan Teknologi Maklumat dan Rangkaian)*
BITS 3513	TCP/IP Programming (*Pengaturcaraan TCP/IP)*
BITS 3533	Wireless Network and Mobile Computing (*Rangkaian Tanpa Wayar dan Komputeran Mudah Alih)*
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan Latihan Industri*)

FREE MODULES (13 credits)

BITM 1123	Interactive Media Authoring (*Pengarangan Media Interaktif)*
BITM 2113	Web Application Development (*Pembangunan Aplikasi Web)*
BITM 2123	Digital Audio and Video Technology (*Teknologi Audio dan Video Digital)*
BITS 2513	Internet Technology (*Teknologi Internet)*
BITS 3343	Fiber Optic (*Fiber Optik)*
BITS 3443	Digital Forensics (*Forensik Digital)*
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)

PROFESSIONAL CERTIFICATION

BITS 2610	CCNA Professional Certificate Preparation *(Persediaan Sijil Profesional CCNA*)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan Akademik*	W	2	0	2	
BLHW XXXX	*Penghayatan Etika dan Peradaban***	W	2	0	2	
BITI 1213	Linear Algebra and Discrete Mathematics *Aljabar Linear dan Matematik Diskrit*	P	2	2	3	
BITP 1113	Programming Technique *Teknik Pengaturcaraan*	P	2	2	3	
BITM 1113	Multimedia System *Sistem Multimedia*	P	2	2	3	
BITS 1123	Computer Organization and Architecture *Organisasi dan Senibina Komputer*	P	2	2	3	
				Total	**18**	

For International Students, replaced with: *BLHW 1742 Malaysian Studies **BLHW 2752 Malaysian Culture.

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 1123	Data Structure and Algorithm *Struktur Data dan Algoritma*	P	2	2	3	BITP 1113
BITS 1313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	P	2	2	3	
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	
BIT- ---3	Elective I *Elektif I*	E	2	2	3	
				Total	**18**	

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 2452	Academic Writing *Penulisan Akademik*	W	2	0	2	BLHW 1442
BITU 2913	Workshop 1 *Bengkel 1*	P	1*		3	BITP 1113
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITP 3113	Object Oriented Programming *Pengaturcaraan Berorientasi Objek*	P	2	2	3	
BITS 2313	Local Area Network *Rangkaian Komputer Setempat*	K	2	2	3	BITS 1313
				Total	**17**	

* Average official contact hours per week.
Note for Professional Certification: BITS 2610 CCNA Professional Certificate Preparation (*Persediaan Sijil Profesional CCNA*) - will be offered in Semester 3.

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BKK- ---1	Co-Curriculum I* *Ko-kurikulum I**	W	0	3	1	
BITI 1113	Artificial Intelligence *Kepintaran Buatan*	P	2	0	2	
BITP 2213	Software Engineering *Kejuruteraan Perisian*	P	2	2	3	
BITS 2333	Network Analysis and Design *Analisa dan Rekabentuk Rangkaian*	K	2	2	3	BITS 2313
BITS 2323	Wide Area Network *Rangkaian Komputer Meluas*	K	2	2	3	BITS 2313
B--- ---2	Elective II *Elektif II*	E	2	0	2	
BIT- ---3	Elective III *Elektif III*	E	2	2	3	
				Total	**18**	

* This course can be taken in any semester. Please refer to Co-Curriculum unit before register.

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Komunikasi*	W	2	0	2	BLHW 2452
BKK- ---1	Co-Curriculum II* *Ko-kurikulum II**	W	0	3	1	
BITU 3923	Workshop II *Bengkel II*	K	1**		3	BITU 2913
BITS 3313	Network Administration and Management	K	2	2	3	BITS 2333
BITS 3323	Network Project Management *Pengurusan Projek Rangkaian*	K	2	2	3	
BITS 3533	Wireless Network and Mobile Computing	K	2	2	3	BITS 1313
BIT- ----	Elective IV *Elektif IV*	E	2	2	3	
				Total	18	

* This course can be taken in any semester. Please refer to Co-Curriculum unit before register.
** Average official contact hours per week.

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BITS 3333	Multimedia Networking *Rangkaian Multimedia*	K	2	2	3	BITS 2313
BITS 3513	TCP/IP Programming *Pengaturcaraan TCP/IP*	K	2	2	3	BITP 1113
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1*		3	BITU 3923
BITS 3413	Information Technology and Network Security *Keselamatan Teknologi Maklumat dan Rangkaian*	K	2	2	3	BITS1213, BITS 1313
B--- ---2	Elective V *Elektif V*	E	2	0	2	
				Total	16	

* Average official contact hours per week.

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week.

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU 3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU 3983*
BITU 3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU 3983*
			Total	**12**	

* Pre-requisite (completed all courses).

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of **THREE** (3) courses with **THREE** (3) credits **AND** **TWO** (2) courses with **TWO** (2) credits, to complete at least 13 credits.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Lecture	Contact Hours		Pre-requisite
			Lab	Credit	
BITS 3343	Fiber Optic *Fiber Optik*	2	2	3	BITS 1313
BITS 3443	Digital Forensics *Forensik Digital*	2	2	3	
BITS 2513	Internet Technology *Teknologi Internet*	2	2	3	
BITM 1123	Interactive Media Authoring *Pengarangan Media Interaktif*	2	2	3	
BITM 2123	Digital Audio and Video Technology *Teknologi Audio dan Video Digital*	2	2	3	
BITM 2113	Web Application Development *Pembangunan Aplikasi Web*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	
BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHC 4022	Negotiation Skills *Kemahiran Perundingan*	2	0	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

****Third Language Courses**

Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

BITD

BACHELOR OF COMPUTER SCIENCE (DATABASE MANAGEMENT) WITH HONOURS

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF COMPUTER SCIENCE (DATABASE MANAGEMENT) WITH HONOURS

INTRODUCTION

The learning objectives of this course are to produce knowledge and highly skilled graduates in the field of information and communication technology. Graduates pursuing the programme are equipped with the in-depth knowledge and specialized skills in database management area. This includes the ability to analyse, design, develop programme using structured programming methods, manage and maintain database system which could meet the industrial needs in the field. Students should be able to develop data mining application with required security standard to protect the system database.

PROGRAMME LEARNING OUTCOMES

Bachelor of Computer Science (Database Management) programme at FTMK intended to produce graduates with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to develop database by applying database concept using latest technology.
iv. Able to develop database application with standard security measures.
v. Able to administer and maintain database according to the standard procedure and policy.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various discipline and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

Graduates specialized in Database Management have the opportunity to work as Database Analyst, Database System Administrator and Database Designer. They also could work as System Programmer, Information System Officer and System Analyst. The graduates also have the opportunity to further up their studies in Master and Doctorate level.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Database Management). The programme components as follows:

BACHELOR'S DEGREE (COMPUTER SCIENCE) Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	45
Specialisation	K	30
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (45 credits)

BITI 1113	Artificial Intelligence (*Kepintaran Buatan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 1113	Multimedia System (*Sistem Multimedia*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1113	Programming Technique (*Teknik Pengaturcaraan*)
BITP 1123	Data Structure and Algorithm (*Struktur Data dan Algorithma*)
BITP 1323	Database (*Pangkalan Data*)
BITP 2213	Software Engineering (*Kejuruteraan Perisian*)
BITP 3113	Object Oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITU 2913	Workshop I (*Bengkel I*)

SPECIALISATION (30 credits)

BITP 2223	Software Requirement and Design (*Keperluan dan Rekabentuk Perisian*)
BITP 2303	Database Programming (*Pengurusan Projek Perisian*)
BITP 2313	Database Design (*Rekabentuk Pangkalan Data*)
BITP 2323	Database Administration (*Pentadbiran Pangkalan Data*)
BITP 3223	Software Project Management (*Pengurusan Projek Perisian*)
BITP 3353	Multimedia Database (*Pangkalan Data Multimedia*)
BITP 3363	Data Warehousing and Business Intelligence (*Penggudangan Data dan Kepintaran Perniagaan*)
BITS 3433	Information Technology and Database Security (*Keselamatan Teknologi Maklumat dan Pangkalan Data*)
BITP 3483	Geography Information Systems (*Sistem Maklumat Geografi*)
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan latihan Industri*)

FREE MODULES (13 credits)

BITI 2223	Machine Learning (*Pembelajaran Mesin*)
BITM 2113	Web Application Development (*Pembangunan Aplikasi Web*)
BITP 3233	Strategic Information System Planning (*Perancangan Strategik Sistem Maklumat*)
BITP 3253	Software Validation and Verification (*Validasi dan Verifikasi Perisian*)
BITP 3423	Special Topic in Software Engineering (*Topik Khas Kejuruteraan Perisian*)
BITP 3523	Advanced Database Administration (*Pentadbiran Pangkalan Data Lanjutan*)
BITS 2313	Local Area Network (*Rangkaian Komputer Setempat*)
BITS 2513	Internet Technology (*Teknologi Internet*)
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)

PROFESSIONAL CERTIFICATION

BITP 2620	Database Foundations Certified Junior Associate (*Persediaan Sijil Profesional* Database Foundations Certified Junior Associate)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan*	W	2	0	2	
BKK- ---1	Co-Curriculum I* *Ko-kurikulum I**	W	0	3	1	
BITP 1113	Programming Technique *Teknik Pengaturcaraan*	P	2	2	3	
BITI 1213	Linear Algebra and Discrete Mathematics	P	2	2	3	
BITS 1123	Computer Organization and Architecture	P	2	2	3	
BITM 1113	Multimedia System *Sistem Multimedia*	P	2	2	3	
B--- ---2	Elective I *Elektif I*	E	2	0	2	
				Total	**17**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register.

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW XXXX	*Penghayatan Etika dan Peradaban***	W	2	0	2	
BKK- ---1	Co-Curriculum II*** *Ko-kurikulum II****	W	0	3	1	
BITP 1123	Data Structure and Algorithm *Struktur Data dan Algoritma*	P	2	2	3	BITP 1113
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 2213	Software Engineering *Kejuruteraan Perisian*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	BITP 1113
				Total	**17**	

For International Students, replaced with: *BLHW 1742 Malaysian Studies **BLHW 2752 Malaysian Culture.
***This course can be taken in any semester. Please refer to Co-curriculum unit before register.

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 2913	Workshop 1 *Bengkel 1*	P	1*		3	BITP 1113
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITP 2313	Database Design *Rekabentuk Pangkalan Data*	K	2	2	3	BITP 1323
BITP 3223	Database Programming *Pengaturcaraan Pangkalan Data*	K	2	2	3	BITP 1323, BITP1113
				Total	**18**	

* Average official contact hours per week.
Note for Professional Certification: BITP 2610 Database Foundations Certified Junior Associate (*Persediaan Sijil Profesional* Database Foundations Certified Junior Associate)

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 2452	Academic Writing *Penulisan Akademik*	W	2	0	2	BLHW 1442
BITP 3113	Object Oriented Programming *Pengaturcaraan Berorientasi Objek*	P	2	2	3	
BITI 1113	Artificial Intelligence *Kepintaran Buatan*	P	2	2	3	
BITS 1313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	P	2	2	3	
BITP 2223	Software Requirement and Design *Keperluan dan Rekabentuk Perisian*	K	2	2	3	
BITP 2323	Database Administration/ *Pentandbiran Pangkalan Data*	K	2	2	3	
B--- ---2	Elective II *Elektif II*	E	2	0	2	
				Total	**19**	

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Komunikasi*	W	2	0	2	BLHW 2452
BITU 3923	Workshop II *Bengkel II*	K	1*		3	BITU 2913
BITS 3423	Information Technology and Database Security *Keselamatan Teknologi Maklumat dan Pangkalan Data*	K	2	2	3	
BITP 3223	Software Project Management *Pengurusan Projek Perisian*	K	2	2	3	
BITP 3363	Data Warehousing and Business Intelligence/ *Penggudangan Data dan*	K	2	2	3	
BITP 3483	Geography Information System / *Sistem Maklumat Geografi*	K	2	2	3	
				Total	**17**	

* Average official contact hours per week.

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1*		3	BITU 3923
BITP 3353	Multimedia Database *Pangkalan Data Multimedia*	K	2	2	3	
BIT- ---3	Elective III *Elektif III*	E	2	2	3	
BIT- ---3	Elective IV *Elektif IV*	E	2	2	3	
BIT- ---3	Elective V *Elektif V*	E	2	2	3	
				Total	**17**	

* Average official contact hours per week.

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week.

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU 3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU 3983*
BITU 3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU 3983*
			Total	**12**	

* Pre-requisite (completed all courses).

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of **THREE** (3) courses with **THREE** (3) credits **AND** **TWO** (2) courses with **TWO** (2) credits, to complete at least 13 credits. List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITP 3233	Strategic Information System Planning *Perancangan Strategik Sistem Maklumat*	2	2	3	
BITS 2313	Local Area Network *Rangkaian Area Setempat*	2	2	3	
BITP 3523	Advanced Database Administration *Pentadbiran Pangkalan Data Lanjutan*	2	2	3	
BITI 2223	Machine Learning *Pembelajaran Mesin*	2	2	3	
BITP 3253	Software Validation and Verification *Validasi dan Verifikasi Perisian*	2	2	3	
BITP 3423	Special Topic in Software Engineering *Topik Khas Kejuruteraan Perisian*	2	2	3	
BITS 2513	Internet Technology *Teknologi Internet*	2	2	3	
BITM 2113	Web Application Development *Pembangunan Aplikasi Web*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	
BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHC 4022	Negotiation Skills *Kemahiran Perundingan*	2	0	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

**Third Language Courses

Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

BITI

BACHELOR OF COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE) WITH HONOURS

UNIVERSITI TEKNIKAL MALAYSIA MELAKA
UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF COMPUTER SCIENCE (ARTIFICIAL INTELLIGENCE) WITH HONOURS

INTRODUCTION

Bachelor of Computer Science (Artificial Intelligence) academic programme is offered to prepare graduates with a thorough understanding and superior skills of Computer Science, particularly in the area of Artificial Intelligence. Graduates will also be equipped with advanced scientific knowledge and engineering skills in Artificial Intelligence to fulfil industrial needs especially in the field of ICT, robotics and manufacturing.

PROGRAMME LEARNING OUTCOMES

The aim of the Bachelor of Computer Science (Artificial Intelligence) programme is to produce students with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to apply AI techniques such as searching techniques, fuzzy logic, machine learning, neural networks, evolutionary computing, and intelligent agents in developing a system.
iv. Equipped with skills to develop individually or in a group on artificial intelligence-based systems such as intelligent systems, expert systems, intelligent agent systems and robotic systems.
v. Able to conduct research in the fields related and based on AI.
vi. Able to resolve problems in a creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

There is a wide range of career opportunities in the field of computer science and information technology available for graduates who are specialized in AI. Among the career opportunities are:

i. Knowledge Engineer
ii. Intelligent Systems or Expert Systems Developer
iii. System Analyst/Programmer/Designer
iv. Software Developer/Consultant
v. Computer/Data Scientist
vi. Researcher

Other than that, the graduates also have the opportunity to further their studies at postgraduate level.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Artificial Intelligence) with Honours. The programme components as follows:

BACHELOR'S DEGREE (COMPUTER SCIENCE) Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	45
Specialisation	K	30
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (45 credits)

BITI 1113	Artificial Intelligence (*Kepintaran Buatan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 1113	Multimedia System (*Sistem Multimedia*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1113	Programming Technique (*Teknik Pengaturcaraan*)
BITP 1123	Data Structure and Algorithm (*Struktur Data dan Algorithma*)
BITP 1323	Database (*Pangkalan Data*)
BITP 2213	Software Engineering (*Kejuruteraan Perisian*)
BITP 3113	Object Oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITU 2913	Workshop I (*Bengkel I*)

SPECIALISATION MODULES (30 credits)

BITI 2213	Knowledge Based System (*Sistem Berasaskan Pengetahuan*)
BITI 2223	Machine Learning (*Pembelajaran Mesin*)
BITI 3123	Fuzzy Logic (*Logik Kabur*)
BITI 3133	Neural Network (*Rangkaian Neural*)
BITI 3143	Evolutionary Computing (*Pengkomputeran Evolusi*)
BITI 3413	Natural Language Processing (*Pemprosesan Bahasa Tabii*)
BITI 3523	Artificial Intelligence in Robotics & Automation (*Kepintaran Buatan dalam Robotik & Automasi*)
BITI 3533	Artificial Intelligence Project Management (*Pengurusan Projek Kepintaran Buatan*)
BITS 3423	Information Technology Security (*Keselamatan Teknologi Maklumat*)
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan Latihan Industri*)

FREE MODULES (13 credits)

BENT 4733	Digital Signal Processing (*Pemprosesan Signal Digital*)
BITI 2113	Logic Programming (*Pengaturcaraan* Logik)
BITI 2513	Introduction to Data Science (*Pengenalan kepada Sains Data*)
BITI 3113	Intelligent Agent (*Agen Pintar*)
BITI 3213	Decision Support Systems (*Sistem Bantuan Keputusan*)
BITI 3313	Image Processing & Pattern Recognition (*Pemprosesan Imej dan Pengecaman Corak*)
BITI 3513	Artificial Intelligence in Manufacturing (*Kepintaran Buatan dalam Pembuatan*)
BITM 2113	Web Application Development (*Pembangunan Aplikasi Web*)
BITM 3133	Computer Games Development (*Pembangunan Permainan Komputer*)
BITS 2513	Internet Technology (*Teknologi Internet*)
BITP 3253	Software Validation and Verification (*Validasi dan Verifikasi Perisian*)
BITP 3453	Mobile Application Development (*Pembangunan Aplikasi Mudah Alih*)
BITP 3473	Formal Methods (*Kaedah Formal*)
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)
BTMT 3323	Contemporary Business Management (*Pengurusan Perniagaan Kontemporari*)

PROFESSIONAL CERTIFICATION

BITI 3910	Preparation for RapidMiner Analyst Professional Certificate (*Persediaan Sijil Profesional RapidMiner Analyst*)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan Akademik*	W	2	0	2	
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW XXXX	*Penghayatan Etika dan Peradaban***	W	2	0	2	
BITI 1213	Linear Algebra and Discrete Mathematics *Aljabar Linear dan Matematik Diskrit*	P	2	2	3	
BITP 1113	Programming Technique *Teknik Pengaturcaraan*	P	2	2	3	
BITM 1113	Multimedia System *Sistem Multimedia*	P	2	2	3	
BITS 1123	Computer Organization and Architecture *Organisasi dan Senibina Komputer*	P	2	2	3	
				Total	**18**	

Note: International Student Only. *BLHW 1942 Malaysian Studies and **BLHW 2752 Malaysian Culture.

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITI 1113	Artificial Intelligence *Kepintaran Buatan*	P	2	2	3	
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 1123	Data Structure and Algorithm *Struktur Data dan Algoritma*	P	2	2	3	BITP 1113
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	
BITS 1313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	P	2	2	3	
				Total	**18**	

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 2452	Academic Writing *Penulisan Akademik*	W	2	0	2	BLHW 1442
BKK- ---1	Co-Curriculum I* *Ko-kurikulum I**	W	0	3	1	
BITU 2913	Workshop 1 *Bengkel 1*	P	1**		3	BITP 1113
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITP 3113	Object Oriented Programming *Pengaturcaraan Berorientasi Objek*	P	2	2	3	
BITI 2213	Knowledge Based System *Sistem Berasaskan Pengetahuan*	K	2	2	3	BITI 1113
BITI 2223	Machine Learning *Pembelajaran Mesin*	K	2	2	3	BITI 1113
				Total	**18**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register.
** Average official contact hours per week.

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITP 2213	Software Engineering *Kejuruteraan Perisian*	P	2	2	3	
BITI 3123	Fuzzy Logic *Logik Kabur*	K	2	2	3	BITI 1113
BITI 3133	Neural Network *Rangkaian Neural*	K	2	2	3	BITI 1113
BITI 3143	Evolutionary Computing *Pengkomputeran Evolusi*	K	2	2	3	BITI 1113
B--- ---3	Elective I *Elektif I*	E	2	2	3	
				Total	**18**	

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Interaksi Profesional*	W	2	0	2	BLHW 2452
BKK- ---1	Co-Curriculum II* *Ko-kurikulum II**	W	0	3	1	
BITU 3923	Workshop II *Bengkel II*	K	1**		3	BITU 2913
BITI 3533	Artificial Intelligence Project Management *Pengurusan Projek Kepintaran Buatan*	K	2	2	3	
BITI 3413	Natural Language Processing *Pemprosesan Bahasa Tabii*	K	2	2	3	BITI 1113
BITI 3523	Artificial Intelligence in Robotics & Automation *Kepintaran Buatan dalam Robotik & Automasi*	K	2	2	3	
B--- ---3	Elective II *Elektif II*	E	2	2	3	
				Total	**18**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register.
** Average official contact hours per week.
Note for Professional Certification: BITI 3910 Preparation for RapidMiner Analyst Professional Certificate (*Persediaan Sijil Profesional RapidMiner Analyst*).

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1**		3	BITU 3923
BITS 3423	Information Technology Security *Keselamatan Teknologi Maklumat*	K	2	2	3	
B--- ---3	Elective III *Elektif III*	E	2	2	3	
BLH- ---2	Elective IV *Elektif IV*	E	2	0	2	
BLH- ---2	Elective V* *Elektif V**	E	2	0	2	
				Total	**15**	

Note: International Student Only. * BLHL 1012 Bahasa Melayu Komunikasi.
** Average official contact hours per week.

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week.

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU 3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU 3983*
BITU 3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU 3983*
			Total	**12**	

* Pre-requisite (completed all courses).

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of **THREE** (3) courses with **THREE** (3) credits **AND** **TWO** (2) courses with **TWO** (2) credits, to complete **at least 13 credits**.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITI 3113	Intelligent Agent *Agen Pintar*	2	2	3	BITP 3113
BITI 2113	Logic Programming *Pengaturcaraan Logik*	2	2	3	
BITI 2513	Introduction to Data Science *Pengenalan kepada Sains Data*	2	2	3	
BITI 3213	Decision Support Systems *Sistem Bantuan Keputusan*	2	2	3	
BITI 3313	Image Processing & Pattern Recognition *Pemprosesan Imej dan Pengecaman Corak*	2	2	3	BITI 1113
BITI 3513	Artificial Intelligence in Manufacturing *Kepintaran Buatan dalam Pembuatan*	2	2	3	BITI 1113
BITM 2113	Web Application Development *Pembangunan Aplikasi Web*	2	2	3	
BITM 3133	Computer Games Development *Pembangunan Permainan Komputer*	2	2	3	
BITS 2513	Internet Technology *Teknologi Internet*	2	2	3	
BITP 3253	Software Validation and Verification *Validasi dan Verifikasi Perisian*	2	2	3	BITP 2213
BITP 3453	Mobile Application Development *Pembangunan Aplikasi Mudah Alih*	2	2	3	
BITP 3473	Formal Methods *Kaedah Formal*	2	2	3	
BTMT 3323	Contemporary Business Management *Pengurusan Perniagaan Kontemporari*	2	2	3	
BENT 4733	Digital Signal Processing *Pemprosesan Signal Digital*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	

BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	
BLHC 4022	Negotiation Skills *Kemahiran Perundingan*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

****Third Language Courses**

Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

BITM

BACHELOR OF COMPUTER SCIENCE (INTERACTIVE MEDIA) WITH HONOURS

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF COMPUTER SCIENCE (INTERACTIVE MEDIA) WITH HONOURS

INTRODUCTION

Bachelor of Computer Science (Interactive Media) academic programme is offered to prepare graduates with a thorough understanding and superior skills in information technology particularly in the area of multimedia. The learning outcomes of this programme are to equip the students with the basic knowledge in every aspect of information technology, to provide the students with sufficient theoretical knowledge and skills to apply the knowledge learnt through the practiced concept , enable the students to be able to apply the interactivity concept in the design and development of multimedia-based application, equip the students with deep understanding and high skills in the development and management of web sites, animation, computer graphics, virtual reality and development of computer games, produce graduates that are capable to develop high quality interactive media products and multimedia applications which fulfill the industry specifications.

PROGRAMME LEARNING OUTCOMES

The purpose of FTMK offering the Bachelor of Computer Science (Interactive Media) is to produce students with the following qualities:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to apply interactivity concept in designing and developing multimedia-based applications and products.
iv. Able to analyze requirements, configure, implement and maintain digital audio/video equipment.
v. Able to develop multimedia application with the quality that fulfills industry specifications.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

Our aim is to give produce highly knowledgeable and skillful graduates in the field of multimedia. They will have the opportunities to start careers such as Web designer or developer, computer games designer, computer graphics designer, animator, digital audio video engineer, user interface designer, interactive media application developer and multimedia consultant. On the other hand, the graduates may also choose

career based on their basic knowledge in Computer Science and ICT such as programmer and information system officer or system analyst.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Interactive Media) with Honours. The programme components as follows:

BACHELOR'S DEGREE COMPUTER SCIENCE) Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	45
Specialisation	K	30
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (45 credits)

BITI 1113	Artificial Intelligence (*Kepintaran Buatan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 1113	Multimedia System (*Sistem Multimedia*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1113	Programming Technique (*Teknik Pengaturcaraan*)
BITP 1123	Data Structure and Algorithm (*Struktur Data dan Algorithma*)
BITP 1323	Database (*Pangkalan Data*)
BITP 2213	Software Engineering (*Kejuruteraan Perisian*)
BITP 3113	Object Oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITU 2913	Workshop I (*Bengkel I*)

SPECIALISATION MODULES (30 credits)

BITM 1123	Interactive Media Authoring (*Pengarangan Media Interaktif*)
BITM 2113	Web Application Development (*Pembangunan Aplikasi Web*)
BITM 2123	Digital Audio and Video Technology (*Teknologi Audio dan Video Digital*)
BITM 2213	Computer Animation (*Animasi Komputer*)
BITM 3113	Interactive Media Project Management (*Pengurusan Projek Media Interaktif*)
BITM 3133	Computer Games Development (*Pembangunan Permainan Komputer*)
BITM 3213	Interactive Computer Graphics (*Komputer Grafik Interaktif*)
BITM 3223	Virtual Reality Technology (*Teknologi Realiti Maya*)
BITS 3423	Information Technology Security (*Keselamatan Teknologi Maklumat*)
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan latihan Industri*)

FREE MODULES (13 credits)

BITI 2223	Machine Learning (*Pembelajaran Mesin*)
BITE 3623	Motion Graphics (*Grafik Bergerak*)
BITE 3633	Game Play (*Game Play*)
BITE 3713	Multi-platform Game (*Permainan Komputer Pelbagai Platfom*)
BITM 2323	Digital Imaging for Multimedia (*Pengimejan Multimedia Digital*)
BITP 2223	Software Requirements and Design (*Reka bentuk dan Keperluan Perisian*)
BITP 3353	Multimedia Database (*Pangkalan Data Multimedia*)
BITP 3433	Mobile Application Development (*Pembangunan Aplikasi Mudah Alih)*
BITS 2513	Internet Technology (*Teknologi Internet*)
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)

PROFESSIONAL CERTIFICATION

BITM 2130	Web Developer Professional Certificate (HTML5) (*Persijilan Profesional Pembangun Web (HTML5)*)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW XXXX	*Penghayatan Etika dan Peradaban***	W	2	0	2	
BKK- ---1	Co-Curriculum I*** *Ko-kurikulum I****	W	0	3	1	
BITI 1213	Linear Algebra and Discrete Mathematics *Aljabar Linear dan Matematik Diskrit*	P	2	2	3	
BITP 1113	Programming Technique *Teknik Pengaturcaraan*	P	2	2	3	
BITM 1113	Multimedia System *Sistem Multimedia*	P	2	2	3	
BITS 1123	Computer Organization and Architecture *Organisasi dan Senibina Komputer*	P	2	2	3	
				Total	**17**	

Note: International Student Only. *BLHW 1942 Malaysian Studies and **BLHW 2752 Malaysian Culture
*** This course can be taken in any semester. Please refer to Co-curriculum unit before register

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BKK- ---1	Co-Curriculum II* *Ko-kurikulum II**	W	0	3	1	
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan Akademik*	W	2	0	2	
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 1123	Data Structure and Algorithm *Struktur Data dan Algoritma*	P	2	2	3	BITP 1113
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	
BITM 1123	Interactive Media Authoring *Pengarangan Media Interaktif*	K	2	2	3	
				Total	**18**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 2452	Academic Writing *Penulisan Akademik*	W	2	0	2	BLHW 1442
BITU 2913	Workshop 1 *Bengkel 1*	P	1**		3	BITP 1113
BITS 1313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	P	2	2	3	
BITI 1113	Artificial Intelligence *Kepintaran Buatan*	P	2	2	3	
BITM 2123	Digital Audio and Video Technology *Teknologi Audio dan Video Digital*	K	2	2	3	
BITM 2213	Computer Animation *Animasi Komputer*	K	2	2	3	
BLH- ---2	Elective I* *Elektif I**	E	2	2	2	
				Total	19	

Note: International Student Only. * BLHL 1012 Bahasa Melayu Komunikasi
** Average official contact hours per week

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITP 3113	Object Oriented Programming *Pengaturcaraan Berorientasi Objek*	P	2	2	3	
BITM 3213	Interactive Computer Graphics *Komputer Grafik Interaktif*	K	2	2	3	
BLH- ---2	Elective II *Elektif II*	E	2	0	2	
BIT- ---3	Elective III *Elektif III*	E	2	2	3	
				Total	19	

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITP 2213	Software Engineering *Kejuruteraan Perisian*	P	2	2	3	
BITU 3923	Workshop II *Bengkel II*	K	1*		3	BITU 2913
BITM 2113	Web Application Development *Pembangunan Aplikasi Web*	K	2	2	3	
BITM 3133	Computer Games Development *Pembangunan Permainan Komputer*	K	2	2	3	
BITM 3113	Interactive Media Project Management *Pengurusan Projek Media Interaktif*	K	2	2	3	
BIT- ---3	Elective IV *Elektif IV*	E	2	2	3	
				Total	**18**	

* Average official contact hours per week
Note for Profesional Certification: BITM 2130 Web Developer Professional Certificate (*Persijilan Profesional Pembangun Web*)

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Interaksi Profesional*	W	2	0	2	BLHW 2452
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1**		3	BITU 3923
BITM 3223	Virtual Reality Technology *Teknologi Realiti Maya*	K	2	2	3	
BITS 3423	Information Technology Security *Keselamatan Teknologi Maklumat*	K	2	2	3	
BIT- ---3	Elective V *Elektif V*	E	2	2	3	
				Total	**14**	

** Average official contact hours per week

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU 3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU 3983*
BITU 3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU 3983*
			Total	**12**	

* Pre-requisite (completed all courses)

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of **THREE** (3) courses with **THREE** (3) credits **AND TWO** (2) courses with **TWO** (2) credits, to complete at least 13 credits.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITE 3623	Motion Graphics *Grafik Bergerak*	2	2	3	
BITE 3633	Game Play *Game Play*	2	2	3	
BITE 3713	Multi-platform Game *Permainan Komputer Pelbagai Platfom*	2	2	3	
BITM 2323	Digital Imaging for Multimedia *Pengimejan Multimedia Digital*	2	2	3	
BITP 2223	Software Requirements and Design *Reka bentuk dan Keperluan Perisian*	2	2	3	
BITP 3353	Multimedia Database *Pangkalan Data Multimedia*	2	2	3	
BITP 3433	Mobile Application Development *Pembangunan Aplikasi Mudah Alih*	2	2	3	
BITS 2513	Internet Technology *Teknologi Internet*	2	2	3	
BITI 2223	Machine Learning *Pembelajaran Mesin*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	
BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHC 4022	Kemahiran Perundingan *Negotiation Skills*	2	0	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

****Third Language Courses**

Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

BITS

BACHELOR OF COMPUTER SCIENCE (SOFTWARE DEVELOPMENT) WITH HONOURS

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF COMPUTER SCIENCE (SOFTWARE DEVELOPMENT) WITH HONOURS

INTRODUCTION

The Bachelor in Computer Science (Software Development) degree course is offered in order to produce knowledgeable and highly skilled graduates in the field of information technology and communication. Graduates pursuing the programme are equipped with the necessary knowledge and specialized skills in engineering and software development which could meet the industrial needs in the field. This includes the ability to analyze, synthesize, design complex systems, maintain, test, control software quality and manage software projects.

PROGRAMME LEARNING OUTCOMES

Bachelor of Computer Science (Software Development) programme at FTMK intended to produce graduates with the following characteristic:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyze, design and develop ICT applications.
iii. Able to perform system coding using relevant programming language according to industry need.
iv. Able to manage software development project by applying software engineering concepts.
v. Able to perform research in software engineering field.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurshipship skills.
ix. Able to perform continuous self learning to obtain knowledge and skills.

CAREER PROSPECTS

Graduates specialized in Software Engineering have the opportunity to work either in the Government or private sector. They could work as Information System Officer, System Analyst, Software Engineer, Software development Manager, Team member Software Quality Assurance, System Administrator, Software Tester or Software Development Consultant. Graduates have the opportunity too to further up their studies in Master and Doctorate level.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Software Development). The programme components as follows:

BACHELOR'S DEGREE COMPUTER SCIENCE) Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	45
Specialisation	K	30
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (45 credits)

BITI 1113	Artificial Intelligence (*Kepintaran Buatan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 1113	Multimedia System (*Sistem Multimedia*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1113	Programming Technique (*Teknik Pengaturcaraan*)
BITP 1123	Data Structure and Algorithm (*Struktur Data dan Algorithma*)
BITP 1323	Database (*Pangkalan Data*)
BITP 2213	Software Engineering (*Kejuruteraan Perisian*)
BITP 3113	Object Oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITU 2913	Workshop I (*Bengkel I*)

SPECIALISATION (30 credits)

BITP 2113	Algorithm Analysis (*Analisa Algoritma*)
BITP 2223	Software Requirement and Design (*Keperluan dan Rekabentuk Perisian*)
BITP 2313	Database Design (*Rekabentuk Pangkalan Data*)
BITP 3123	Distributed Application Development (*Pembangunan Aplikasi Teragih*)
BITP 3223	Software Project Management (*Pengurusan Projek Perisian*)
BITP 3253	Software Verification and Validation (*Validasi dan Verifikasi Perisian*)
BITP 3423	Special Topic in Software Engineering (*Topik Khas Kejuruteraan Perisian*)
BITP 3453	Mobile Application Development (*Pembangunan Aplikasi Mudah Alih*)
BITS 3423	Information Technology Security (*Keselamatan Teknologi Maklumat*)
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan latihan Industri*)

FREE MODULES (13 credits)

BITI 2213	Knowledge Based System (*Sistem berasaskan Pengetahuan*)
BITM 1123	Interactive Media Authoring (*Pengarangan Media Interaktif*)
BITM 2113	Web Application Development (*Pembangunan Aplikasi Web*)
BITP 2323	Database Administration *(Pentadbiran Pangkalan Data*)
BITP 3233	Strategic Information System Planning (*Perancangan Strategik Sistem Maklumat*)
BITP 3443	Enterprise Application Development (*Pembangunan Aplikasi Enterprise*)
BITP 3473	Formal Methods (*Kaedah Formal*)
BITP 3483	Geography Information System (*Sistem Maklumat Geografi*)
BITS 2313	Local Area Network (*Rangkaian Komputer Setempat*)
BITS 2513	Internet Technology (*Teknologi Internet*)
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)

PROFESSIONAL CERTIFICATION

BITP 2610	Java Foundation Certified Junior Associate (*Persijilan Profesional* Java Foundation Certified Junior Associate)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan*	W	2	0	2	
BKK- ---1	Co-Curriculum I* *Ko-kurikulum I**	W	0	3	1	
BITP 1113	Programming Technique *Teknik Pengaturcaraan*	P	2	2	3	
BITI 1213	Linear Algebra and Discrete Mathematics	P	2	2	3	
BITS 1123	Computer Organization and Architecture	P	2	2	3	
BITM 1113	Multimedia System *Sistem Multimedia*	P	2	2	3	
B--- ---2	Elective I *Elektif I*	E	2	0	2	
				Total	17	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW XXXX	*Penghayatan Etika dan Peradaban***	W	2	0	2	
BKK- ---1	Co-Curriculum II*** *Ko-kurikulum II****	W	0	3	1	
BITP 1123	Data Structure and Algorithm *Struktur Data dan Algoritma*	P	2	2	3	BITP 1113
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 2213	Software Engineering *Kejuruteraan Perisian*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	BITP 1113
				Total	17	

For International Students, replaced with: *BLHW 1742 Malaysian Studies **BLHW 2752 Malaysian Culture
***This course can be taken in any semester. Please refer to Co-curriculum unit before register

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 2913	Workshop 1 *Bengkel 1*	P	1*		3	BITP 1113
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITP 3113	Object Oriented Programming *Pengaturcaraan Berorientasi Objek*	P	2	2	3	
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITP 2113	Algorithm Analysis *Analisa Algoritma*	K	2	2	3	
BITP 2313	Database Design *Rekabentuk Pangkalan Data*	K	2	2	3	
				Total	**18**	

* Average official contact hours per week

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 2452	Academic Writing *Penulisan Akademik*	W	2	0	2	BLHW 1442
BITI 1113	Artificial Intelligence *Kepintaran Buatan*	P	2	2	3	
BITS 1313	Data Communication and Networking	P	2	2	3	
BITP 2223	Software Requirement and Design *Keperluan dan Rekabentuk Perisian*	K	2	2	3	
BITP 3253	Software Verification and Validation *Validasi dan Verifikasi Perisian*	K	2	2	3	
BITP 3123	Distributed Application Development	K	2	2	3	
B--- ---2	Elective II *Elektif II*	E	2	0	2	
				Total	**19**	

Note for Professional Certification: BITP 2610 Java Foundation Certified Junior Associate (*Persijilan Profesional* Java Foundation Certified Junior Associate)

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Komunikasi*	W	2	0	2	BLHW 2452
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITU 3923	Workshop II *Bengkel II*	K	1*		3	BITU 2913
BITS 3423	Information Technology Security *Keselamatan Teknologi Maklumat*	K	2	2	3	
BITP 3223	Software Project Management *Pengurusan Projek Perisian*	K	2	2	3	
BITP 3453	Mobile Application Development *Pembangunan Aplikasi Mudah Alih*	K	2	2	3	
				Total	17	

* Average official contact hours per week

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1*		3	BITU 3923
BITP 3423	Special Topic in Software Engineering	K	2	2	3	
BIT- ---3	Elective III *Elektif III*	E	2	2	3	
BIT- ---3	Elective IV *Elektif IV*	E	2	2	3	
BIT- ---3	Elective V *Elektif V*	E	2	2	3	
				Total	17	

* Average official contact hours per week

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU 3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU 3983*
BITU 3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU 3983*
			Total	**12**	

* Pre-requisite (completed all courses)

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of **THREE** (3) courses with **THREE** (3) credits **AND TWO** (2) courses with **TWO** (2) credits, to complete at least 13 credits.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITP 2323	Database Administration *Pentadbiran Pangkalan Data*	2	2	3	
BITP 3233	Strategic Information System Planning *Perancangan Strategik Sistem*	2	2	3	
BITP 3473	Formal Methods *Kaedah Formal*	2	2	3	
BITP 3443	Enterprise Application Development *Pembangunan Aplikasi Enterprise*	2	2	3	
BITP 3483	Geography Information System *Sistem Maklumat Geografi*	2	2	3	
BITM 1123	Interactive Media Authoring *Pengarangan Media Interaktif*	2	2	3	
BITS 2313	Local Area Network *Rangkaian Area Setempat*	2	2	3	
BITI 2213	Knowledge Based System *Sistem Berasaskan Pengetahuan*	2	2	3	
BITS 2513	Internet Technology *Teknologi Internet*	2	2	3	
BITM 2113	Web Application Development *Pembangunan Aplikasi Web*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	
BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHC 4022	Negotiation Skills *Kemahiran Perundingan*	2	0	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

****Third Language Courses**

Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

BITZ

BACHELOR OF COMPUTER SCIENCE (COMPUTER SECURITY) WITH HONOURS

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF COMPUTER SCIENCE (COMPUTER SECURITY) WITH HONOURS

INTRODUCTION

A bachelor's degree course in Computer Science, B.Sc. (Computer Security) (Honours) is aimed to produce highly knowledgeable and skilful graduates in the field of security related to computer science and information technology. Graduates are competent in advanced specialized knowledge and skill to analyse, design, install, configure, implement, administer, maintain and monitor the security infrastructure.

PROGRAMME LEARNING OUTCOMES

The aim of FTMK's Bachelor of Computer Science (Computer Security) degree programme is to produce students with the following characteristics:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyse, design and develop ICT applications.
iii. Able to analyse, create, assemble, configure, implement, manage, maintain and administer network infrastructure and security.
iv. Able to analyse and design the physical and cybersecurity policy.
v. Able to obtain recognition from professional bodies.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have Entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

The graduates can be employed in the government and private sectors as well as undertaking business ventures of their own. The positions suitable for the graduates including Information Technology Executive, System Analyst, Network Security Manager or Administrator, System Security Manager or Administrator, IT Project Manager, Network Security Engineer, Network Security Executive, System/Network Security Consultant, Researcher.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Computer Science (Computer Networking). The programme components as follows:

BACHELOR'S DEGREE COMPUTER SCIENCE Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	45
Specialisation	K	30
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (45 credits)

BITI 1113	Artificial Intelligence (*Kepintaran Buatan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 1113	Multimedia System (*Sistem Multimedia*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1113	Programming Technique (*Teknik Pengaturcaraan*)
BITP 1123	Data Structure and Algorithm (*Struktur Data dan Algorithma*)
BITP 1323	Database (*Pangkalan Data*)
BITP 2213	Software Engineering (*Kejuruteraan Perisian*)
BITP 3113	Object Oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITU 2913	Workshop I (*Bengkel I*)

SPECIALISATION (30 credits)

BITS 2343	Computer Network (*Rangkaian Komputer)*
BITS 2413	Network Security Infrastructure and Design (*Infrastruktur dan Rekabentuk Keselamatan Komputer*)
BITS 2423	Physical Security and Electronic Surveillance (*Keselamatan Fizikal dan Pengawasan Elektronik)*
BITS 2523	Cyber Law and Security Policy (*Perundangan Siber dan Polisi Keselamatan)*
BITS 3353	Network Security Administration and Management (*Pengurusan dan Pentadbiran Keselamatan Rangkaian)*
BITS 3363	Network Security Project Management (*Pengurusan Projek Keselamatan Rangkaian)*
BITS 3463	Cryptography Application and Information Theory (*Aplikasi Kriptografi dan Teori Informasi)*
BITS 3523	Computer Audit and Risk Management (*Audit Komputer dan Pengurusan Risiko)*
BITS 3613	Hacking Techniques and Prevention (*Teknik Pencegahan dan Penggodaman)*
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan Latihan Industri*)

FREE MODULES (13 credits)

BITM 2113	Web Application Development (*Pembangunan Aplikasi Web)*
BITS 2513	Internet Technology (*Teknologi Internet)*
BITS 3443	Digital Forensic (*Forensik Digital)*
BITS 3453	Malware Analysis and Digital Investigation (*Analisa Malware dan Penyiasatan Digital)*
BITS 3473	Watermarking and Steganography (*Tetinta Cair dan Steganografi)*
BITS 3513	TCP/IP Programming (*Pengaturcaraan TCP/IP)*
BITS 3533	Wireless Network and Mobile Computing (*Rangkaian Tanpa Wayar dan Komputeran Mudah Alih)*
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)

PROFESSIONAL CERTIFICATION

BITS 2620	CCNA Security Professional Certificate Preparation (*Persediaan Sijil Profesional CCNA Security*)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan Akademik*	W	2	0	2	
BKK- ---1	Co-Curriculum I** *Ko-kurikulum I***	W	0	3	1	
BITI 1213	Linear Algebra and Discrete Mathematics *Aljabar Linear dan Matematik Diskrit*	P	2	2	3	
BITP 1113	Programming Technique *Teknik Pengaturcaraan*	P	2	2	3	
BITM 1113	Multimedia System *Sistem Multimedia*	P	2	2	3	
BITS 1123	Computer Organization and Architecture *Organisasi dan Senibina Komputer*	P	2	2	3	
				Total	**17**	

* For International Students, replaced with BLHW 1742 Malaysian Studies
** This course can be taken in any semester. Please refer to Co-Curriculum unit before register

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 1123	Data Structure and Algorithm *Struktur Data dan Algoritma*	P	2	2	3	BITP 1113
BITS 1313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	P	2	2	3	
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	
BIT- ---3	Elective I *Elektif I*	E	2	0	2	
				Total	**17**	

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 2452	Academic Writing	W	2	0	2	BLHW 1442
BKK- ---1	Co-Curriculum II* *Ko-kurikulum II**	W	0	3	1	
BITU 2913	Workshop 1 *Bengkel 1*	P	1**		3	BITP 1113
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITI 1113	Artificial Intelligence *Kepintaran Buatan*	P	2	0	2	
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITS 2343	Computer Network *Rangkaian Komputer*	K	2	2	3	
				Total	**17**	

*This course can be taken in any semester. Please refer to Co-Curriculum unit before register
** Average official contact hours per week

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITP 3113	Object Oriented Programming *Pengaturcaraan Berorientasi Objek*	P	2	2	3	
BITP 2213	Software Engineering *Kejuruteraan Perisian*	P	2	2	3	
BITS 2423	Physical Security and Electronic Surveillance *Keselamatan Fizikal dan Pengawasan Elektronik*	K	2	2	3	
BITS 2413	Network Security Infrastructure and Design *Infrastruktur dan Rekabentuk Keselamatan Komputer*	K	2	2	3	
BITS 2523	Cyber Law and Security Policy *Perundangan Siber dan Polisi Keselamatan*	K	2	2	3	
BIT- ---3	Elective II *Elektif II*	E	2	2	3	
				Total	**18**	

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Penghayatan Etika dan Peradaban**	W	2	0	2	
BITU 3923	Workshop II *Bengkel II*	K	1**		3	BITU 2913
BITS 3353	Network Security Administration and Management *Pengurusan dan Pentadbiran Keselamatan Rangkaian*	K	2	2	3	
BITS 3363	Network Security Project Management	K	2	2	3	
BITS 3463	Cryptography Application and Information Theory *Aplikasi Kriptografi dan Teori Informasi*	K	2	2	3	
BIT- ---3	Elective III *Elektif III*	E	2	2	3	
				Total	**17**	

* For International Students, replaced with BLHW 2752 Malaysian Culture
** Average official contact hours per week

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Komunikasi Profesional*	W	2	0	2	BLHW 2452
BITS 3523	Computer Audit and Risk Management *Audit Komputer dan Pengurusan Risiko*	K	2	2	3	
BITS 3613	Hacking Techniques and Prevention *Teknik Pencegahan dan Penggodaman*	K	2	2	3	
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1*		3	BITU 3923
BIT- ---3	Elective IV *Elektif IV*	E	2	2	3	
B--- ---2	Elective V *Elektif V*	E	2	0	2	
				Total	**18**	

* Average official contact hours per week

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week

Note for Professional Certification: BITS 2620 CCNA Security Professional Certificate Preparation (*Persediaan Sijil Profesional CCNA Security*)

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU 3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU 3983*
BITU 3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU 3983*
			Total	**12**	

* Pre-requisite for BITU 3926 (completed all subjects)

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of **THREE** (3) courses with **THREE** (3) credits **AND TWO** (2) courses with **TWO** (2) credits, to complete at least 13 credits.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITS 3513	TCP/IP Programming *Pengaturcaraan TCP/IP*	2	2	3	BITP 1113
BITS 3453	Malware Analysis and Digital Investigation *Analisa Malware dan Penyiasatan Digital*	2	2	3	BITS 3443
BITS 3533	Wireless Network and Mobile Computing *Rangkaian Tanpa Wayar dan Komputeran Mudah Alih*	2	2	3	BITS 1313
BITS 3473	Watermarking and Steganography *Tetinta Cair dan Steganografi*	2	2	3	BITS 3463
BITS 2513	Internet Technology *Teknologi Internet*	2	2	3	
BITS 3443	Digital Forensics *Forensik Digital*	2	2	3	
BITM 2113	Web Application Developmet *Pembangunan Aplikasi Web*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	
BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHC 4022	Negotiation Skills *Kemahiran Perundingan*	2	0	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

**Third Language Courses

Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

BITE

BACHELOR OF INFORMATION TECHNOLOGY (GAME TECHNOLOGY) WITH HONOURS

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BACHELOR OF INFORMATION TECHNOLOGY (GAME TECHNOLOGY) WITH HONOURS

INTRODUCTION

Bachelor of Information Technology (Game Technology) academic programme is offered to produce knowledgeable and skilful graduates in information technology particularly in the area of computer games technology that includes both entertainment and educational 'serious games' industry. The learning outcomes of this programme are as follows:

i. To equip the students with the basic knowledge in every aspect of computer games technology.
ii. To provide the students with sufficient theoretical knowledge and skills to apply the knowledge learnt through the practiced concept.
iii. To enable the students to be able to apply the interactivity concept in the design and development of computer games.
iv. To equip the students with deep understanding and high skills in the development and management of computer games.
v. To produce graduates that are capable to develop high quality interactive games products and games applications which fulfil the industry specifications.

PROGRAMME LEARNING OUTCOMES

The purpose of FTMK offering the Bachelor of Information Technology (Game Technology) is to produce students with the following qualities:

i. Able to apply knowledge of computer science and information technology.
ii. Able to analyse, design and develop ICT applications.
iii. Able to apply interactivity concept in designing and developing interactive games technique.
iv. Able to apply the knowledge and practice of interactive game development process using various software and tools.
v. Able to develop interactive games with the quality that fulfils industry specifications.
vi. Able to resolve problems in creative way and able to communicate effectively.
vii. Able to contribute individually or in a team in various disciplines and domains.
viii. Able to lead with ethics and have entrepreneurship skills.
ix. Able to perform continuous self-learning to obtain knowledge and skills.

CAREER PROSPECTS

This course is offered to produce graduates who are highly knowledgeable and skilled in the field of computer games technology. The graduates are well equipped with knowledge and specific skills such as computer game programming, design and develop various types of computer games, the principle of games, web-based games, project management as well as 2D and 3D game development. Graduates of this course are able to contribute their expertise and skills to the education and entertainment industry such as game-based education and game content development.

CURRICULUM STRUCTURE

Students are required to complete a minimum of 120 credits to graduate with a Bachelor of Information Technology (Game Technology) with Honours. The programme components as follows:

BACHELOR'S DEGREE COMPUTER SCIENCE) Minimum Graduating Credits – 120		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	14
Core Modules	P	33
Specialisation	K	42
Final Year Project	P	6
Industrial Training	P	12
Free Modules	E	13
Total		**120**

MATA PELAJARAN UMUM (MPU) MODULES (14 credits)

BKK- ---1	Co-Curriculum I (*Ko-kurikulum I*)
BKK- ---1	Co-Curriculum II (*Ko-kurikulum II*)
BLHW 1442	English for Academic Purposes (*Bahasa Inggeris untuk Tujuan Akademik*)
BLHW XXXX	(*Falsafah dan Isu Semasa*)
BLHW 1742	Malaysian Studies (International) (*Pengajian Malaysia*)
BLHW 2452	Academic Writing (*Penulisan Akademik*)
BLHW XXXX	(*Penghayatan Etika dan Peradaban*)
BLHW 2752	Malaysian Culture (International) (*Kebudayaan Malaysia*)
BLHW 3462	English for Professional Interaction (*Bahasa Inggeris untuk Interaksi Profesional*)
BTMW 4012	Technology Entrepreneurship (*Keusahawanan Teknologi*)

CORE MODULES (33 credits)

BITE 1513	Programming Fundamentals (*Asas Pengaturcaraan*)
BITI 1213	Linear Algebra and Discrete Mathematics (*Aljabar Linear dan Matematik Diskrit*)
BITI 1223	Calculus and Numerical Methods (*Kalkulus Dan Kaedah Berangka*)
BITI 2233	Statistics and Probability (*Statistik dan Kebarangkalian*)
BITM 2313	Human-Computer Interaction (*Interaksi Komputer-Manusia*)
BITP 1323	Database (*Pangkalan Data*)
BITS 1123	Computer Organization and Architecture (*Organisasi dan Senibina Komputer*)
BITS 1213	Operating System (*Sistem Pengoperasian*)
BITS 1313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
BITS 3423	Information Technology Security (*Keselamatan Teknologi Maklumat*)
BITU 2913	Workshop I (*Bengkel I)*

SPECIALISATION MODULES (42 credits)

BITE 1523	Computer Game Programming (*Pengaturcaraan Permainan Komputer*)
BITE 1613	2D Game Development (*Pembangunan Permainan Komputer 2 Dimensi*)
BITE 1713	Game Architecture (*Senibina Permainan Komputer*)
BITE 1723	Game Design Principle (*Prinsip Rekabentuk Permainan Komputer*)
BITE 2123	Artificial Intelligence for Games (*Kepintaran Buatan untuk Permainan Komputer*)
BITE 2513	Game Engine Development I (*Pembangunan Enjin Permainan I*)
BITE 2523	Web Game Development (*Pembangunan Permainan Web*)

BITE 2613	Interactive 3D Animation (*Animasi 3D Interaktif*)
BITE 2623	3D Game Development (*Pembangunan Permainan Komputer 3 Dimensi*)
BITE 2633	Audio Video Production for Game (*Produksi Audio dan Video Permainan Komputer*)
BITE 3513	Game Engine Development II (*Pembangunan Enjin Permainan II*)
BITE 3613	Game Project Management (*Pengurusan Projek Pembangunan Permainan Komputer*)
BITE 3713	Multi-platform Game (*Permainan Komputer Pelbagai Platfom*)
BITU 3923	Workshop II (*Bengkel II*)

FINAL YEAR PROJECT (6 credits)

BITU 3973	Final Year Project I (*Projek Sarjana Muda I*)
BITU 3983	Final Year Project II (*Projek Sarjana Muda II*)

INDUSTRIAL TRAINING (12 credits)

BITU 3926	Industrial Training (*Latihan Industri*)
BITU 3946	Industrial Training Report (*Laporan Latihan Industri*)

FREE MODULES (13 credits)

BITE 3523	Game Physics (*Fizik Permainan Komputer*)
BITE 3623	Motion Graphics (*Grafik Bergerak*)
BITE 3633	Game Play (*Game Play*)
BITE 3723	Game Mechanics (*Mechanics Permainan Komputer*)
BITS 3333	Multimedia Networking (*Rangkaian Multimedia*)
BLHC 4012	Organizational Communication (*Komunikasi Organisasi*)
BLHC 4022	Negotiation Skills (*Kemahiran Perundingan*)
BLHC 4032	Critical and Creative Thinking (*Pemikiran Kritis dan Kreatif*)
BLHH 1032	Industrial Psychology and Organization (*Psikologi Industri dan Organisasi*)
BLHL 1012	Bahasa Melayu I (International)
BLHL ---2	Third Language (*Bahasa Ketiga*)

PROFESSIONAL CERTIFICATION

BITM 2130	Web Developer Professional Certificate (HTML5) (*Persijilan Profesional Pembangun Web (HTML5)*)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITI 1213	Linear Algebra and Discrete Mathematics *Aljabar Linear dan Matematik Diskrit*	P	2	2	3	
BITE 1513	Programming Fundamentals *Asas Pengaturcaraan*	P	2	2	3	
BITS 1213	Operating System *Sistem Pengoperasian*	P	2	2	3	
BITS 1123	Computer Organization and Architecture *Organisasi dan Senibina Komputer*	P	2	2	3	
BITE 1723	Game Design Principle *Prinsip Rekabentuk Permainan Komputer*	K	2	2	3	
BLH- ---2	Elective I *Elektif I*	E	2	2	2	
				Total	17	

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Falsafah dan Isu Semasa**	W	2	0	2	
BLHW 1442	English for Academic Purposes *Bahasa Inggeris untuk Tujuan Akademik*	W	2	0	2	
BITI 1223	Calculus and Numerical Methods *Kalkulus dan Kaedah Berangka*	P	2	2	3	
BITP 1323	Database *Pangkalan Data*	P	2	2	3	
BITE 1523	Computer Game Programming *Pengaturcaraan Permainan Komputer*	K	2	2	3	
BITE 1613	2D Game Development *Pembangunan Permainan Komputer 2 Dimensi*	K	2	2	3	
				Total	16	

Note: International Student only. *BLHW 1942 Malaysian Studies

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW XXXX	*Penghayatan Etika dan Peradaban****	W	2	0	2	
BLHW 2452	Academic Writing *Penulisan Akademik*	W	2	0	2	BLHW 1442
BKK- ---1	Co-Curriculum I* *Ko-kurikulum I**	W	0	3	1	
BITU 2913	Workshop 1 *Bengkel 1*	P	1**		3	
BITS 1313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	P	2	2	3	
BITE 1713	Game Architecture *Senibina Permainan Komputer*	K	2	2	3	
BITE 2513	Game Engine Development I *Pembangunan Enjin Permainan I*	K	2	2	3	
BLH- ---2	Elective II**** *Elektif II****	E	1	2	2	
				Total	**19**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register
** Average official contact hours per week
Note: International Student Only. ***BLHW 2752 Malaysian Culture and **** BLHL 1012 Bahasa Melayu Komunikasi

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BKK- ---1	Co-Curriculum II* *Ko-kurikulum II**	W	0	3	1	
BITM 2313	Human Computer Interaction *Interaksi Komputer-Manusia*	P	2	2	3	
BITI 2233	Statistics and Probability *Statistik dan Kebarangkalian*	P	2	2	3	
BITE 2633	Audio Video Production for Game *Produksi Audio dan Video Permainan Komputer*	K	2	2	3	
BITE 2613	Interactive 3D Animation *Animasi 3D Interaktif*	K	2	2	3	
BITE 2123	Artificial Intelligence for Games *Kepintaran Buatan untuk Permainan Komputer*	K	2	2	3	
BIT- ---3	Elective III *Elektif III*	E	2	2	3	
				Total	**19**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BLHW 3462	English for Professional Interaction *Bahasa Inggeris untuk Interaksi Profesional*	W	2	0	2	BLHW 2452
BITU 3923	Workshop II *Bengkel II*	K	1*		3	BITU 2913
BITE 3513	Game Engine Development II *Pembangunan Enjin Permainan II*	K	2	2	3	
BITE 3713	Multi-platform Game *Permainan Komputer Pelbagai Platfom*	K	2	2	3	
BITE 2523	Web Game Development *Pembangunan Permainan Web*	K	2	2	3	
BIT- ---3	Elective IV *Elektif IV*	E	2	2	3	
				Total	**17**	

Note for Professional Certification: BITM 2130 Web Developer Professional Certificate (*Persijilan Profesional Pembangun Web*)
* Average official contact hours per week

Year Three (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BTMW 4012	Technology Entrepreneurship *Keusahawanan Teknologi*	W	2	0	2	
BITS 3423	Information Technology Security *Keselamatan Teknologi Maklumat*	P	2	2	3	
BITU 3973	Final Year Project I *Projek Sarjana Muda I*	P	1*		3	BITU 3923
BITE 3613	Game Project Management *Pengurusan Projek Pembangunan Permainan Komputer*	K	2	2	3	
BITE 2623	3D Game Development *Pembangunan Permainan Komputer 3 Dimensi*	K	2	2	3	
BIT- ---3	Elective V *Elektif V*	E	2	2	3	
				Total	**17**	

* Average official contact hours per week

Year Three (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
BITU 3983	Final Year Project II *Projek Sarjana Muda II*	P	1*		3	BITU 3973
				Total	**3**	

* Average official contact hours per week

Year Four (Semester I)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
BITU3926	Industrial Training *Latihan Industri*	P	24	6 (Attend and Pass)	BITU3983*
BITU3946	Industrial Training Report *Laporan Latihan Industri*	P	24	6	BITU3983*
			Total	**12**	

* pre-requisite (completed all courses)

Free Modules

Below is the list of elective courses that can be selected as part of the curriculum. Students need to choose a minimum of THREE (3) courses with THREE (3) credits AND TWO (2) courses with TWO (2) credits, to complete at least 13 credits.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
BITE 3523	Game Physics *Fizik Permainan Komputer*	2	2	3	
BITE 3723	Game Mechanics *Mechanics Permainan Komputer*	2	2	3	
BITE 3623	Motion Graphics *Grafik Bergerak*	2	2	3	
BITE 3633	Game Play *Game Play*	2	2	3	
BITS 3333	Multimedia Networking *Rangkaian Multimedia*	2	2	3	
BLHC 4032	Critical and Creative Thinking* *Pemikiran Kritis dan Kreatif**	2	0	2	
BLHL ---2	Third Language** *Bahasa Ketiga***	1	2	2	
BLHC 4022	Kemahiran Perundingan *Negotiation Skills*	2	0	2	
BLHH 1032	Industrial Psychology and Organization *Psikologi Industri dan Organisasi*	2	0	2	
BLHC 4012	Organizational Communication *Komunikasi Organisasi*	2	0	2	

* offered to local students only.
** refer to Third Language courses table.

****Third Language Courses**

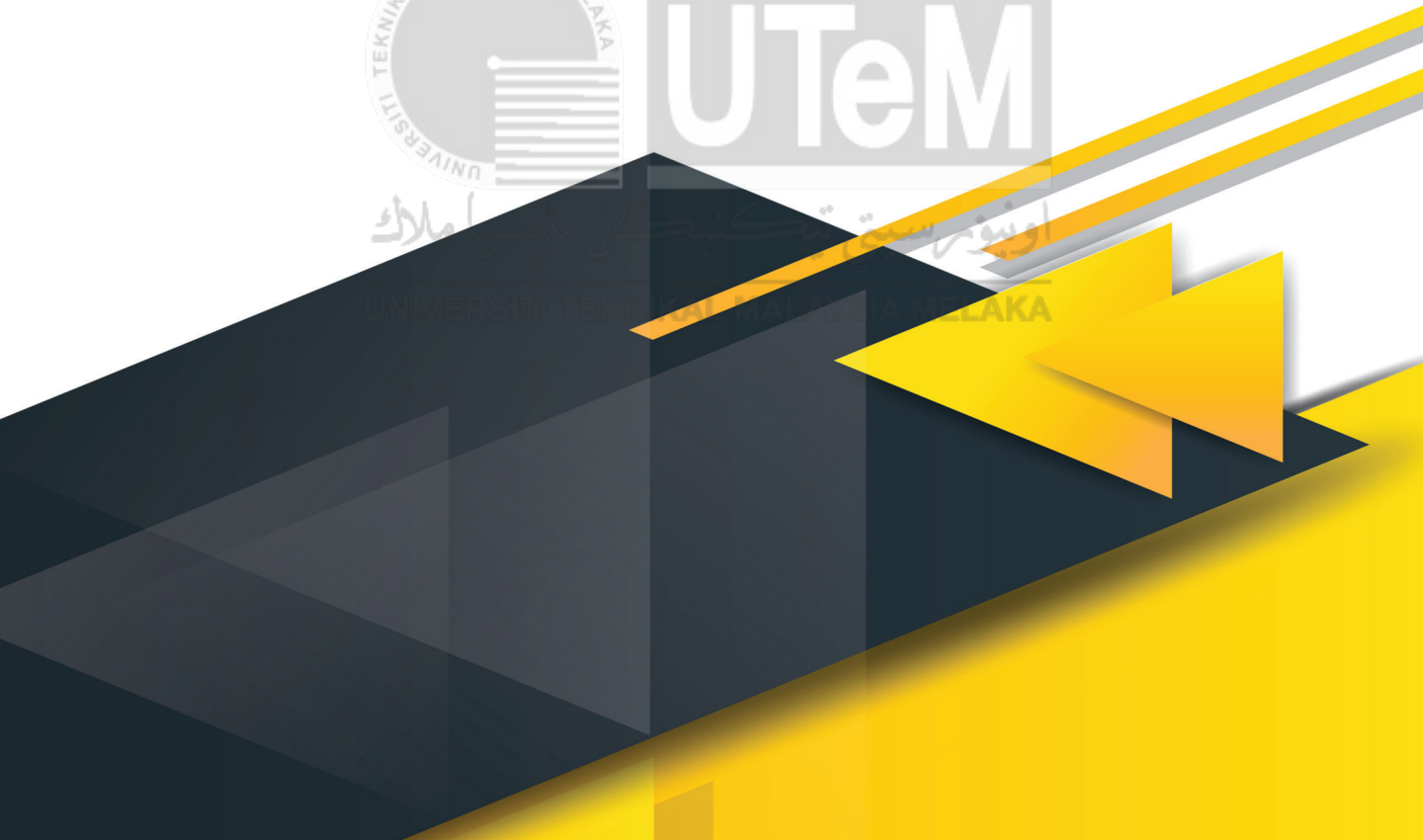
Code	Course Name	Contact Hours		Credit
		Lecture	Lab	
BLHL 1112	Arabic I	1	2	2
BLHL 1212	Mandarin I	1	2	2
BLHL 1312	Japanese I	1	2	2
BLHL 1412	German I	1	2	2
BLHL 1612	Korean Language	1	2	2

Note: Students are NOT allowed to take Third Language courses that are in their native language.

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DIT

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY



UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY

INTRODUCTION

The Diploma in Information and Communication Technology programme deals with designing innovative methodologies and sophisticated tools for developing software systems. Students are exposed to various techniques of analysing user requirements and specifications, as well as design and implementation of software systems. Some of the core courses include object-oriented programming, database systems, software engineering and introduction to multimedia.

PROGRAMME LEARNING OUTCOMES

i. Graduates should be able to understand fundamental principles of Computer Science and Information Technology.
ii. Graduates should be able to analyse, design and develop ICT software and database.
iii. Graduates should be able to configure hardware, maintain and administer computer operation systems and network.
iv. Graduates should be able to use multimedia authoring tools and develop multimedia application and simple multimedia presentation.
v. Graduates should be able to exhibit critical and creative thinking in resolving problems and able to communicate in delivering ideas.
vi. Graduates should be able to contribute individually or in a team in various discipline and domain.
vii. Graduates should have good personalities and ethics with leadership and entrepreneurship skills.
viii. Graduates should be able to continue learning independently in the acquisition of new knowledge and skill.

CAREER PROSPECTS

Graduates of the programme will be able to work as Programmers, Analyst Programmers, Multimedia Programmers, Network Administrators, Software Developers and any IT related positions. They may also pursue further education at degree level at UTeM.

CURRICULUM STRUCTURE

Student will be graduating with Diploma in Information and Communication Technology after successfully completing at least 91 credit hours. Credit hours for subjects are as follows:

Diploma in Information and Communication Technology Minimum Graduating Credits – 91 credits		
Component	**Code**	**Credits**
Mata Pelajaran Umum (MPU) Modules	W	16
Core Modules	P	18
Concentration	K	36
Final Year Project	P	4
Industrial Training	P	5
Elective	E	12
Total		**91**

MPU COMPENENTS (16 credits)

DKK- ---1 Co-curriculum I (*Ko-kurikulum I*)
DKK- ---1 Co-curriculum II (*Ko-kurikulum II*)
DLHW 1012 Foundation English (*Asas Bahasa Inggeris*)
DLHW 1032 Malaysian Studies (*Pengajian Malaysia*)
DLHW 1722 Philosophy of Science & Technology (*Falsafah Sains & Teknologi*)
DLHW 1742 Leadership (*Kepimpinan*)
DLHW 2422 English for Effective Communication (*Bahasa Inggeris untuk Komunikasi Berkesan*)
DLHW 3432 English for Marketability (*Bahasa Inggeris untuk Kebolehpasaran*)
DTMW 1012 Fundamentals of Entrepreneurial Acculturation (*Asas Pembudayaan Keusahawanan*)

CORE COMPONENTS (22 credits)

DITI 1213	Calculus (*Kalkulus*)
DITI 1223	Discrete Mathematics (*Matematik Diskrit*)
DITI 2213	Linear Algebra and Numerical Methods (*Aljabar Linear dan Kaedah Berangka*)
DITI 2233	Applied Statistics (*Statistik Gunaan*)
DITP 1113	Programming I (*Pengaturcaraan I*)
DITU 3933	System Development Workshop (*Bengkel Pembangunan Sistem*)
DITU 3964	Diploma Project (*Projek Diploma*)

CONCENTRATION COMPONENTS (36 credits)

DITM 2113	Multimedia System (*Sistem Multimedia*)
DITM 2123	Web Programming (*Pengaturcaraan Web*)
DITP 1123	Programming II (*Pengaturcaraan II*)
DITP 1333	Database (*Pangkalan Data*)
DITP 2113	Data Structure and Algorithm (*Struktur Data dan Algoritma*)
DITP 2123	Event-Driven Programming (*Pengaturcaraan Berpandukan Peristiwa*)
DITP 2213	System Analysis and Design (*Analisa dan Rekabentuk Sistem*)
DITP 3113	Object-oriented Programming (*Pengaturcaraan Berorientasikan Objek*)
DITS 1133	Computer Organization & Architecture (*Organisasi & Senibina Komputer*)
DITS 2213	Operating System (*Sistem Pengoperasian*)
DITS 2313	Data Communication and Networking (*Komunikasi Data dan Rangkaian*)
DITS 2413	Computer Security (*Keselamatan Komputer*)

ELECTIVE COMPONENTS (12 credits)

DITI 3113	Artificial Intelligence (*Kepintaran Buatan*)
DITI 3123	Logic Programming (*Pengaturcaraan Logik*)
DITI 3513	Artificial Intelligence in Robotic and Automation (*Kepintaran Buatan Dalam Robotik Dan Automasi*)
DITM 3133	Digital Audio and Video Technology (*Teknologi Audio dan Video Digital*)
DITM 3143	Digital Media Design (*Rekabentuk Media Digital*)
DITM 3313	User Interface Design (*Rekabentuk Antaramuka Pengguna*)
DITM 3323	Introduction to Computer Games Programming (*Pengenalan Kepada Pengaturcaraan Permainan Komputer*)
DITP 2313	Database Programming (*Pengaturcaraan Pangkalan Data*)
DITP 3213	Software Engineering (*Kejuruteraan Perisian*)
DITP 3253	Software Requirements and Design (*Keperluan dan Rekabentuk Perisian*)
DITP 3263	Software Verification and Validation (*Validasi dan Verifikasi Perisian*)
DITP 3273	Strategic Information System Planning (*Perancangan Strategik Sistem Maklumat*)
DITP 3313	Database Design (*Rekabentuk Pangkalan Data*)
DITP 3323	Database Administration (*Pentadbiran Pangkalan Data*)
DITS 3613	Basic Networking (*Asas Rangkaian*)
DITS 3623	Network Routing (*Penghalaan Rangkaian*)
DITS 3633	Implementing and Administering Active Directory (*Perlaksanaan dan Pentadbiran Aktif Direktori*)
DITS 3643	Implementing and Administering Network Infrastructure (*Perlaksanaan Dan Pentadbiran Perkhidmatan Rangkaian*)

INDUSTRIAL TRAINING COMPONENTS (5 credits)

DITU 2343	Industrial Training (*Latihan Industri*)
DITU 2362	Industrial Training Report (*Laporan Latihan Industri*)

CURRICULUM STRUCTURE FOR EACH SEMESTER

Year One (Special Semester)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
DLHW 1012	Foundation English *Asas Bahasa Inggeris*	W	2	0	2	
DLHW 1742	Leadership *Kepimpinan*	W	2	0	2	
DLHW 1722	Philosophy of Science & Technology *Falsafah Sains dan Teknologi*	W	2	0	2	
				Total	**6**	

Year One (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
DKK- ---1	Co-Curriculum I* *Ko-kurikulum I**	W	0	3	1	
DITI 1213	Calculus *Kalkulus*	P	2	2	3	
DITP 1113	Programming I *Pengaturcaraan I*	P	2	2	3	
DITP 1333	Database *Pangkalan Data*	K	2	2	3	
DITS 1133	Computer Organization & Architecture *Organisasi dan Senibina Komputer*	K	2	2	3	
DITM 2113	Multimedia System *Sistem Multimedia*	K	2	2	3	
				Total	**16**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register.

Year One (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
DLHW 2422	English for Effective Communication *Bahasa Inggeris untuk Komunikasi*	W	1	2	2	
DITI 1223	Discrete Mathematics *Matematik Diskrit*	P	2	2	3	
DITP 2213	System Analysis and Design *Analisa dan Rekabentuk Sistem*	K	2	2	3	DITP 1333
DITP 1123	Programming II *Pengaturcaraan II*	K	2	2	3	DITP 1113
DITS 2213	Operating System *Sistem Pengoperasian*	K	2	2	3	DITS 1133
DITM 2123	Web Programming *Pengaturcaraan Web*	K	2	2	3	
				Total	**17**	

Year Two (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
DLHW 3432	English for Marketability *Bahasa Inggeris untuk Kebolehpasaran*	W	2	0	2	
DLHW 1032	Malaysian Studies *Pengajian Malaysia*	W	2	0	2	
DKK- ---1	Co-Curriculum II* *Ko-kurikulum II**	W	0	3	1	
DITI 2213	Linear Algebra and Numerical Methods *Aljabar Linear dan Kaedah Berangka*	P	2	2	3	
DITP 2113	Data Structure and Algorithm *Struktur Data dan Algoritma*	K	2	2	3	DITP 1113, DITP 1123
DITP 3113	Object-oriented Programming *Pengaturcaraan Berorientasikan Objek*	K	2	2	3	DITP 1113
DITS 2313	Data Communication and Networking *Komunikasi Data dan Rangkaian*	K	2	2	3	
				Total	**17**	

* This course can be taken in any semester. Please refer to Co-curriculum unit before register.

Year Two (Semester II)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
DTMW 1012	Fundamentals of Entrepreneurial Acculturation	W	1	2	2	
DITI 2233	Applied Statistics *Statistik Gunaan*	P	2	2	3	
DITU 3933	System Development Workshop *Bengkel Pembangunan Sistem*	P	0	6	3	DITP 2213
DITP 2123	Event-Based Programming *Pengaturcaraan Berpandukan Peristiwa*	K	2	2	3	DITP 1113
DIT- ----	Elective I *Elektif I*	E	2	2	3	
DIT- ----	Elective II *Elektif II*	E	2	2	3	
				Total	**17**	

Year Two (Special Semester)

Course Code	Course Name	Component Code	Duration (weeks)	Credit	Pre-requisite
DITU 2343	Industrial Training *Latihan Industri*	P	10	3	
DITU 2362	Industrial Training Report *Laporan Latihan Industri*	P	10	2	
			Total	**5**	

Year Three (Semester I)

Course Code	Course Name	Component Code	Contact Hours		Credit	Pre-requisite
			Lecture	Lab		
DITU 3964	Diploma Project *Projek Diploma*	P	1*		4	
DITS 2413	Computer Security *Keselamatan Komputer*	K	2	2	3	DITS 2213
DIT- ----	Elective III *Elektif III*	E	2	2	3	
DIT- ----	Elective IV *Elektif IV*	E	2	2	3	
				Total	**13**	

* Average official contact hours per week

Elective Modules

Below is the list of Elective courses that can be selected as part of the curriculum. Students can choose a minimum of FOUR (4) courses during the study to complete at least 12 credits.

List of elective courses offered can be changed from time to time in accordance with industry needs.

Course Code	Course Name	Contact Hours		Credit	Pre-requisite
		Lecture	Lab		
DITI 3113	Artificial Intelligence *Kepintaran Buatan*	2	2	3	
DITI 3123	Logic Programming *Pengaturcaraan Logik*	2	2	3	
DITI 3513	Artificial Intelligence in Robotic and Automation *Kepintaran Buatan Dalam Robotik Dan Automasi*	2	2	3	
DITM 3133	Digital Audio and Video Technology *Teknologi Audio dan Video Digital*	2	2	3	
DITM 3143	Digital Media Design *Rekabentuk Media Digital*	2	2	3	
DITM 3313	User Interface Design *Rekabentuk Antaramuka Pengguna*	2	2	3	
DITM 3323	Introduction to Computer Games Programming *Pengenalan Kepada Pengaturcaraan Permainan*	2	2	3	
DITP 2313	Database Programming *Pengaturcaraan Pangkalan Data*	2	2	3	
DITP 3213	Software Engineering *Kejuruteraan Perisian*	2	2	3	
DITP 3253	Software Requirements and Design *Keperluan dan Rekabentuk Perisian*	2	2	3	
DITP 3263	Software Verification and Validation *Validasi dan Verifikasi Perisian*	2	2	3	DITP 3213
DITP 3273	Strategic Information System Planning *Perancangan Strategik Sistem Maklumat*	2	2	3	
DITP 3313	Database Design *Rekabentuk Pangkalan Data*	2	2	3	DITP 1333
DITP 3323	Database Administration *Pentadbiran Pangkalan Data*	2	2	3	DITP 1333
DITS 3613	Basic Networking *Asas Rangkaian*	2	2	3	DITS 2313
DITS 3623	Network Routing *Penghalaan Rangkaian*	2	2	3	DITS 3613
DITS 3633	Implementing and Administering Active Directory *Perlaksanaan dan Pentadbiran Aktif Direktori*	2	2	3	DITS 2213
DITS 3643	Implementing and Administering Network Infrastructure *Perlaksanaan Dan Pentadbiran*	2	2	3	DITS 3633

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

MATA PELAJARAN UMUM
(MPU)

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

MPU MODULES COURSES

BLHW 1442 English For Academic Purposes

Learning Outcomes

By the end of the course, students should be able to:

1. Apply correct grammar rules according to context.
2. Demonstrate knowledge of various reading skills in the reading tasks given.

Synopsis

This course aims to develop students' reading skills and grammar. A variety of academic reading texts and reading skills are explored to facilitate students' comprehension of the texts. These reading skills are also necessary in assisting students to master study skills. Grammar elements are taught in context to develop students' accuracy in the use of the language. This course also includes elements of blended learning.

References

1. De Chazal, E., & Rogers, L. (2013). Oxford EAP: A course in English for Academic Purposes. Oxford: Oxford University Press.
2. McDonald, A. & Hancock, M. (2010). English result. Oxford: Oxford University Press.
3. Paterson, K. & Wedge, R. (2013). Oxford grammar for EAP. Oxford: Oxford University Press.

BLHW 1702 Tamadun Islam dan Tamadun Asia

Hasil Pembelajaran

Setelah selesai mengikuti kursus ini, pelajar berupaya untuk:

1. Membincangkan peranan nilai ketamadunan dalam pembentukan sistem nilai masyarakat Malaysia.
2. Menghubungkan elemen ketamadunan dengan isu kemasyarakatan semasa.

Sinopsis

Mata pelajaran ini menjelaskan tentang ilmu ketamadunan yang mencakupi definisi, pandangan semesta dan sumber ketamadunan. Mata pelajaran ini turut membincangkan persamaan dan perbezaan tamadun-tamadun dunia dengan mencari titik pertemuan melalui dialog peradaban. Selain itu, mata pelajaran ini juga turut mengupas isu dan cabaran semasa serta kesannya dalam perkembangan peradaban masa kini.

Rujukan

1. Osman Bakar, 2009. Modul Pengajian Tamadun Islam dan Tamadun Asia. Kuala Lumpur : Penerbit Universiti Malaya.

BLHW 1742 Malaysian Studies (International)

Learning Outcome

Upon completion of this subject, student should be able to:

1. Analyse the historical and cultural heritage, political and economic scenario in Malaysia
2. Integrate the comparison between Malaysian achievement with their home countries in various aspect

Synopsis

By going through this subject, students will be exposed to a wealth of information on Malaysia. They will gain information on Malaysian's historical background, political system and socio-economic structure. Additionally, this subject highlights the Malaysian government's development plans and major policies in economic, industrial and socio-cultural aspects. It also gives emphasis on the attitude and commitment of the Malaysian government towards the regional and international issues as reflected in its foreign policy.

References

1. Abdul Rahman Embong. (2010). Malaysian Studies: Looking Back Moving Forward: Selected Speeches, Public Statements And Other Writings. Kuala Lumpur: Persatuan Sains Sosial Malaysia.
2. Abdul Razak Baginda. (2009). Malaysia at 50 and Beyond. Kuala Lumpur: Malaysian Strategic Research Centre.
3. Ambri Buang. (2009). Dasar-Dasar Utama Kerajaan Malaysia. Kuala Lumpur: Institusi Tadbiran Awam Malaysia

BLHW 2452 Academic Writing

Learning Outcomes

By the end of the course, students should be able to:

1. Prepare clear and detailed descriptions of a product related to fields of interest.
2. Express arguments systematically in a composition.
3. Prepare short reviews of technical materials.

Synopsis

This course aims to equip the students with the skills to communicate clear and detailed viewpoints in writing. The students are expected to have a stand on topics of their fields by providing advantages and disadvantages to support their arguments. From time to time, consultations with the students will be conducted throughout the completion of their assignments. This serves as the formative evaluation in the course. Grammar components are embedded in the course to support the required writing skills. Blended learning is incorporated in this course.

References

1. Chazal, E.d. & Rogers, L. (2012). Oxford EAP: A course in English for Academic Purposes. New York: Oxford University Press.

2. Hancock, M. & McDonald, A. (2010). English Result Upper-intermediate. New York: Oxford University Press.
3. Paterson, K. & Wedge, R. (2013). Oxford Grammar for EAP. UK: Oxford University Press.

BLHW 2712 Hubungan Etnik

Hasil Pembelajaran

Setelah selesai mengikuti kursus ini, pelajar berupaya untuk:

1. Menilai kepentingan jati diri kebangsaan dan kesukarelaan ke arah mewujudkan warganegara yang bertanggungjawab
2. Membina hubungan dan interaksi sosial pelbagai etnik

Sinopsis

Mata pelajaran ini membincangkan konsep-konsep asas budaya, peranan etnik dan pengaruhnya terhadap sosiopolitik dan sosioekonomi negara khususnya dalam merealisasikan agenda perpaduan. Mata pelajaran ini juga memberi pendedahan tentang isu-isu dan cabaran dalam konteks perpaduan di Malaysia. Selain itu, mata pelajaran ini turut mengupas perkembangan globalisasi dan kesannya ke atas jati diri dan proses pembangunan di peringkat Malaysia. Selain itu mata pelajaran ini akan merumuskan isu-isu perpaduan dan cadangan penambahbaikannya di Malaysia.

Rujukan

1. Shamsul Amri Baharuddin. (2012). Modul Hubungan Etnik. Selangor: Institut Kajian Etnik Universiti Kebangsaan Malaysia.
2. Wan Hashim. (2011). Hubungan etnik di Malaysia. Kuala Lumpur: Institut Terjemahan Negara Malaysia.
3. Wan Norhasniah Haji Wan Husin. (2012) Peradaban dan perkauman di Malaysia: Hubungan etnik Melayu-Cina. Kuala Lumpur : Penerbit Universiti Malaya.

BLHW 2752 Malaysian Culture (International)

Learning Outcome

Upon completion of this subject, student should be able to:

1. Analyse the general issues related to Malaysian culture
2. Report the scenario of cultural diversity in Malaysia
3. Explain the comparison between Malaysian culture with their home countries in various aspects

Synopsis

This subject exposes international students to the socio-cultural background of Malaysia which includes ethnic composition, religions, traditions and values. Other elements like music, arts, cuisine, costume, ethnic games, celebrations and national festivals are also highlighted. Student Centered Learning (SCL) methods such as group discussion and presentation will be used in order to assist international students in developing

their understanding and appreciation of Malaysian culture.

BLHW 3462 English for Professional Interaction

Learning Outcomes

By the end of the course, students should be able to:

1. Listen and infer based on situations in context.
2. Respond to standard spoken language using communication strategies.
3. Display detailed descriptions by expanding and supporting points of view using relevant examples.

Synopsis

This course which is designed based on a blended and student-centred learning approach aims to develop students' listening skills as well as communication skills and strategies. Among the elements covered are professional interactions that include group discussion and public speaking. Students are also required to express ideas with relevant examples in public speaking and online assessments. They are also exposed to the rudiments of grammar implicitly via the communicative activities.

References

1. Fry, R. (2016). 101 smart questions to ask on your interview. U.K.: New Page Books.
2. Cooper, S. (2016). 100 tricks to appear smart in meetings: How to get by without even trying. Andrews McMeel Publishing.
3. Hood, J.H. (2013). How to book of meetings: A complete guide for every business. South Australia: Magill.
4. Carmine,G. (2014). Talk like TED: The 9 public-speaking secret of the world's top minds. New York: St Martins Press.
5. Jason, S.W. (2013). Workplace communication for the 21st century: Tools and strategies that impact the bottom line. California: Praeger.

BTMW 4012 Technology Entrepreneurship

Learning Outcome

Upon completion of this subject, student should be able to:

1. Recognize the importance of entrepreneurship, the role of entrepreneurship in today's society, and the technical knowledge of the entrepreneurial process.
2. Explain the basic concepts of interdisciplinary competences in management, and create technology-based businesses.
3. Propose a business plan project.

Synopsis

The subject provides students with technological knowledge about entrepreneurship as well as the skills to turn such knowledge into practice. The teaching and learning (T&L) activities include case study and field work with the aim to inculcate entrepreneurship values and entrepreneurship acculturation with a view to successfully launch and subsequently manage their enterprises.

Students will be exposed with the support systems available or government agencies in starting new ventures, including the tactics commonly employed by entrepreneurs starting a business. The subject allows students to critically evaluate business in terms of technical feasibility, investment potential, and risks.

References

1. Arifin, S. & Hamidon, S. (2017). Introduction to Entrepreneurship. Oxford Fajar.
2. Barringer, B. R. and Ireland, R. D. (2015). Entrepreneurship: Successfully Launching New Ventures. 5th International Edition, Pearson.
3. Ariffin, S., Wahab, I. A., Hambali, Z. (2013). Fundamentals of Entrepreneurship. Oxfort Fajar.
4. Scarborough, N. (2014). Essentials of entrepreneurship and small business management. Boston: Pearson.
5. UiTM Entrepreneurship Study Group. Revised Edition (2010). Fundamentals of Entrepreneurship, Pearson.

DLHW 1012 Foundation English

Learning outcome

Upon completion of this course, students will be able to:

1. Interpret and express ideas and thoughts from various types of texts.
2. Demonstrate group interaction skills by expressing ideas and thoughts verbally.
3. Analyze data and write report based on non-linear texts using correct grammar.
4. Apply appropriate grammar elements.

Synopsis

This subject is designed to help students to improve their proficiency in the English language and to communicate effectively in both spoken and written forms. Five main aspects: listening, speaking, reading, writing and grammar are taught in an integrated approach to build confidence among the learners to become efficient speakers of English in their tertiary education.

References

1. Bixby, J. & McVeigh, J. (2011). Skills for success: Reading and writing. New York: Oxford University Press.
2. Hooi, C. (2013). Mastering MUET. (3rd Edition) Johor Bahru: Pelangi Sdn. Bhd.
3. Swan, M. & Walter, C. (2011). Oxford English grammar course: Basic. New York: Oxford University Press.

DLHW 1032 Malaysian Studies

Learning outcome

Diakhir kursus ini, pelajar akan dapat:

1. Menilai kepentingan identiti kebangsaan ke arah mengukuhkan semangat patriotism.
2. Membina hubungan dan interaksi sosial dalam kalangan pelajar.

Synopsis

Mata pelajaran ini menghuraikan tentang warganegara Malaysia yang berwawasan dan mampu menghadapi cabaran ke arah mencapai kesejahteraan hidup serta dapat menghayati peranan Malaysia di peringkat antarabangsa. Kursus ini memberi penghayatan tentang sejarah dan politik, perlembagaan Malaysia, kemasyarakatan dan perpaduan, pembangunan negara dan isu-isu keprihatinan negara.Kursus ini bertujuan melahirkan graduan yang mempunyai identiti kebangsaan dan semangat patriotism yang unggul.

References

1. Mardiana dan Hasnah Hussin. 2011. Pengajian Malaysia. Shah Alam : Oxford Fajar.
2. INTAN .1991. Malaysia Kita. Kuala Lumpur: Institut Tadbiran Awam Negara.
3. Mohamed Suffian Hashim. 1994. Mengenal Perlembagaan Malaysia. Edisi Kedua. Kuala Lumpur. Dewan Bahasa dan Pustaka.
4. Zainal Abidin Wahid. 1979. Sejarah Malaysia Sepintas Lalu. Kuala Lumpur. Dewan Bahasa dan Pustaka.
5. Ruslan Zainuddin, Mohd Mahadee Ismail & Zaini Othman. 2010.

DLHW 1722 Philosophy of Science & Technology

Learning outcome

Diakhir kursus ini, pelajar akan dapat:

1. Menilai kepentingan konsep ilmu dan isu-isu falsafah sains dan teknologi serta kepentingan isu dan cabaran berkaitan ilmu, falsafah sains dan teknologi
2. Membina pemahaman tentang ilmu dan isu falsafah sains dan teknologi dalam kehidupan masyarakat masa kini melalui kerja berpasukan.

Synopsis

Mata pelajaran ini membincangkan tentang konsep ilmu, konsep falsafah, sains dan teknologi yang berunsurkan kreativiti dan inovasi menurut sarjana Islam dan barat. Selain itu, mata pelajaran ini juga menekankan tentang metodologi dalam sains Islam, konsep dan pencapaian tamadun Islam dalam bidang matematik, astronomi, fizik, kimia, perubatan, konsep penciptaan alam dan kosmologi dalam Islam, pencapaian dalam bidang telekomunikasi terkini dan isu-isu sains semasa. Pendekatan sarjana Islam silam menjadi contoh kepada generasi masa kini menjadi manusia yang kreatif dan mempunyai pemikiran kritis dalam pelbagai bidang seperti penciptaan dan kejuruteraan.

References

1. Ahmad Ridzwan Mohd Noor, Radzuan Nordin, Norliah Kudus, Nor Azilah Ahmad, Mahadi Abu Hassan, Shahrulanuar Mohamed, Ali Hafizar Mohd Rawi & Ismail Ibrahim. (2008). Modul Falsafah Sains dan Teknologi. Cetakan Dalaman Universiti Teknikal Malaysia Melaka.
2. Majid Fakhry. (2005). A History of Islamic Philosophy. Columbia: Columbia University Press.

3. Yahaya Jusoh & Azhar Muhammad. (2007). Pendidikan Falsafah Sains Al-Quran. Johor: Penerbit Universiti Teknologi Malaysia.
4. Abdul Rahman Abdullah. (2010). Wacana Falsafah Sains Sejarah Dan Pemikiran. Pulau Pinang: Pusat Kajian Pengurusan Pembangunan Islam Universiti Sains Malaysia.
5. Osman Bakar. (2008). Tauhid dan Sains: Perspektif Islam Tentang Agama dan Sains. Bandung: Pustaka Hidayah.

DLHW 1742 Leadership

Learning outcome

Diakhir kursus ini, pelajar akan dapat:

1. Mengenal pasti dan menerangkan konsep utama dalam kepimpinan.
2. Menunjukkan kemahiran interpersonal dalam melaksanakan tugasan kumpulan
3. Mengubung kait peranan dan kepimpinan dan kepengikutan.

Synopsis

Mata pelajaran ini membincangkan konsep-konsep kepimpinan, kemahiran interpersonal dalam kepimpinan, kerja berpasukan, kepengikutan, budaya kepimpinan dan kepelbagaian budaya/etika organisasi. Tujuan mata pelajaran ini ialah memberi kefahaman dan penghayatan aspek kepimpinan dalam diri pelajar. Pengajaran dan pembelajaran akan dilaksanakan dalam bentuk pembelajaran berasaskan pengalaman melalui aktiviti berpasukan di dalam dan di luar kuliah. Pada akhir mata pelajaran ini, pelajar diharapkan dapat membentuk keyakinan diri, kesedaran kendiri, etika dan profesionalisme disamping dapat mengaplikasi kemahiran komunikasi, kepimpinan dan kerja berpasukan dalam mengurus kehidupan seharian mahupun dalam mengurus organisasi.

References

1. Abdul Halim el-Muhammady. (1996) Pengurusan dalam Islam, Persatuan Bekas Mahasiswa Islam Timur Tengah
2. Adair, J. (2013) Develop Your Leadership Skills: Koogan Page
3. Lusier, R. N. Dan Achua, C.F (2009). Leadership: Theory, Application, Skill Development. International Edition, Cincinnati: South Western College Publishing
4. Syed Ismail Syed Mustafa dan Ahmad Subki Miskon. (2012). Asas Kepimpinan & Perkembangan Profesional: Penerbitan Multimedia.

DLHW 2422 English for Effective Communication

Learning outcome

Upon completion of this course, students will be able to:

1. Demonstrate interpersonal skills in communicative activities.
2. Explain products through informative speech.
3. Apply appropriate grammar elements in communicative activities.

Synopsis

This subject is designed to provide students with the necessary communication skills to communicate effectively. The elements of grammar are taught to complement the topics covered in this subject. Students demonstrate interpersonal skills through speeches and role-play. The elements of problem-based learning (PBL) are especially exercised during the oral presentation of the product as well as role-play.

References

1. Murphy, R. (2015). Essential Grammar in Use (4th Ed.). UK: Cambridge University Press.
2. Weinschenk, S. (2012). 100 things every presenter needs to know about people. California: New Riders.
3. Yule, G. (2012).Oxford Practice Grammar. New York: Oxford University Press.

DLHW 3432 English for Marketability

Learning outcome

Upon completion of this course, students will be able to:

1. Produce effective written correspondence at workplace.
2. Justify opinions in spoken interaction at workplace.
3. Analyse grammar rules in workplace interaction.

Synopsis

This subject aims to introduce and expose students to the basic tenets of communication specifically the oral and written communication required at the workplace. Students will be provided with the opportunity to produce a resume, a job-application letter, and a letter of inquiry. They will also be able to participate in an interview and a group discussion. Students will be exposed to situations where they learn to function as individuals and team members by communicating in spoken and written forms using appropriate language in a variety of workplace contexts.

References

1. Searles, G. J. (2017). Workplace Communications. Boston: Pearson.
2. Samsiah A. H., & Rosyati A.R. (2012). Mastering English for employment. Petaling Jaya: Cengage Learning Asia
3. Jane English (Ed). (2013). Professional Communications: Deliver Effective Written, Spoken and Visual Messages (3rd ed.).
4. Juta Academic. White, P. (2012). The 5 languages of appreciation in the workplace: empowering organizations by encouraging people. UK: Northfield Publishing.

DTMW 1012 Fundamentals of Entrepreneurial Acculturation

Learning outcome

Diakhir kursus ini, pelajar akan dapat:

1. Menerap budaya keusahawanan berdasarkan teori keusahawanan, revolusi usahawan, sejarah pembangunan usahawan dan perkembangan keusahawanan di Malaysia.

2. Mengaplikasikan kemahiran keusahawanan seperti kreativiti, inovasi, pro-aktif, mengambil risiko, mengenalpasti peluang, pemasaran dan rangkaian untuk memasuki / menembusi pasaran.
3. Melaksanakan kerja lapangan perniagaan di samping membuat pembentangan projek perniagaan serta berkongsipengalaman berkaitan pelaksanaan projek perniagaan kumpulan masing-masing.

Synopsis

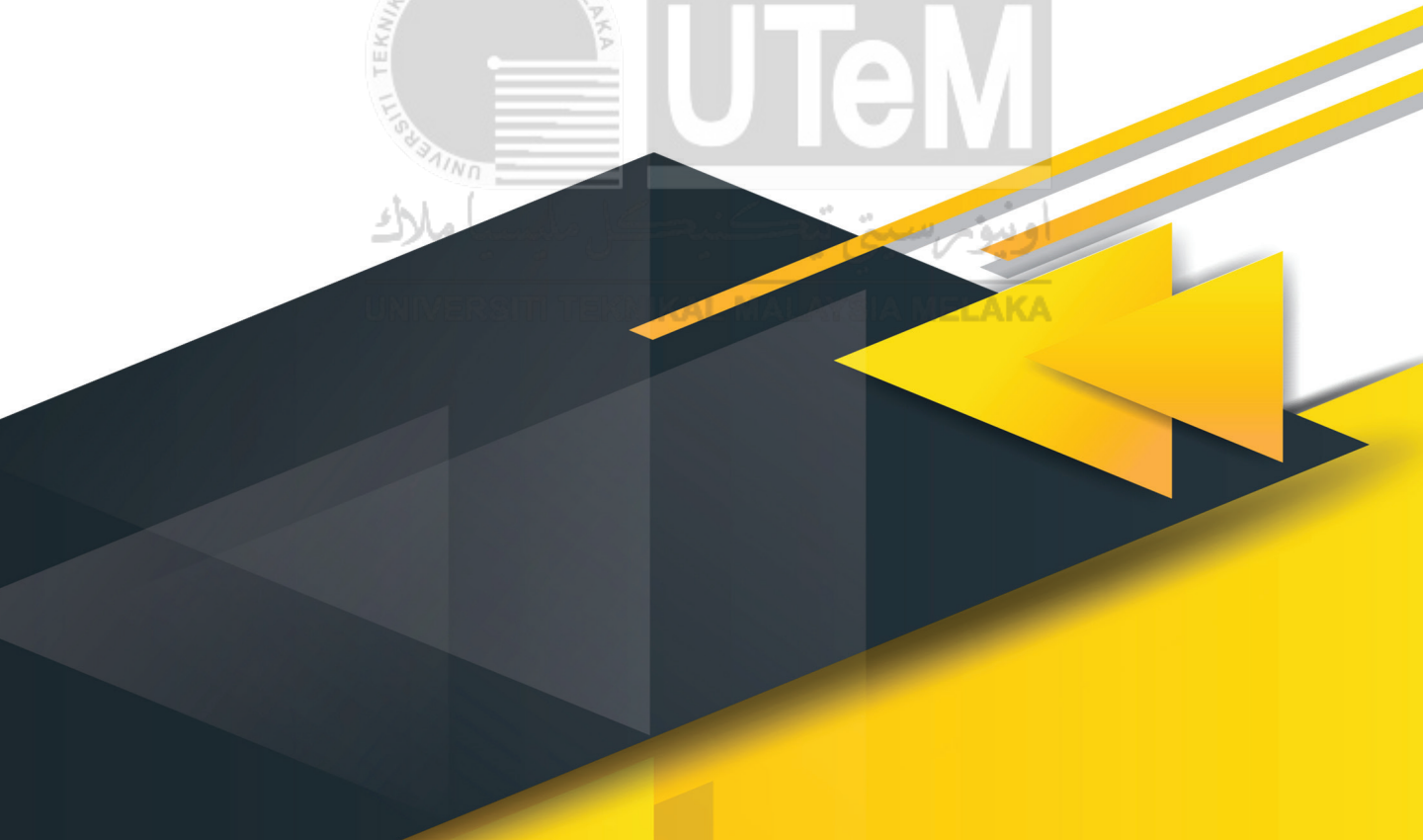
Kursus ini akan membekalkan pelajar dengan motivasi dan kemahiran utama keusahawanan. Di samping itu, pelajar juga akan mendapat kemahiran tentang prinsip-prinsip dan amalan yang diperlukan untuk memulakan, mengembangkan dan memperkukuhkan sesebuah perniagaan. Aktiviti pengajaran, pembelajaran dan aplikasi yang menerapkan teori dan amalan akan membantu pelajar menguasai kompetensi yang perlu sebelum menceburkan diri dalam bidang perniagaan. Kursus ini juga membantu pelajar membentuk jaringan/ rangkaian perniagaan melalui perbincangan perniagaan, simulasi dan seminar. Pelajar akan didedahkan dengan isu-isu yang berkaitan dengan pemasaran, pengurusan strategi dan risiko. Di samping itu, pelajar akan dibekalkan dengan kemahiran yang perlu untuk menyediakan penyata aliran tunai dan asas dalam membangunkan/ menyediakan perancangan perniagaan.

References

1. UiTM Entrepreneurship Study Group. (2004). “Fundamental of Entrepreneurship” Prentice Hall
2. Read, S., Sarasvathy, S., Dew, N., Wiltbank, R. & Ohlsson A.V (2011). Effectual Entrepreneurship.Routledge: Taylor & Francis Group.
3. Acs, Z.J. & Audretsch, D.B. (2011). Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction. 2nd Ed. Springer.

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CORE MODULES COURSES



UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CORE MODULES COURSES

BITI 1113 Artificial Intelligence

Learning Outcome

Upon completion of this subject, student should be able to:

1. Explain the definition of Artificial Intelligence and its techniques
2. Identify the types of Artificial Intelligence techniques
3. Use the Artificial Intelligence techniques in problem solving

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems and machine learning will be introduced.

References

1. Russel, S & Norvig, P. (2016). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
2. Luger, G. F. (2015). Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 5th Edition, Pearson Education.
3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
4. Kopec, D, Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Information.

BITI 1213 Linear Algebra and Discrete Mathematics

Learning Outcome

Upon completion of this subject, student should be able to:

1. Explain the basic concepts and application of related Linear Algebra topics
2. Explain the basic concepts and application of related Discrete Mathematics topics
3. Solve problems based on the concept and thetheories that have been learned

Synopsis

This course covers selected topics from two disciplines of mathematics (Linear Algebra and Discrete Mathematics) that are important for computer science students. Topics for Linear Algebra includes matrices, determinants, linear equations, vectors, eigenvalues and linear transformation while discrete mathematics covers introduction to logics, integers and algorithms, mathematical reasoning, combinatorics, relations, graphs and trees.

References
1. Kevin Ferland (2017), "Discrete Mathematics and Applications", 2nd Ed.", CRC Press.
2. Richard Johnsonbough. (2017), "Discrete Mathematics", 8th Ed, Pearson.Axler, S (2015), "Linear Algebra Done Right 3rd ed. 2015 Edition", Springer.
3. Anton, H. (2013), "Elementary Linear Algebra", 11th Ed.", Wiley.
4. Lay, D.C., Lay, S.R., McDonald, J.J. (2015), "Linear Algebra and Its Applications", 5thEd.",Pearson.
5. Kenneth H. Rosen, Kamala. Krithivasan (2013), "Discrete Mathematics and Its Applications", 7th Ed.", McGraw-Hill.

BITI 1223 Calculus and Numerical Methods

Learning Outcome
Upon completion of this subject, student should be able to:
1. Apply fundamental concepts of Calculus and Numerical Methods
2. Solve problems particularly in computer science with appropriate and high-level programming language or tools
3. Use suitable techniques in Calculus and Numerical Methods to solve real-life application problems

Synopsis
This course covers two areas of mathematics namely Elementary Calculus and Introductory Numerical Methods. Topics for first part include Functions, Differentiation, Exponential and Natural Logarithm Functions and Its Applications, Integration, and Initial Value Problems. The second part topics consist of Errors, Taylor Polynomials, Root Finding, Interpolation, Numerical Integration and Differentiation and Numerical Solution for Initial Value Problems.

References
1. Sauer, Timothy, 2017. Numerical Analysis, Pearson.
2. J.C.Butcher., 2016. Numerical Solution of Ordinary Differential Equations., New Jersey: John Wiley & Sons.
3. Radhey S. Gupta, 2015. Elements of Numerical Analysis, 2nd Ed., Cambridge University Press.
4. Fowler, J. and Snapp, B., 2014. MOOculus Calculus [online] Available at: https://mooculus.osu.edu [Accessed on 22 January 2018].
5. Joel R. Hass, Maurice D. Weir, George B. Thomas, 2016. Unviersity Calculus. Pearson.
6. Briggs & Cochran, 2018. Calculus: Early Transcendentals. Pearson.

BITI 2233 Statistics and Probability

Learning Outcome
Upon completion of this subject, student should be able to:
1. Demonstrate understanding of the concept and fundamentals of statistics and probability
2. Reproduce solutions for application problems using statistical software

3. Solve application problems using appropriate statistical techniques

Synopsis

This course will provide a comprehensive introductory to statistics and probability for computer science students. Topics that will be covered in this course includes data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distribution. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing, estimation and hypothesis testing for two populations, simple linear regression and correlation, and one-way ANOVA. In this course, students will be guide to use statistical software to perform descriptive and inferential statistics analysis.

References

1. Allan G Bluman (2017), "Elementary Statistics: A Step by Step Approach", 10th edition, McGraw-Hill Education.
2. Navidi, W., (2014), "Statistics for Engineers and Scientists", 4th Edition,McGraw-Hill Education.
3. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2016), "Probability and Statistics for Engineers & Scientist", 9th Edition, Pearson Educational International.
4. Devore, J. L., (2015) "Probability and Statistics for Engineering and the Sciences", 8th Edition, Thomson.

BITM 1113 Multimedia System

Learning Outcome

Upon completion of this subject, student should be able to:

1. Interpret the core concept of multimedia elements
2. Manipulate multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs
3. Demonstrate problem solving skills for multimedia project development

Synopsis

This subject prepares students with the basic concept of multimedia, technology and the importance of multimedia application. It covers the introduction to multimedia elements such as Text, Graphic, Audio, Animation and Video include 2D / 3D graphic and authoring, multimedia integration and multimedia application development. During lab sessions, students will be introduced to several tools for selected media element and authoring software for media integration. In addition, students will be trained for practical preparation of still image, simple animation, sound and effectively apply it to multimedia project. Students also will be exposed to teamwork, leadership, problem-solving and communication skills while performing their various tasks and project. Blended Learning / Flipped Classroom / Cooperative Learning (CL) / Problem Based Learning (PBL) / Collaborative Learning approach will be used to enhance students capability such

as competency, attitude, knowledge and communication skills.

References

1. Siti, N. M. & Norasiken, B. (2016), Cara Mudah Belajar Photoshop, Dewan Bahasa & Pustaka.
2. Norasiken, B. & Faaizah, S., (2012), Adobe Flash CS5 Professional Includes Exercise Files and Training Videos, University Technical Malaysia Melaka, ISBN: 978-967-0257-19-8.
3. Vaughan, T., (2014), Multimedia: Making It Work 9th Edition, McGraw-Hill Osborne Media.
4. Vic Costelo., (2016), Multimedia Foundations: Core Concept for Digital Design (Second Edition), Routledge, ISBN: 978-0415740036
5. Savage T.M. and Karla E. Vogel (2013), An Introduction to Digital Multimedia

BITM 2313 Human Computer Interaction

Learning Outcome

Upon completion of this subject, student should be able to:

1. Explain and apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application, website or product design
3. Follow and respond to the usability evaluation activities

Synopsis

This subject introduces the concept of HCI and its relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

1. Jennifer Preece, Yvonne Rogers and Helen Sharp, Interaction Design: beyond human-computer interaction, (5th Edition), John Wiley & Sons, 2017.
2. Still, B., and Crane, K. , Fundamentals of User-Centered Design: A Practical Approach, CRC Press 2017.
3. Alan Dix et al., Human-Computer Interaction (3rd Edition), Prentice Hall, 2005.
4. Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.
5. Jennifer Preece et al., Human-Computer Interaction, Addison Wesley, 1994
6. Tom Frase et al, The Complete Guide To Colour, ILEX Press Limited, 2004.
7. Geri Hay et al, Activity-Centered Design: An ecological Approach to Designing Smart Tools and Usable Systems, 2005.

BITP 1113 Programming Technique

Learning Outcome

Upon completion of this subject, student should be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program application
2. Construct computer program codes by applying suitable programming tools, structures and techniques
3. Apply suitable programming structures and techniques in problem solving

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., Walters, J., Muganda, G., (2011), "Starting Out with C++: Early Objects: International Version 7th Edition", Pearson Education International.
2. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.
3. Malik, D.S (2011), "C++ Programming from Problem Analysis to Program Design 5th Edition", Cengage Learning.
4. Liang, Y. D.(2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.
5. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson.

BITP 1123 Data Structure and Algorithm

Learning Outcome

Upon completion of this subject, student should be able to:

1. Illustrate the algorithm design and performance for different abstract data type operation
2. Apply the suitable data structures for an application that requires data structures
3. Construct the data structures and algorithms in problem solving

Synopsis

This course will expose the students in data structures and algorithms. The basic concept in structure, class, array and pointer is discussed in order to understand the fundamental of data structures and algorithms. The course will focus on data structures such as list, stack, queue, tree, searching and hash while sorting, graph and heaps topics will concentrate on the algorithms. Algorithm efficiency for run time will also be discussed. Pseudo code and C++ programming language will be used for algorithm implementation. Apart from the theory, the students are asked to apply the data structures

and algorithms through small application that is developed in a team.

References

1. Malik, D. S., "Data Structures Using C++".2nd, edition, Cengage Learning, 2010.
2. Malik, D., "C++ programming: Program design including data structures". Nelson Education, 2012.
3. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++",4thEdition, Addison Wesley, 2011.
4. Michael T. Goodrich, Tamassia, R & Mount, D. M., "Data Structures and Algorithms in C++",2nd edition, Wiley, John & Sons, Inc., 2011.
5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

BITP 1323 Database

Learning Outcome

Upon completion of this subject, student should be able to:

1. Interpret database queries in Structured Query Language (SQL) and Relational Algebra (RA)
2. Construct a relational database according to user requirements
3. Solve simple and complex queries using Structured Query Language

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for the use and design of database management systems (DBMS).

References

1. Coronel & Morrisa (2017) Database Systems: Design, Implementation and Management with CB VitalSource eBook 12th Edition. Cengage Learning.
2. Connolly, T., & Begg, C. (2015) Database Systems: A Practical Approach to Design, Implementation, and Management. 6th Edition.Addison-Wesley.
3. Casteel, J., (2001). Oracle 11g: SQL 2nd Edition (2009), Course Technology.
4. Elmasri, R. &Navathe, S.B. (2015) Fundamentals of Database Systems. 7th Edition. Addison-Wesley.

BITP 2213 Software Engineering

Learning Outcome

Upon completion of this subject, student should be able to:

1. Explain the concept, principles and practices of software engineering for system development
2. Apply the concept, principles and practices of software engineering in the system development

3. Follow the standard guideline to produce formal specifications and software modelling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object oriented approach.

References

1. Pressman, Roger S., 2015, Software Engineering: A Practitioner's Approach, Eighth (8th) Edition, McGraw-Hill.
2. Sommerville, I., 2015, Software Engineering, 10th Edition, Addison-Wesley.
3. Pfleeger, S.L and Atlee, J.M, 2010, Software Engineering, 4th Edition, Pearson.
4. Dennis, A., Wixom, B.H., & Roberta, M. R., 2012, System Analysis Design, 5th Edition, Wiley.

BITP 3113 Object Oriented Programming

Learning Outcome

Upon completion of this subject, student should be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the relationship among classes
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.
3. Perform implementation of classes and methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs.

Synopsis

This subject will discuss about the concept of object-oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures (such as polymorphism, inheritance, encapsulation and abstraction), GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop a complete Java applications with database.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.
2. Deitel, H. M. & Deitel, P. J., Java How To Program, 10th Ed., Pearson Education International, 2014.
3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.

4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.
5. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015.

BITS 1123 Computer Organization and Architecture

Learning Outcome

Upon completion of this subject, student should be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems
2. Explain the principles and techniques used in implementing a processor
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory

Synopsis

This subject provides a detail of computer system's functional components, characteristics, performance and interactions including system bus, different types of memory and Input/ Output and CPU, as well as practical implementations of the components. Besides that, the architectural issues such as instruction set design and data types are covered. This subject includes digital circuit design and its application in microprocessor architecture.

References

1. David A. Patterson and John L. Hennessy (2013. Computer Organization and Design: The Hardware/Software Interface, 5th Edition. Morgan Kauffman.
2. Linda Null and Julia Lobur(2014). The Essentials of Computer Organization and Architecture, 4th Edition. Jones & Bartletts Pub.
3. Aslinda, Fahmi, Nurul Azma, Zakiah and Zurina. Lecture Slides: Computer Organization & Arcitecture. Second Edition
4. Syarulnaziah, Zakiah, Marliza., Aslinda. Lab Module: Computer Organization and Architecture with MIPS Programming.
5. William Stallings, (2013). Computer Organization and Architecture, 9th Edition. Pearson.
6. Andrew S. Tanenbaum, (2013). Structured Computer Organization 6th Edition. Prentice Hall.
7. Irv. Englander (2014).The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Edition. John Wiley & Sons.

BITS 1213 Operating System

Learning Outcome

Upon completion of this subject, student should be able to:

1. Explain the basic concepts, theory and technology used in operating system
2. Demonstrate the major components and functionalities of an operating system

3. Display the basic administrative task on commonly used operating system

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

References

1. Stallings W. and Moumita M.M. (2017), Operating Systems: Internals and Design Principles 9th Ed., Pearson.
2. McHoes, A. and Flynn, I. M (2017). Understanding Operating System, 7th Ed. Cengage Learning.
3. Tanenbaum A.S. and Herbert Bos (2016), Modern Operating Systems 4th Ed. Pearson.
4. Anderson T. and Dahlin M. (2014). Operating Systems: Principles and Practice, 2nd Ed. Recursive Books.
5. Linux Ubuntu Guide www.ubuntu.com

BITS 1313 Data Communication and Networking

Learning Outcome

Upon completion of this subject, student should be able to:

1. Build the understanding of data communication and networking concept and terminologies
2. Differentiate types of network media, network topology and network technologies
3. Manipulate network configuration using guided and unguided media

Synopsis

This course introduces the fundamental concepts and terminology of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include: fundamentals of telecommunications, data transmission mechanisms, telecommunication media and technologies, considerations for LAN and WAN implementations, the Internet and intranet applications, emerging telecommunications technologies, and trends in the telecommunications industry. Students will also be able to understand, explain and apply the fundamentals of data communication and network technology concepts and skills in network applications, troubleshooting, and configuring basic computer networks using guided or unguided media.

References
1. Forouzan, Behrouz A., 2012. Data Communications and Networking, 5th Edition, McGraw-Hill.
2. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. Lab Companion: Data Communications and Networking, 1st Edition.
3. William Stallings, 2013. Data and Computer Communications, 10th Edition, Pearson.
4. Massoud Moussavi, 2011. Data Communication and Networking: A Practical Approach, 1st Edition, Cengage Learning.
5. Jerry Fitz Gerald, Alan Dennis, Alexandra Durcikova, 2014, Business Data Communications and Networking, 12th Edition, Pearson .

BITU 2913 Workshop I

Learning Outcome

Upon completion of this subject, student should be able to:

1. Apply the knowledge that had been learned especially in programming technique to build, run and develop the project individually
2. Identify and solve problems in systematic way
3. Defend while presenting result of the project

Synopsis

Workshop I aims to provide exposure and skills to the students in submitting and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project. Students must use the techniques learned in programming technique and system development subjects to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and debate to defend the project that had been built. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. Workshop I is also functioned as the platform to prepare the students for their industrial training program.

References
1. JK Bengkel 1, Buku Panduan Bengkel 1 BITU 2913, 2018.
2. Ivor Horton, Ivor Horton's Beginning Visual C++ 2012, John Wiley & Son, 2012.
3. G. Gopalakrishnan, Oracle Database 11g Oracle Real Application Clusters Handbook, 2nd Edition, McGraw Hill, 2011.
4. Michael McLaughlin, Oracle Database 11g & MySQL 5.6 Developer Handbook, McGraw Hill, 2011.

5. Ian Sommerville, Software Engineering (9th Edition), Pearson, 2011.

SYNOPSIS OF FINAL YEAR PROJECT

BITU 3973 Final Year Project I

Learning Outcome

Upon completion of this subject, student should be able to:

1. Identify the problems associated with the needs of industry in the ICT domain with literature review
2. Develop project using an appropriate method
3. Defend the results to elaborate the significance of the project
4. Organize information to produce a formal report

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, “PSM Report Guideline 2017”, FTMK, Universiti Teknikal Malaysia Melaka.
2. Bachelor Degree Project and Diploma Project Committee, “PSM Report Guideline: Book”, FTMK, Universiti Teknikal Malaysia Melaka.
3. Bachelor Degree Project and Diploma Project Committee, “PSM Report Guideline: Reference”, FTMK, Universiti Teknikal Malaysia Melaka.

BITU 3983 Final Year Project II

Learning Outcome

Upon completion of this subject, student should be able to:

1. Verify the project based on the project timeline
2. Complete the project output that has potential commercial value
3. Defend the results to elaborate the significance of the project
4. Organize information to produce a formal report

Synopsis

This course joins together all the subjects learnt from year one of the studies including to analyze and to design a specific system, the application of database, algorithm and data structure, web programming, data communication etc. It is compulsory to the final year students to develop a Final Project and to attend the offered courses.

References

1. Bachelor Degree Project and Diploma Project Committee, “PSM Report Guideline 2017”, FTMK, Universiti Teknikal Malaysia Melaka.
2. Bachelor Degree Project and Diploma Project Committee, “PSM Report Guideline: Book”, FTMK, Universiti Teknikal Malaysia Melaka.

3. Bachelor Degree Project and Diploma Project Committee, "PSM Report Guideline: Reference", FTMK, Universiti Teknikal Malaysia Melaka.

SYNOPSIS OF INDUSTRIAL TRAINING

BITU 3926 Industrial Training

Learning Outcome

Upon completion of this subject, student should be able to:

1. organise ICT tasks to fulfil an organisation's objectives
2. report technical tasks performed into a technical journal
3. report on the knowledge and skills gained throughout their internship
4. practise the knowledge and skills that they've learned in classes throughout their internship
5. develop interpersonal skill by interacting and communicating with staff, colleagues and personnel

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

BITU 3946 Industrial Training Report

Learning Outcome

Upon completion of this subject, student should be able to:

1. prepare an internship presentation
2. report on the knowledge and skills gained throughout their internship

Synopsis

Students must do the internship no less than 24 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student twice: one after 2 weeks of internship and another will be near the end of the 24 week period. During the 2nd visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri UTeM (2013)

DITI 1213 Calculus

Learning outcome

Upon completion of this course, students will be able to:

1. Apply knowledge and fundamental concepts of Calculus.
2. Manipulate problems using software by referring to Calculus theories.
3. Solve application problems by relevant information using suitable techniques.

Synopsis

This course covers one discipline of mathematics namely Calculus. Topics for Calculus include Set of Real Numbers, Functions, Derivative, Techniques of Differentiation, Application of Derivatives, Exponential and Natural Logarithm Functions, Definite Integral, Techniques of Integration, Application of Integration and Functions of Several Variables.

References

1. Bittinger M.L.,Ellenbogen D.J, S.J. Surgent (2012). Calculus and Its Applications, Pearson International Edition.
2. Goldstein, L. J., Lay, D.C, Schneider D.I., Asmar, N.H. (2013). Brief Calculus and Its Applications, 13th Edition; Pearson.
3. Briggs, B., Cochran, L., Gillett, B. (2014). Calculus: Early Transcendentals. Pearson.
4. Stewart, J.(2015).Calculus, 8th Edition; Pearson Education.
5. Larson (2012). Brief Calculus: An Applied Approach, 9th Edition; Cengage Learning.

DITI 1223 Discrete Mathematics

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the basic concepts and techniques of Discrete Mathematics.
2. Apply those concepts and techniques to related theoretical problems.
3. Propose solutions to problems in applied computer science with the assistance of an appropriate use of software.

Synopsis

This course introduces the fundamental concepts and techniques of Discrete Mathematics that are needed for computer science. It includes logics sets, functions, counting, relations, graphs and trees along with their applications to problems in computer science.

References

1. Rosen, K.H. & Krithivasan, K. (2013).Discrete Mathematics and Its Applications. 7th Edition", McGraw-Hill.
2. Stein, C. L., Drysdale, R., and Bogart, K. (2010). Discrete Mathematics for Computer Scientists. 1st Edition, Addison-Wesley.

3. Epp, S. S. (2011). Discrete Mathematics with Applications. 4th Edition, Brooks Cole, Cengage Learning.
4. Grimaldi, R.P. (2014). Discrete and Combinatorial Mathematics: An Applied Introduction. Fifth Edition. Pearson Education. Inc.

DITI 2213 Linear Algebra and Numerical Methods

Learning outcome

Upon completion of this course, students will be able to:

1. Solve problems on the basic concepts of Linear Algebra and Numerical Methods.
2. Replicate steps of solving Linear Algebra and Numerical Methods problems using an appropriate tool or software.
3. Propose solutions to related problems by recognising relevant information and using suitable concepts and/or principles in Linear Algebra and Numerical Methods.

Synopsis

This course covers two disciplines of mathematics namely Linear Algebra and Numerical Methods. Topics for Linear Algebra include Matrices, Determinant, Inverse, Linear Equations Systems, Vector Spaces, Eigenvalues & Eigenvectors and Linear Transformations. Numerical Methods topics consist of Taylor Polynomials, Error and Computer Arithmetic, Root finding, Interpolation, Numerical Differentiation, Numerical Integration, and Numerical Solution to Ordinary Differential Equation.

References

1. Kolman, B. & Hill, D.R. (2014), Introductory Linear Algebra with Application, 9th Edition. Prentice Hall.
2. Anton, H. & Rorres, C. (2015), Elementary Linear Algebra with Supplemental Applications, 11th Edition, John Wiley & Sons.
3. Dorfman, K.D and Daoutidis, P. (2017).Numerical Methods with Chemical Engineering Applications, Cambridge University Press.
4. Burden, R.L., Faires, J.D. & Burden, N.M. (2016), Numerical Analysis, 10E Edition. Cengage.

DITI 2233 Applied Statistics

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the fundamental concepts of statistics and its application.
2. Apply concept of probability and inferential statistics techniques to solve application problems.
3. Manipulate solutions of application problems using statistical software.

Synopsis

Students are exposed to the concept of probability and inferential statistics. The course

starts with data description and numerical measures, probability, discrete random variables, continuous random variables and sampling distributions. Main topics for inferential statistics will start with estimation and will be followed by hypothesis testing and simple linear regression. Besides that, this course will give some exposure to statistical software.

References

1. Triola, M., F., (2017) Elementary Statistics, 13th Edition, Pearson.
2. Devore, J. L., (2015), Probability and Statistics for Engineering and the Sciences, 9th Edition, Cengage Learning.
3. Mann, P. S., (2013), Introductory Statistics, 8th Edition, Wiley.
4. Navidi, W., (2014), Statistics for Engineers and Scientists, 4th Edition,McGraw-Hill Education.
5. Walpole R. E., Myers, R. H., Myers, S. L., Ye, K., (2012), Probability and Statistics for Engineers & Scientist, 9th Edition, Pearson Educational International.

DITP 1113 Programming I

Learning outcome

Upon completion of this course, students will be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming as well as the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function are among the topics covered in the course.

References

1. Gaddis, T., (2012), “Starting Out with C++: From Control Structures Through Objects 7th Edition”, Pearson Education International.
2. Malik, D.S (2018), “C++ Programming from Problem Analysis to Program Design 8th Edition”, Cengage Learning.
3. Liang, Y. D.(2010), “Introduction to Programming with C++ 2nd Edition”, Pearson Education International.
4. Friedman, Koffman (2011), “Problem Solving, Abstraction and Design using C++ 6th Edition”, Pearson.

DITU 3933 System Development Workshop

Learning outcome

Upon completion of this course, students will be able to:

1. Identify the problems in information system development.
2. Apply the appropriate information system development methods and tools in a project assigned to a group.
3. Present the given project outcome and produce a report which details all stages of the project development.

Synopsis

This course will require students to design, construct and assess an information system to solve a specific information system problem. Students should be working with a group of four and encouraged to select a problem to solve in which they are interested and which is achievable by their lecturer. Students should present the work at the end of the semester and produce a report of the given project. The expected outcome is a working information system, a written report detailing the work undertaken and assessment of the success of the work in solving the initial problem.

References

1. Matt Stauffer, Laravel: Up and Running: A Framework for Building Modern PHP Apps (2016),
2. Rob Foster, CodeIgniter Web Application Blueprints, (2015), Packt Publishing
3. Skidmore, S.and Eva, M. Introducing Systems Development, (2003) Macmillan Education UK
4. Carol Britton, Jill Doake, Object-oriented Systems Development: A Gentle Introduction, (2000), McGraw-Hill.
5. Carol Britton, Jill Doake, Software System Development: A Gentle Introduction, (2005), McGraw-Hill Education.

DITU 3964 Diploma Project

Learning outcome

Upon completion of this course, students will be able to:

1. Identify problems related to industrial needs in the ICT domain.
2. Construct system applications using relevant project management methods.
3. Organize information to produce a formal report.
4. Present a completed project.

Synopsis

Diploma project trains the students to practice their knowledge by undertaking a project. The students are exposed to real system development environment in which they will have to analyze and solve system related problems, plan and develop the system as well as to meet the design and analysis requirements using appropriate computer programming language.

References

1. Bachelor Final Year Project and Diploma Project Committee, "Diploma Project Handbook", 5th Edition (2014), FTMK, Universiti Teknikal Malaysia Melaka.

DITU 2343 Industrial Training

Learning outcome

Upon completion of this course, students will be able to:

1. Be responsible and conduct tasks related to ICT.
2. Apply the knowledge and skills that they've learned in classes throughout their internship.
3. Develop interpersonal skill by interacting and communicating with staff, colleagues and personnel.

Synopsis

Students must do the internship no less than 10 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student only once and usually it will be near the end of the 10-week period. During the visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisors. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Buku Panduan Latihan Industri, UTeM, 2009.

DITU 2362 Industrial Training Report

Learning outcome

Upon completion of this course, students will be able to:

1. Write a formatted report based on the knowledge and skills gained throughout their internship.
2. Describe the experience and knowledge gained into written form in log book.
3. Display interpersonal skill by presentation.

Synopsis

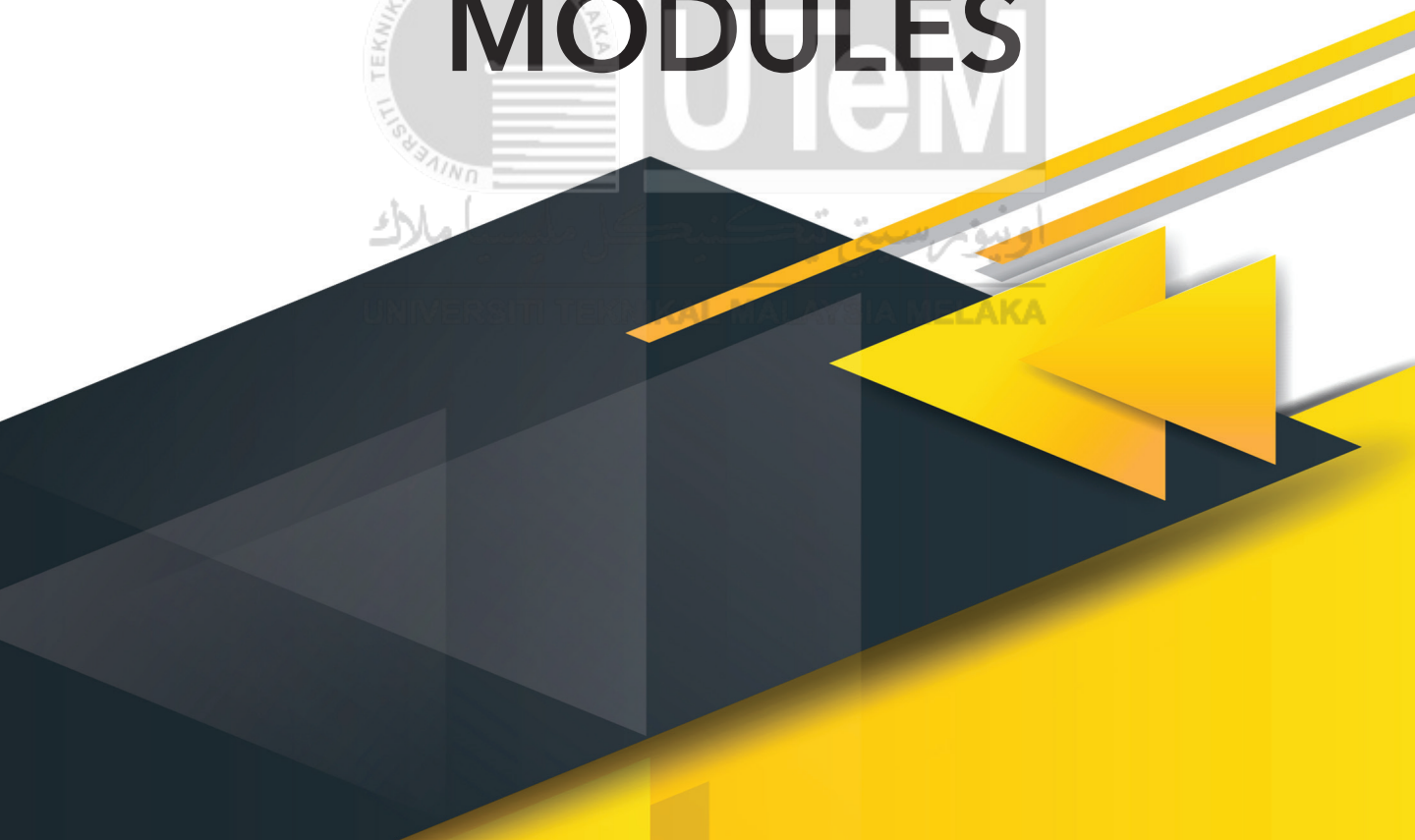
This subject is an extension of DITU 2343 where students must do the internship no less than 10 weeks in an organisation which they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship's activities in their log book. The faculty supervisor will visit the student only once and usually it will be near the end of the 10-week period. During the visit, students are required to do a presentation at the organisation in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of Industrial Training Report to the faculty supervisor for evaluation.

References

1. Dasar Latihan Industri KPT, 2010
2. Dasar Latihan Industri UTeM, 2013

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SPECIALISATION/ CONCENTRATION MODULES



UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SPECIALISATION (CONCENTRATION) MODULES COURSES

BITE 1523 Computer Game Programming

Learning Outcomes

Upon completion this course, students will be able to:

1. Describe the different abstract data type & algorithms used in game programming and the effects towards performance.
2. Apply structured data and algorithm in game application that requires data structures.
3. Produce game application by applying suitable type of data structures and algorithms to solve game programming problems.

Synopsis

This course covers the topics in fundamental Abstract Data Type (ADT) and Algorithms which commonly applied in games application development. In this course, the data structures and the algorithms will be implemented using MSVC++ and Simple DirectMedia Layer (SDL) Libraries. ADT such as array, linked-list, stack, queue, tree, hash table and graph will be emphasized during the program development. The algorithms of data operations such as modifying data (insertion, remove, replace etc), recursion, sorting, searching and indexing which are always used to operate data in games will also be covered. This subject requires the students to have a sound background in fundamental C++ programming techniques they have learnt in Game Programming I. For this course, Object Oriented. Programming (OOP) techniques will not be emphasized.

References

1. Ron Penton, "Data Structure For Game Programmers", Game Development Series, The Premier Press, 2003. (EBook)
2. Eric S. Robert, "Programming Abstraction in C++", Prentice Hall 1st edition , 2013. (EBook).
3. Allen Sherrod, "Data Structures and Algorithms for Game Developers", Game Development Series, Charles River Media, Thomson Learning Inc. , 2007. (EBook).

BITE 1613 2D Game Development

Learning Outcomes

Upon completion this course, students will be able to:

1. Demonstrate the basic concept related to digital graphic design, computer graphics 2D and 2D computer game development.
2. Explain key skills, techniques and components in 2D computer games development.
3. Construct appropriate components for generating 2D computer games from different types and genres as the basis for continuous learning.

Synopsis

This course provides students with the concept of digital graphic design, computer graphics 2D, and basic concepts and techniques for the development of a two-dimensional (2D) computer games. Students will be introduced to the concept of 2D raster graphics, and geometric 2D graphics. This course also covers the theory of computer games, game design, game logic and game engine development. In addition, students will also be exposed to other important matters related to the development of computer games such as the integration of 2D graphics and content development. At the end of this course, students will develop 2D games based on any given genres.

References

1. Steve Rabin (2010), Introduction to Game Development (Second Edition), COURSE TECHNOLOGY – CENGAGE Learning.
2. Jerry Lee Ford, Jr. (2010) Getting Started with Game, Course Technology CENGAGE Learning.
3. Jim Thompson, Barnaby Berbank-Green and Nic Cusworth (2007), Game Design – Principles, Practice and Techniques – The Ultimate Guide for the Inspiring Game Designer, John Wiley & Sons Inc.
4. Jacob Habgood, Nana Neilsen & Martin Rijks (2012), The Game Maker Companion, Game Development: The Journey Continues, Technology in Action.
5. Micheal E. Moore (2007), Introduction to Game Industry, PEARSON: Prentice Hall.

BITE 1713 Game Architecture

Learning Outcomes

Upon completing this subject, students should be able to:

1. Relate and explain the concepts, theories and methods of programming a computer game development.
2. Describes technical problems with the computer game development follow application development cycle.
3. Describes the current issues related to architectural design of computer games based on various sources of information relevant to the development of technology.

Synopsis

This course provides an introduction to the design aspects of the development of a computer games. The topics include basic technical understanding, game design and programming. Other topics include the game engine and the type of games. Current issues related to game development methods, technologies and trends in computer games is discussed at the end of the course.

References

1. F. von Borries, Steffen P. Walz, M. Bottger, D. Davidson, H. Kelley, J. Kucklick (2007), Space Time Play: Computer Games, architecture and urbanism: the next level, Springer.
2. A. Rolling, D. Morris. (2009), Game Architecture and Design, New Riders.
3. J. Gregory, J. Lander. (2009), Game Engine Architecture, A. K. Peters Ltd.

BITE 1723 Game Design Principle

Learning Outcomes

By the end of the course, students must be able to:

1. apply computer game design concepts and theories in the development of games. (C3, A3)
2. explain computer game design elements in various genres of games. (P2, CTPS)
3. follow game design principles in designing games using appropriate tools. (P3, LL)

Synopsis

This course is designed to provide students with a fundamental working knowledge and understanding of critical concept and historical context for analyzing games, as well as the skills and techniques necessary to incorporate game design in their study. Students will learn how to identify, create and manipulate core game elements such as game philosophy, design process, player objectives, rule systems and the human elements in a game. This course will introduce students to the tools and concepts used to create levels for games. The course will incorporate level design and architecture theory, concepts of the critical path and flow, game balancing, playtesting and storytelling. Using user-friendly toolsets from industry titles, students will build and test levels that reflect design concepts.

References

1. Ernest Adams, Fundamentals of Game Design, (3rd Edition), New Riders, 2014.
2. David Perry and Rusel DeMaria, David Perry on Game Design : A Brainstorming Toolbox, Course Technology Cengage Learning, 2009.
3. Jeannie Novak, Game Development Essentials : An Introduction, (3rd Edition), Delmar Cengage Learning, 2012.
4. Kevin Saunders and Jeannie Novak, Game Development Essentials : Game interface Design, 2nd Edition, Delmar Cengage Learning, 2013.

BITE 2123 Artificial Intelligence for Games

Learning Outcomes

Upon completion this course, students will be able to:

1. explain the principles, current issues and techniques in academic and industry game AI.
2. demonstrate how the functions of computer game AI can be used to create game experience including rule design, game mechanic, game balancing and social game integration into game experience.
3. apply problem solving skills in planning and developing a computer game AI project.

Synopsis

In this course, various AI techniques for games including techniques for real-time heuristic search, managing NPC behaviour, crowd simulation, and resource balancing. AI techniques which are deployed in games including the A* path finding algorithm, rule based reasoning, neural networks, and genetic algorithms. The course will also be concerned with knowledge representation and

problem formalization. To make the theory accessible and fun, the course will be using a game engine that allows students to apply AI routines that they choose and design.

References

1. Millington, I. (2014). Artificial Intelligence for Games(2nd Edition). Morgan Kaufmann. ISBN: 978-0123747310
2. Lucci, S. & Kopec, D. (2015). Artificial Intelligence in the 21st Century. Mercury Learning & Information. ISBN : 978-1936420236
3. Armstrong, S. (2016). Smarter Than Us : The Rise of Machine Intelligence. Machine Intelligence Research Institute. ISBN : 978-1939311098.
4. Kyaw, A., Peters, C. & Swe, T. (2016). Unity 4.x Game AI Programming. Packt Publishing. ISBN : 978-1849693400
5. Barrera, R., Aung, S.K, Thet, N.S. (2017). Unity 2017 Game AI Programming : Leverage the power of Artificial Intelligence to program Smart Entities for Your Games. Packt Publishing. ISBN: 978-1788477901

BITE 2513 Game Engine Development I

Learning Outcomes

Upon completion of this course the student will able to:

1. Identify and describe the theory and practice of programming video games.
2. Following the game engine design approach to develop their own game engine.
3. Develop their own games using existing game engines.

Synopsis

This course provides students with an introduction to the theory and practice of video game programming. Students will participate in individual hands-on lab exercises, and also work together like a real game development team to design and build their own functional game using an existing game engine (e.g. OPENGL, UNITY, UNREAL, CRY Engine, etc). Concepts learns during this subject is introduction to game engine, math for game engine, engine support systems, game loop and real-time simulation, human interface devices, tools for debugging and development, rendering engine, animation system, collision detection and introduction to gameplay system.

References

1. Jason Gregory. “Game Engine Architecture”. AK Peters. ISBN 978-1-56881-413-1.
2. Alan Thorn, “Game Engine Design and Implementation”, Jones and Bartlett Learning. ISBN-13: 978-0763784515.
3. Tomas Akenine-Moller, Eric Haines, & Naty Hoffman, “Real-Time Rendering”, 3rd Edition, A K Peters/CRC Press. ISBN 978-1568814247
4. Ian Millington, “Game Physics Engine Development: How to Build a Robust Commercial-Grade Physics Engine for your Game”, CRC Press, ISBN 978-0123819765.
5. Dave Shreiner, Graham Sellers, John M. Kessenich, & Bill M. Licea-Kane, “OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 4.3 (8th Edition)”,

Addison-Wesley Professional, ISBN 978-0321773036.
6. Michelle Menard, "Game Development with Unity", Cengage Learning PTR, ISBN 978-1435456587.

BITE 2523 Web Game Development

Learning Outcomes

Upon completing this subject, students should be able to:

1. Relate and explain the concepts, theories and methods of on-line computer games development.
2. Solve problems online game engine design by following web game development programming techniques that meet industry specifications.
3. Describe that issues related to the development of computer games web from variety of source.

Synopsis

This course provides an introduction to computer-based online games or web-games. The topics cover the basic technical understanding, design web game development, game programming and safety (security). Other topics include online game engine and the type of web games. Current issues related to games development methods, technology and gaming trends are discussed at the end of the course.

References

1. C. Griffith (2009), Real-World Flash Game Development: How to Follow Best Practices and Keep Your Sanity, Focal Press.
2. J. Makar (2009), Action Script for Multiplayer Games and Virtual Worlds, New Riders.
3. W. McGugan (2007), Beginning Game Development with Phyton and Phygame: From Novice to Professional, Springer.

BITE 2613 Interactive 3D Animation

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain what is the animation principles, 3D environment development design for 3D modeling with interactivity elements.
2. Modeling, texturing, animate, adding light and rendering 3D objects using software and devices following 12 principles of animation.
3. Applying 3D environment development principles and interactivity in their interactive animation project.

Synopsis

This course addresses the design and creation of 3D environments using software for modeling and animation and using tools for adding interactivity. Students are invited to explore the unique feeling of being immersed in a virtual world by creating new types of user experiences. Attention is given to the use of physical input devices or interaction regimes in the service of creating the user's feeling of delight in the artificial world.

References
1. Dariush Derakhshani, (2015) Autodesk 3ds Max 2016 Essentials, Sybex
2. Jere Miles, (2016) Unity 3D and PlayMaker Essentials: Game Development from Concept to Publishing (Focal Press Game Design Workshops), A K Peters/CRC Press
3. Micheal Lanham (2017) Augmented Reality Game Development, Packt Publishing
4. Michael O'Rourke, (2003) Principles of Three-Dimentional Computer Animation, W.W. Norton & Company
5. Tradigital Maya: A CG Animator's Guide to Applying the Classical Principles of Animation (2017), Routledge

BITE 2623 3D Game Development

Learning Outcomes

Upon completing this subject, students should be able to:

1. To understand the 3D game development process from conceptual idea to alpha testing.
2. To implement 3D modelling, texturing, rigging and animation technique for real-time 3D game 3. To develop 3D game and utilize an industry standard game engine as part of game
3. development workflow such as asset management, programming, GUI, sound, visual effects and packaging.

Synopsis

This course provides the student an in depth study about 3D game development process. 3D environment has allow gaming to evolve from simple traditional side scrolling game into more sophistticated and realistic experience to the player. Students will participate from conceptual ideation, 3D assets integration, texture and material for 3D games, 3D gameplay, collision detection and many other. Moreover, student will develop a prototype of 3D game for playtesting and refinement phase. It also discuss few case study and current industry standard technique in 3D game development.

References
1. Steve Rabin, (2008) Introduction to Game Development, Course Technology
2. Theresa Hill, (2015) 3D game development Practical Introduction
3. Nicola Valcasara, (2015) Unreal Engine Game Development Blueprint, PACKT Publishing

BITE 2633 Audio Video Production for Game

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain and apply the knowledge and principles of digital audio and video in computer games environment.
2. Demonstrate advanced skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Choose and organize audio video software and hardware in the conducive production

environment with the latest and relevance information.

Synopsis

This course will give details and valuable insights of digital audio and video production in games industry. Throughout the semester, students will be introduced to relevant topics on digital audio and video hardware, the art of audio production, recording techniques, video production, the integration of other media in video product, implementing special effects, and storyboarding. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References

1. Mohd Hafiz Zakaria, Zulisman Maksom, Wan Sazli Nasaruddin Saifudin, and Muhammad Haziq Lim Abdullah, in Press 2016. Digital Audio and Video Technology: Classroom in a book, Penerbit Universiti UTeM.
2. Marks, Aaron. 2009. The Complete Guide to Game Audio: for Composers, Musicians, Sound Designers, and Game Developers. Taylor & Francis: Oxford.
3. Ken C. Pohlmann, 2010. Principles of Digital Audio, Sixth Edition, McGraw-Hill Professional
4. 4. Ananda Mitra, 2013. Digital Video: Moving Images and Computers, Facts on File Publishing
5. Adobe Creative Team, 2013. Adobe Premiere Pro CS6 Classroom in a Book, Adobe Press

BITE 3513 Game Engine Development II

Learning Outcomes

At the end of this course student should be able to:

1. Explain the latest game engine design approach and the concept of “game” and “play”
2. Distinguish the design principles of game design and production of experimental procedures using various software and tools.
3. Reproduce their own game engine design and implementation part of the engine and integrate third-party components in accordance with industry requirements specification.

Synopsis

This course provides students with an in-depth exploration of game engine architecture. Students will learn state-of-the-art software architecture principles in the context of game engine design, investigate the subsystems typically found in a real production game engine, survey some engine architectures from actual shipping games, and explore how the differences between game genres can affect engine design. Students will participate in individual hands-on lab exercises, and also work together like a real game development team to design and build their own functional game engine by designing and implementing engine subsystems and integrating 3rd party components of game engine architecture. The pinnacle of this course is that the student will be able to develop and customize a game on top of their game engine.

Concepts: Engine subsystems/Elements including rendering, audio, collision, physics and game world models. Object Oriented approach in developing game engine. Game Engine as framework.

References

1. Jason Gregory. Game Engine Architecture. 2nd edition. AK Peters. 2009. ISBN 978-1-56881-413-1.
2. Eric Lengyel, series editor, Game engine Gems 2, Volume 2, AK Peters/CRC Press, 2011. ISBN-13: 978-1-5688-1437-7
3. Ian Millington, "Game Physics Engine Development: How to Build a Robust Commercial-Grade Physics Engine for your Game", CRC Press, ISBN 9780123819765.
4. Harbour, Jonathan S., Game Programming , All in One. 3rd ed Boston: Thomson Course Technology, 2007
5. Schwab, Brian, AI Game Engine Programming, Hingham, MA: Charles River Media, 2004.

BITE 3613 Game Project Management

Learning Outcomes

By the end of the course, students must be able to:

1. Prepare related documentations of games project management according to industry specification.
2. Demonstrate leadership skills, ethics and professionalism in managing group project.
3. Follow games project management techniques in analyzing project's risk, planning, cost management and control, quality assurance and budgeting.

Synopsis

This subject emphasizes on theory, application and practice in managing game projects. Students will gain knowledge and acquire skills in managing game projects such as planning, costing and preparing documentations. Students will demonstrate the key competencies required in managing game assets, resources and team members through group activities and case studies. They will be introduced to the roles as game producer, game artist, game designer, game developer and related supports in game production. At the end of the course, students must be able to adopt appropriate game project management tools in managing project activities. Students will be encouraged to actively participate and share their ideas through group discussions, presentations and role play.

References

1. Hight, H and Novak, J., Game Development Essentials: Game Project Management. Thomson Delmar Learning, 2008.
2. Vaughan, T., Multimedia: Making It Work 8th Edition. McGraw-Hill Osborne Media, 2011.
3. England, E. and Finney, A., Managing Interactive Media: Project Management for Web and Digital Media (4th Edition), Addison Wesley, 2007.
4. Frick, T., Managing Interactive Media Project. Thomson Delmar Learning, 2008.

BITE 3713 Multi-platform Game

Learning Outcomes

At the end of this course student should be able to:

1. Understanding the design approach for multiplatform game development (P2, A3)
2. Distinguish the principles of multiplatform game design strategy and production of experimental procedures using various software and tools. (C4, CTPS)
3. Implementation of multiplatform use case scenario in game development pipeline (P3,LL)

Synopsis

This course provide student with a study of multiplatform development strategy in game development pipeline. Understanding multiplatform concept is an important step to determine business process and goal for the developer. Various architecture of game consoles and other platform such as mobile devices lead towards different performance and expectation toward one game title. Thus the need to understand various game development pipeline across multiple gaming platform is crucial in order to deliver the final game product expectation. Students will participate in individual hands-on lab exercises, and also work together like a real game development team to design and build their own game across several platform.

Concepts: Game development pipeline, Console architecture, mobile gaming, Game Engine as framework, Multiplatform strategy.

References

1. Jason Gregory. Game Engine Architecture. 2nd edition. AK Peters. 2009. ISBN 978-1-56881-413-1.
2. Eric Lengyel, series editor, Game engine Gems 2, Volume 2, AK Peters/CRC Press, 2011. ISBN-13: 978-1-5688-1437-7
3. Ian Millington, "Game Physics Engine Development: How to Build a Robust Commercial-Grade Physics Engine for your Game", CRC Press, ISBN 9780123819765.
4. Harbour, Jonathan S., Game Programming , All in One. 3rd ed Boston: Thomson Course Technology, 2007
5. Schwab, Brian, AI Game Engine Programming, Hingham, MA: Charles River Media, 2004.

BITI2213 Knowledge Based System

Learning Outcomes:

1. Define the fundamental concept of knowledge based systems, components and lifecycle.
2. Compare different knowledge representations and reasoning in knowledge-based system.
3. Apply a basic knowledge based system based on appropriate concept and components.

Synopsis:

The purpose of this course is to introduce the students to the concept of knowledge-based systems (KBS) such as phases of developing KBS, types of knowledge representations, knowledge acquisitions, and types of inference techniques

and reasoning. Students also are exposed to Expert Systems as one of the KBS.

References:

1. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
2. Darrel Ryan (2017), Expert Systems: Design, Applications and Technology (Computer Science, Technology and Applications)
3. Michael M. Ritcher and Rosina Weber (2013), Case-Based Reasoning: A Textbook, 2013th Edition, Springer.
4. Patrice Micouin (2014), Model Based Systems Engineering: Fundamentals and Methods (Control, Systems and Industrial Engineering Series), Wiley.
5. Petricğ Vizureanu (Eds) (2010), Expert Systems, Published by Intech.

BITI2223 Machine Learning

Learning Outcomes:

1. Differentiate the fundamental concept of machine learning theory.
2. Select the appropriate techniques in machine learning problem solving.
3. Demonstrate machine learning algorithm based on machine learning concepts.

Synopsis:

Students are exposed to the foundation of machine learning, which is the study of how to build a computer system that learns from experience. The course starts with an overview of Data Mining for a background study. Main topics that will be covered are such as concept learning, decision tree learning, Bayesian learning, linear model, instance-based learning, model evaluation, association analysis, and reinforcement learning. Besides, some applications of machine learning including robotic control, autonomous navigation, bioinformatics, speech recognition, and web data processing will be introduced.

References:

1. Flach, P., (2012), Machine Learning: The Art and Science of Algorithms that Make Sense of Data, Cambridge University Press.
2. Kelleher, J.D., Namee, B.M., D'Arcy A., (2015), Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies, The MIT Press
3. Stephen Marsland (2014), Machine Learning: An Algorithmic Perspective, 2nd Edition, Chapman & Hall/Crc Machine Learning & Pattern Recognition
4. Kotu, V., Deshpande, B., (2014), Predictive Analytics and Data Mining: Concepts and Practice with RapidMiner, 1st edition, Morgan Kaufmann.
5. Rapidminer inc., (2012), URL: https://rapidminer.com/getting-started-central/, Access date: 07-02-2017.

BITI3123 Fuzzy Logic

Learning Outcomes:

1. Relate various concepts of fuzzy logic to problem solving.
2. Organize solution steps in solving fuzzy logic problem.
3. Demonstrate computer program based on fundamental methods of fuzzy logic for problem solving.

Synopsis:

The course aims to provide exposure on the foundation of fuzzy logic as one of the soft computing techniques. The course starts with an overview on the concept of fuzziness. The main topics will cover the algebra, quantities and the logical aspect of fuzzy sets, fuzzy membership functions, fuzzy operations, fuzzification, de-fuzzification, and fuzzy system. Various applications of fuzzy system such as the automated fuzzy system, fuzzy decision making system, fuzzy classification and clustering system, fuzzy pattern recognition system and fuzzy control system will be included in the discussion.

References:

1. Ross, T. J. (2010). Fuzzy Logic with Engineering Applications, 3rd Edition, John Wiley.
2. The Mathworks Inc. (2013). Fuzzy Logic Toolbox, http://www.mathworks.com/products/fuzzy-logic/index.html, dated: 16/8/2013
3. Selected papers by Prof. L. A. Zadeh downloaded from the website at The Berkeley Initiative in Soft Computing (BISC) (2013). http://www.cs.berkeley.edu/~zadeh/papers/index.htm, dated: 16/8/2013
4. Sivanandam, S. N., Sumathi, S. and Deepa, S. N. (2010). Introduction to Fuzzy Logic Using Matlab. Springer.
5. James, J.B. (2002). An introduction to fuzzy logic and fuzzy sets. CRC Press.

BITI3133 Neural Network

Learning Outcomes:

1. Describe various techniques in neural network.
2. Apply suitable neural networks techniques to solve neural network problems.
3. Develop computer programs based on fundamental method of neural network for problem solving.

Synopsis:

This course will discuss soft computing techniques, which is neural network. The fundamental theories of neural network is introduced, which includes biological and statistical foundations of neural networks. Radial Basis, Hebbian and competitive learning also will be introduced. Additionally, types of learning, information theories and their applications in neural networks will be discussed.

References:

1. Alessandro, V.E.P., Paolo, M., Rivero, P. Antonio, J. (2016). Artificial Neural Networks and Machine Learning, Springer.

2. Kumar, S. (2013). Neural networks: a classroom approach. Mc Graw Hill, New Delhi.
3. Hagan, T.M., Howard, B.D., Mark, H.B., Orlando, D. (2014). Neural Network Design. Martin Hagan, Texas.
4. Haikin, S. (2013). Neural Networks and Learning Machines. Pearson Education, Inc. New Jersey.
5. Jeff, H. (2015). Artificial Intelligence for Humans: Deep Learning and Neural Networks. Heaton Research Inc. Chesterfield.

BITI3143 Evolutionary Computing

Learning Outcomes:

1. Demonstrate the understanding of the fundamental concept of evolutionary computing.
2. Identify different approaches in evolutionary computing.
3. Use the evolutionary computing techniques in problem solving.

Synopsis:

The purpose of this course is to introduce evolutionary computing in problem-solving. Evolutionary computing uses algorithms which are inspired by mechanisms of biological evolution. These search-algorithms apply the concepts of genetic recombination, mutation, and natural selection in producing the potential solutions. A number of evolutionary computing techniques will be taught, and this course puts greater emphasis on Genetic Algorithms. Other techniques such as Memetic Algorithm and constraints handling will also be covered in this course.

References:

1. Eiben, A.E., Smith, J.E., (2015) Introduction to Evolutionary Computing, Springer.
2. Jansen, T. (2013). Analyzing evolutionary algorithms: The computer science perspective. Springer Science & Business Media.
3. De Jong, K.A., (2006) Evolutionary Computation: A Unified Approach, MIT Press.
4. Simon, D., (2013) Evolutionary Optimization Algorithms, Wiley.
5. Yu, X., Gen, M., (2010) Introduction to Evolutionary Algorithms, Springer.

BITI3413 Natural Language Processing

Learning Outcomes:

1. Differentiate various concept of natural language processing.
2. Organise solution steps in solving natural language processing problem.
3. Build a small natural language processing system.

Synopsis:

Natural language processing (NLP) deals with the application of computational models to text or speech data. This course provides knowledge to students about natural language processing (NLP). Topics covered are morphology (word formation), NLP tasks including syntax analysis (sentence structure and parsing), semantic analysis

(meaning), and discourse analysis (pronoun resolution) and NLP applications such as machine translation, information retrieval and extraction, question-answering systems, and dialog systems.

References:

1. Jurafsky, D. & Martin, J. (2009). Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech. 2nd Edition. Prentice-Hall. (http://www.cs.colorado.edu/~martin/slp.html).
2. Steven Bird, Ewan Klein & Edward Loper (2009), Natural Language Processing with Python: Analyzing Text with the Natural Language Toolkit, O'Reilly.
3. Jalaj Thanaki (2017), Python Natural Language Processing, Packt Publishing.
4. Iti Mathur, Nisheeth Joshi, Deepti Chopra, Jacob Perkins, Nitin Hardeniya (2016), Natural Language Processing: Python and NLTK, Packt Publishing.
5. Manning, C. D. and Schütze, H (1999). H. Foundations of Statistical Natural Language Processing. The MIT Press.

BITI3523 Artificial Intelligence In Robotics And Automation

Learning Outcomes:

1. Analyze fundamental concepts related to robotics.
2. Organize solution steps in solving robotics using Artificial Intelligence concepts.
3. Construct robotics & automation programming for practical uses.

Synopsis:

This course covers introduction of robotics, which includes principles behind the Artificial Intelligence approach to robotics & to program an artificially intelligent robot for applications involving sensing, navigation & uncertainty. The students also will be exposed to the principles of automation and mobile robotics programming as well as health & safety issues. Ethical aspects and the future of AI in robotics & automation are also covered.

References:

1. Robin R. Murphy (2000) "Introduction to AI Robotics". The MIT Press.
2. Sebastian Thrun, Wolfram Burgard & Dieter Fox (2005) "Probabilistic Robotics". The MIT Press.
3. Gordon McComb,(2011), Robot Builder's Bonanza, McGraw-Hill.
4. Widodo Budiharto & Paulus Andi Nalwan (2013), Membuat Sendiri Robot Humanoid, Synergy Media.
5. Widodo Budiharto (2013), Membuat Sendiri Robot, Synergy Media.
6. John J. Craig (2018) Introduction to Robotics: Mechanics and Control, Pearson.
7. David J. Gunkel(2012),The Machine Question: Critical Perspectives on AI, Robots, and Ethics, The MIT Press.

BITI3533 Artificial Intelligence Project Management

Learning Outcomes:

1. Relate activities and scopes that involved in managing artificial intelligence project.
2. Analyse project requirements and choose appropriate approaches in managing artificial intelligence project.
3. Organise artificial intelligence development project effectively.

Synopsis:

This course provides students with fundamental discipline in managing artificial intelligence project. The course exposes students to a variety of techniques to manage people, budget, schedule, risk and quality of artificial intelligence project. The course also provides skills to the students on how to analyze potential problems in managing project that they would responsible for.

References:

1. Jefferson Hanley (2015), Project Management: A Compact Guide to the Complex World of Project Management, CreateSpace Independent Publishing Platform.
2. Ed Stark (2014), Project Management For Beginners: Proven Project Management Methods To Complete Projects with Time And Money To Spare, CreateSpace Independent Publishing Platform.
3. Peter Rausch, Alaa F. Sheta, Aladdin Ayesh (2013), Business Intelligence and Performance Management: Theory, Systems and Industrial Applications, Springer.
4. Project Management Institute (2013), A Guide to the Project Management Body of Knowledge: PMBOK(R) Guide 5th Edition. Project Management Institute.
5. Nicolai Andler (2012), Tools for Project Management, Workshops and Consulting: A Must-Have Compendium of Essential Tools and Techniques, John Wiley & Sons.

BITM 1123 Interactive Media Authoring

Learning Outcomes

By the end of the semester, student should be able to:

1. Explain theories and knowledge of various interactive media applications using the multimedia authoring tools based on industrial requirements.
2. Demonstrate a systematic approach in developing interactive application for different multimedia domains and users.
3. Build interactivity in multimedia application based on the current authoring tools used by the industry.

Synopsis

This subject will introduce the various stages of interactive media project development from definition to the delivery of a multimedia product. The students will be introduced to instructional design followed by different stages in the product development including learning objects including prior analysis, the design, delivery considerations

and evaluation. The lessons will also cover different models in instructional design, e-learning standards and concept of interactivity. Lab sessions will cover tools that assist the development on an interactive learning product including iBook Author and Adobe Flash/ Unity. A complete project and report has to be submitted at the end of the semester.

References

1. Ahmad Shaarizan Shaarani, Emaliana Kasmuri, Nurulfajar Abd Manap and Juffrizal Karjanto. (2014). Widgetry Basics for i-Book Module, Penerbit UTeM, 2014.
2. Norasiken Bakar & Faaizah Shahbodin. (2012). Adobe flash CS5 Professional Includes Exercise Files and Training Videos. Penerbit UTeM, 2012.
3. Farah Nadia Azman. (2011). Interactive Media Authoring Lab Module, Penerbit UTeM.
4. Blaire and Preston. (2009). Cartoon Animation (The Collector's Series), Walter Foster.
5. Nellie McKesson and Adam Witwe. (2012). Publishing with iBooks Author, O'Reilly Media, Inc.
6. Michael Garofalo. (2012). The Unofficial GameSalad® Textbook, Photics.
7. Ryan Henson Creighton. (2010). Unity 3D Game Development by Example, Beginner's Guide, Packt Publishing.
8. Ryan Henson Creighton. (2013). Unity 4. X Game Development by Example, Packt Publishing.

BITM 2113 Web Application Development

Learning Outcomes

Upon completion of this course the student will able to:

1. Discuss the concept and the principle of Internet and WWW based on the latest technologies.
2. Use the important components in web applications which are Client Site Technology, Server Site Technology, Database Server and Web Server.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are:

- Client Site Technologies: HTML, XHTML, HTML5, CSS, XML, and JavaScript
- Server Site Technologies: PHP
- Database Server: MySQL.
- Web Servers : Apache

This course also brings together all of the elements of Web site design, graphics, animation, data storage in the construction of fully functional commercial Web site applications.

References
1. Robert W.Sebesta (2014), Programming The World Wide Web – 8th Edition, Pearson, ISBN: 0133775984
2. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006.
3. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5) 4th Edition, O'Reilly. ISBN: 1491918667.
4. Jennifer Niederst Robbins(2012), Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics 4th Edition, O'Reilly. ISBN:1449319270
5. Ashley Menhennett (2014), A Guide to HTML5 and CSS3 [ebook] p.1. Available at: https://html5hive.org/free-ebook-a-guide-to-html5-and-css3 [Accessed 1 Sep. 2017].

BITM 2123 Digital Audio and Video Technology

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain and apply the knowledge and principles of digital audio and video.
2. Demonstrate skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Assemble audio video software and equipment in a conducive production environment using the latest and relevance information.

Synopsis

This course will give details and valuable insight of the wonderful world of digital audio and video. Students will be introduced to topics on audio production, recording techniques, video production tools, video hardware, shooting procedure, special effects, MIDI sequencing, and audio/video production concepts. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References
1. Mohd Hafiz Zakaria, Mohd Haziq Lim Abdullah, (in press). Digital Audio and Video Technology: Classroom in a book, Penerbit Universiti UTeM.
2. Rabiger, M., 2016. Directing: Film techniques and aesthetics. 2nd Edition. Focal Press.
3. Watkinson, J., 2013. Introduction to Digital Audio, Second Edition, Taylor & Francis
4. Ananda Mitra, 2010. Digital Video: Moving Images and Computers, Facts on File Publishing
5. Adobe Creative Team, 2010. Adobe Premiere Pro CS5 Classroom in a Book, Adobe Press
6. David Austerberry, 2013. The Technology of Video and Audio Streaming, Second Edition, Focal Press.

BITM 2213 Computer Animation

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the concepts, techniques and basic 3d animation production process and principles of animation.
2. Produce 3D animation by combining the modeling, texturing, rigging and animating technique.
3. Respond to the theory and applied skill in 3d animation and cinematography of short animated movie to be applied on movie, educational software and mobile app.

Synopsis

This subject will introduce the student to the technology and concepts of 2D and 3D computer animation. Emphasis will be placed on developing a working knowledge on the underlying process of 2D and 3D animation. Topics will cover overview of animation production, principles of 2D and 3D animation, modeling concepts and techniques, rendering concepts and techniques, camera, lighting, shading and surface, animation concepts and techniques, retouching and compositing, and output of the animation production. Student will also be exposed to the introduction of character animation the basic techniques in modeling a character. The output should meet the technical in nature as well as its artistic merit. While this may be different than either the typical art or computer science course, it closely resembles the workings of major movie studios where various projects have to meet spefic technical details (in order to fit in the production pipeline and schedule) as well as achieving the artistic goals. The format of the subject is one-hour lecture followed by four hours lab.

Practical exercises will be given on each lab session and to be submitted at the end of the lesson. Student will have to plan their time to achieve the goals given. Individual and group assignment will be given to develop the creative thinking skill among the students. Students will also work in groups to complete a project in order to foster ideas sharing and teamwork among themselves. At the end of the course, students will have to present their project in class and defend their ideas professionally. Evaluation will be given on soft skill development as well as practical work.

References

1. Dariush Derakhshani, (2015) Autodesk 3ds Max 2016 Essentials, Sybex
2. Andy Beane, (2012) 3D Animation Essentials, Sybex
3. Tina O'Hailey (2013) Rig it Right! Maya Animation Rigging Concepts (Computers and People), Focal Press
4. Jeremy Birn (2013), Digital Lighting and Rendering (3rd Edition) (Voices That Matter), New Riders.
5. Liz Blazer (2015), Animated Storytelling: Simple Steps for Creating Animation and Motion Graphics, Pearson Education.

BITM 3113 Interactive Media Project Management

Learning Outcomes

Upon completion of this course, student should be able to:

1. Determine appropriate techniques to scope, manage, and evaluate multimedia project activities.
2. Follow problem solving strategies in integration of scopes, time, cost, resources and quality of a multimedia project.
3. Demonstrate team skills, professional practices in managing a group project.

Synopsis

This subject emphasizes on theory, application and practice in managing a multimedia and information technology based projects. Students will gain knowledge and acquire skills in managing interactive media projects such as planning, costing and preparing documentations. Through group activities and case studies, students will practice key competencies that project manager must develop in managing media and multimedia team comprises artists, programmers and analysts. At the end of the course, students must also be able to apply interactive media project management process and use the appropriate tools such as multimedia network analysis and Gantt chart in managing project activities. Students will be introduced to software tools to support project management and they will be encouraged to actively participate and share their ideas through group discussions and presentations.

References

1. Frick, Tim, Managing Interactive Media Projects. Thomson Delmar Learning, 2008.
2. Marchewka, Jack T., Information Technology Project Management (Fouth Edition), Wiley, 2013
3. Schwalbe, Kathy, Information Technology Project Management (Third Edition), Thomson Course Technology, 2004
4. Vaughan, Tay, Multimedia: Making It Work (Eight Edition), Mc Graw Hill, 2011
5. Englad, E. and Finney, A. Managing Interactive Media: Project Management for Web and Digital Media (4th edition), Addison Wesley, 2007.

BITM 3133 Computer Games Development

Learning Outcomes

Upon completion this course, students will be able to:

1. explain the principles, basic interface design and the technologies behind the rules to develop a game.
2. demonstrate how the functions of a computer games can be used to create experience including rule design, game mechanic, game balancing and social game integration into game experience.
3. apply problem solving skills in planning and developing a computer game project.

Synopsis

This course is conducted to give an exposure to students with regards to core concepts of

computer games design and games technology. The topics which the students will learn include the game concepts, character development, creating the user experience, game balancing as well as the game genre such as action games, adventure games, puzzle games and construction management games. Lab sessions will introduce students to the fundamental of design and constructing of a particular game. Students will also be asses through practical sessions which involving individual and group task in order to produce a creative and quality games output. At the end of the semester, each individual and group will be required to present their projects.

References

1. Adams, E. (2013). Fundamentals of Game Design (3rd Edition). New Riders.
2. Rodgers, S. (2014). Level Up! : The Guide to Great Video Game Design. Wiley.
3. Floyd, AT (2017). Game Development From Good to Great. Independently Published
4. Tristem, B. & Geig, M. (2015). Unity Game Development in 24 Hours, Sams Teach Yourself (2nd Edition). Pearson Education.
5. Felicia, P. (2015). Unity 5 from Zero to Proficiency (Beginner) : A Step-by-step guide to coding your first game with Unity (Volumn 2). Patrick Felicia Publishing.

BITM 3213 Interactive Computer Graphics

Learning Outcomes

Upon completion of this course, the student should be able to:

1. Apply the knowledge and concept of computer graphic application into 2D and 3D objects and image development.
2. Solve a computer graphic problem with a selected technique and method using OpenGL graphic application.
3. Select a suitable technique from relevant information to solve a computer graphic application.

Synopsis

This course is to expose the students to the basic concept and digital graphic technology. This includes understanding and designing aspects by using a computer graphics application. The students will be exposed to the skill of using a computer graphics application such as OpenGL. It also emphasizes on the latest graphics design context which will focus on the 'graphic thinking' and 'creative design process'.

References

1. Edward Angel & Dave Shreiner (2012), Interactive Computer Graphics: A Top-down Approach With Shader-based OpenGL (6th edition), Pearson.
2. Richard S. Wright, Jr. et. al, (2010), OpenGL Superbible (5th edition), Addison Wesley.
3. Edward Angel, (2009), Interactive Computer Graphics: A Top Down Approach Using OpenGL. (5th edition), Addison Wesley.

4. F.S.Hill. (2007), Computer Graphics Using OpenGL. (3rd edition), Prentice Hall.
5. Donald Hearn & M. Pauline Baker,(2004), Computer Graphics with OpenGL (3rd editing). Prentice Hall.
6. Mason Woo, et. Al, (1999). OpenGL Programming Guide.(3rd edition), Addison-Wesley.
7. Alan Watt. (2000). 3D Computer Graphics (3rd edition), Addison-Wesley.
8. Mark J. Kilgard. (1996). The OpenGL Utility Toolkit(GLUT) :Programming Interface, Silicon Graphics, Inc.website : www.opengl.com

BITM 3223 Virtual Reality Technology

Learning Outcomes

At the end of this course student should be able to:

1. Define how virtual environment works.
2. Demonstrate and reproduce the techniques in computer graphics that is related to virtual reality aspect.
3. Assess the issues in generating the virtual environment with taking into account the human factor and predict the potential of virtual reality and its constraint.

Synopsis

This class will introduce students to the technology and techniques used in virtual reality (also known as virtual environments). Students will gain knowledge about the history of virtual reality, latest innovations in this field, understand the important research issues and methodologies for virtual realities, and have the opportunity to gain practical experience with the hardware and software used to create VR applications.

References

1. Burdea, G. C. & Coiffet Philippe. (2003). Virtual Reality Technology. 2nd edition. Wiley-interscience.
2. Ames, A. L., Nadeau, D. R. & Moreland, J. L. (1997). The VRML 2.0 Sourcebook. John Wiley & Sons, Inc.
3. Tony Parisi (2015). Learning Virtual Reality. O'Reilly.
4. Tony Mullen (2011). Prototyping Augmented Reality. John Wiley & Sons.
5. Tony Parisi (2012) WebGL: Up and Running. O'Reilly.

BITP 2113 Algorithm Analysis

Learning Outcomes

Upon completion of this course, students will be able to:

1. Apply the life cycle of algorithms.
2. Analyze factors influencing the quality of algorithms.
3. Optimize source codes and SQL statements.

Synopsis

This course will enable students to write source codes and SQL statements taking into consideration the efficiency of algorithms. Topics include introduction to algorithm analysis, code optimization, algorithm design techniques, SQL and code tuning techniques.

References
1. Anany Levitin, (2012), "Introduction to the Design and Analysis of Algorithms (3rd Edition)" , Pearson Education Limited.
2. Cormen, T.H., Lieserson, C. E., Rivest, R. L., Stein, C. (2010), "Introduction to Algorithms, Third Edition", MIT Press.
3. Heineman, G. T., Police, G., Selkow, S., (2009), "Algorithms in a Nutshell", O'Reilly Media.
4. Sedgewick, R and Flajolet P, (2014), "Algorithms – 4th Edition", Pearson Education.
5. Kleinberg J and Tardos E, (2014), "Algorithm Design", Pearson Education.

BITP 2223 Software Requirement and Design

Learning Outcomes

Upon completion this course, students will be able to:

1. Analyze software requirements and design the software based on object oriented approach using UML.
2. Model software requirements analysis and software design based on object oriented approach.
3. Produce formal software specification document and software design document.

Synopsis

This course introduces the students to the object oriented approach using UML to apply Object Oriented Analysis and Design (OOAD) towards developing software project. This course covers UML modeling to capture requirements in use cases, perform analysis modeling to produce interaction diagrams; static and dynamic, and identifies design elements in classes. The students will be taught to know sources of requirement, major activities in requirement analysis, knowing tools in requirements management and identify classes via use case analysis, defining relationships and outlining attributes and methods. In design phase, the students will be exposed to designing software architecture, high level and detail design which will be realized through refined class diagram, component diagram and deployment diagram.

References
1. Klaus Pohl.,Chris Rupp, Requirement Engineering Fundamentals, 2nd Edition, Rocky Nook, 2015.
2. Kenneth E. Kendall, Julie E. Kendall, Systems Analysis and Design, 9th Edition, Pearson 2014.
3. Ian Sommerville, Software Engineering 6th Edition, Addison Wesley 2012.
4. Cay Horstman, Object Oriented Design and Patterns, John Wiley and Sons 2012.
5. Jim Arlow, Ila Neustadt UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design, 2/E, Addison-Wesley Professional, 2012.

BITP 2303 Database Programming

Learning Outcomes

At the end of the lesson, students should be able to:

1. Describe features, syntax, purpose and benefits of SQL and PL/SQL to developer and database administrator.
2. Construct and apply procedures, functions, and packages in suitable applications.
3. Construct and apply database triggers in suitable applications.

Synopsis

The contents of this course are based on the syllabus of two modules in Oracle certification (Oracle Certified Associate). The first part of the lesson introduces the concepts of relational database and SQL syntax. This includes topics related to Oracle database architecture, its ability, constraints in data integrity, and other database objects such as views, index, sequence and synonyms. The second part of the lesson explains the objectives, functions and benefits of PL/SQL in developing database applications. This includes the development, implementation and maintenance of procedures, functions, packages and database triggers. The lesson also explains the use of stored procedures and triggers in retrieving data and executing complex business rules to enhance data integrity. Students will be introduced to Oracle packages, subprograms and PL/SQL triggers.

References

1. Pataballa, N. and Nathan, P. (2001). Introduction to Oracle9i: SQL, Volume 1 and Volume 2, Oracle University.
2. Pataballa, N. and Nathan, P. (2001). Oracle9i: Program with PL/SQL, Volume 1 and Volume 2, Oracle University.
3. S. Urman, R. Hardman, and M. McLaughlin (2004), Oracle database 10g PL/SQL programming.
4. S. Feuerstein and B. Pribyll (2014), Oracle PL/SQL Programming, 6th ed. Oreilly Media Inc.
5. C. Mcdonald, W. C. Katz, C. Beck, J. R. Kallman, D. C. Knox, C. Katz, R. Kallman, E. Board, S. Anglin, D. Appleman, G. Cornell, J. Cox, T. Davis, K. Watterson, G. Wray, and J. Zukowski, Mastering Oracle PL / SQL : Practical Solutions. Apress, 2004.

BITP 2313 Database Design

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the database design process and its' importance in database system development life cycle.
2. Construct data model using relational and non-relational data modeling techniques.
3. Explain database design issues in specialized applications such as DSS and E-Commerce.

Synopsis

This subject emphasizes the importance of database design and presents the fundamental

principles of relational and non-relational data models which include object-oriented and object-relational data model together with the enhanced features of an entity-relationship diagram. A practical database design methodology is used to demonstrate the design process which involves not only constructing the data model but also checking and validating the accuracy of the model in line with the user transaction requirements. Design issues related to distributed databases such as data fragmentation, allocation, transparency, and replication are also discussed. This subject also discusses database design issues in specialized database applications such as data warehousing, data mining, online analytical processing, decision support system and electronic commerce.

References

1. Connolly, T. and Begg, C. (2015) Database Systems: A practical approach to design, implementation, and management, 6th Edition, Pearson Education.
2. Coronel, C., Morris, S. and Rob, P. (2016) Database Principles Fundamentals of Design, Implementation, and Management, 12th Edition, Course Technology.
3. Hoffer, J.A., Ramesh, V. and Topi, UH (2015). Modern Database Management, 12th Edition, Pearson Education.
4. Elmasri, R and Navathe, S.B. (2015) Fundamentals of Database Systems, 7th Edition, Addison-Wesley.

BITP 2323 Database Administration

Learning Outcomes

At the end of the lesson, students should be able to:

1. Explain the concepts of database administration.
2. Apply functions of database administration.
3. Analyze database performance.

Synopsis

In this course students will take up the roles, issues and responsibilities as database administrator. They will also identify the functions of the DBMS such as storage, access and data updates; database objects; data integrity; physical database design; user management and database performance.

References

1. Deirdre Matishak, Mark Fuller (2010), Oracle Database 11G: Administration Workshop I (Volume I & II), Edition 2.0, Jobi Varghese and Veena Narasimhan (Oracle Corporation).
2. Bert Rich, (2012), Oracle Database 2 Day DBA 11g Release 2 (11.2), (Oracle Corporation).
3. Oracle Corporation, (2014), Oracle® Database Express Edition, Getting Started Guide & Installation guide 11g Release 2 (11.2).
4. Mullins, Craig, S. (2012) Database Administration – The Complete Guide to Practices and Procedures Second Edition. Addison-Wesley.
5. McCullough-Dieter, Carol. (2003) Oracle9i Database Administrator – Implementation and Administration. Thomson Learning.

BITP 3123 Distributed Application Development

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply the concept of distributed computing.
2. Conform to the architecture of distributed application development.
3. Develop an application for distributed environment.

Synopsis

The course exposes the students to the development of distributed programming applications which are used in the industry for network-based applications. Students are to be exposed to the introduction of distributed computing, multi-threading programming, client server application using socket programming, distributed object using RMI, web services and cloud computing.

References

1. Farley, Jim, 1998, Java Distributed Computing, O'Reilly.
2. Hall, Marty and Hall, Larry, 2005, Core Servlets and JavaServer Pages (JSP) 2nd Edition, Prentice Hall.
3. Liang, Daniel Y., 2010, Introduction to Java Programming, Comprehensive (8th Edition), Prentice Hall.

BITP 3223 Software Project Management

Learning Outcomes

Upon completion of this course, the students should be able to :

1. Explain activities and scopes to manage software development project.
2. Manage software project start-up, monitoring, controlling and closing.
3. Writes formal software development plan document.

Synopsis

This course provides students with fundamental discipline in managing software development project. The course exposes students to a variety of techniques to prepare and manage people, budget, schedule, risks and quality of software project. The course also provides skills to the students how to use software tools in constructing software project plan such as Microsoft Project, MS Excel spreadsheets and MS Words.

References

1. Bob Hughes and Mike Cotterell (2009), Software Project Management, McGraw-Hill.
2. Abd Ghani M.K. (2016), Software Project Management: A guide to manage software development project, Second Edition, Penerbit UTeM.
3. Joel Henry (2004), Software Project Mangement: A real-world guide to success, Pearson.
4. Clifford F. Gray & Erik W.Larson (2006), Project Management, Mc Graw-Hill.

BITP 3253 Software Validation and Verification

Learning Outcomes

Upon completing this subject, students should be able to:

1. Explain the principle of verification and validation focusing on testing the software as well as quality assurance.
2. Develop test requirements, test cases and test script for real software projects.
3. Classify the test design techniques and tools that could satisfy the quality of software products.

Synopsis

This course gives exposure to the students about the software testing concept and focus on process to develop and implement testing plan, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activity such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation.

References

1. Black, R., Veenendaall, E. V., Graham, D. (2012) Foundations of Software Testing ISTQB Certification. 3rd ed., Cengage Learning.
2. ISTQB (2011) ISTQB Certified Tester Foundation Level Syllabus. International Software Testing Qualification Board.
3. Galin, D. (2004). Software Quality Assurance, From Theory to Implementation. Pearson Addison-Wesley.
4. John Watkins. (2001). Testing IT – An Off-the-Shelf Software Testing Process. Cambridge University Press.
5. Glenford J. Myers. (2004). The Art of Software Testing. Second Edition. John Wiley & Sons.

BITP 3353 Multimedia Database

Learning Outcomes

Upon completion this course, students will be able to:

1. explain the fundamental concept of multimedia database and its requirements.
2. demonstrate understanding in dealing with various multimedia data types.
3. apply the multimedia database design concept in storing and retrieving multimedia data.

Synopsis

Multimedia Database Management Systems (MMDBMSs) is a DBMS that supports both traditional and multimedia data types, and is capable of handling large collections of multimedia entities. This subject revolves around fundamental components that need to be integrated into conventional database management systems to make them practical for developing multimedia database applications. The most important is to overview various feature and approaches for handling large collections of multimedia entities by existing relational and object-relational DBMSs. Then, developing a set of features and functions that a MMDBMs should provide to effectively and

efficiently support various multimedia data types, such as text document, images, audio, and video.

References

1. Dunckley, L. (2003), Multimedia Databases: An Object-Relational Approach, UK : Pearson.
2. Kratochvil, M. (2013), Managing Multimedia and Unstructured Data in the Oracle Database, PACKT Publishing.
3. Candan, K.S. and Sapino, M.L. (2010), Data Management for Multimedia Retrieval. Cambridge University Press.
4. Lu, G. (1999), Multimedia Database Management Systems, UK.
5. Subrahmanian, V.S. (1998), Principles of Multimedia Database systems, Morgan Kaufmann.

BITP 3363 Data Warehousing and Business Intelligence

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain the concepts, components and purpose of data warehousing and data mining.
2. Design data warehouses based on the data warehousing model and lifecycle.
3. Apply the techniques and tools related to business intelligence.

Synopsis

This subject focuses on data warehousing fundamentals which includes the importance of data warehousing, multi-dimensional data analysis and factors involved in the analysis, planning, design, loading, maintenance and exploitation of successful data warehouse. It will also cover the tools and techniques supporting business intelligence such as decision making system, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting and data mining.

References

1. Ciampa, B. 2014. The Data Warehouse Workshop: Providing Practical Experience to the Aspiring ETL Developer, Createspace Independent.
2. Vaisman, A, & Zimányi, E. 2014. Data Warehouse Systems: Design and Implementation (Data-Centric Systems and Applications), Springer.
3. Kimball, R. & Ross, M. 2013. The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling (3 Ed), John Wiley & Sons.
4. Sherman, R. 2014. Business Intelligence Guidebook: From Data Integration to Analytics, Morgan Kaufmann.
5. harda, R., Delen, D, & Turban, E. 2018. Business Intelligence, Analytics and Data Science: A Mangerial Perspective (4 Ed.), Pearson.

BITP 3423 Special Topic in Software Engineering

Learning Outcomes

Upon completion this course, students will be able to:

1. Describe the importance of IT Architectureand it's elements.
2. Explain the IT Architecture and how it can be transformed into value centric initiative.
3. Demonstrate the ability of developing an IT Architecture initiative by using Business Model Canvas.

Synopsis

This course provides the students with the foundation in rationalizing the critical skill sets of the core architectural principles and alignment to the IT Architecture Body of Knowledge. Ultimately, the focus of IT Architecture for Special Topic in Software Engineering this semester underlies the need for a holistic IT Architecture approach, skills requirements and strategically equips individual roles in the enterprise to realize the business values of a sound technology adoption.

References

1. Lankhorst, M., Enterprise Architecture at Work: Modelling, Communication and Analysis, Springer, 2013.
2. Hausman, K. K., Cook, S.L., IT Architecture for Dummies, Wiley Publishing, 2010.
3. Tinsley, T., Enterprise Architects: Masters of the Unseen City, BookSurge Publishing, 2009.
4. Perks, C., Beveridge, T., Guide to Enterprise IT Architecture, Springer, 2003.
5. Brooks, F.D., The Mythical Man-Month: Essays on Software Engineering, U.S: Addison-Wesley, 1995.

BITP 3453 Mobile Application Development

Learning Outcomes

Upon completion this course, students will be able to:

1. Understand the concept of mobile application development.
2. Differentiate the architecture of hybrid versus native development.
3. Develop a mobile application for a specific platform/operating system.

Synopsis

The course exposes the students to the development of mobile application development focusing on Android. Students are to be exposed to the introduction of native and hybrid application development as well as multi-threading programming and client server interaction via web services.

References

1. Zigurd Mednieks,Laird Dornin et al, Programming Android, O'Reilly.
2. Delessio, Darceyl, Conder, 2013, Android Application Development in 24 Hours 3rd Edition, SAMS.

BITP 3483 Geographic Information System

Learning Outcomes

Upon completion this course, students will be able to:

1. Apply the concepts, issues, techniques and various GIS applications.
2. Solve information system problems based on the GIS language technique.
3. Evaluate the issues in GIS management based on the information from various resources.

Synopsis

This course will introduce students to Geographic Information Systems (GIS). GIS is a computer based data processing tool that is used to manage, analyze and visualise spatial data. It can be considered as advanced database. Students will explore some of the GIS applications in in the area of electronic government, resources management, disaster management, businesses, banking and insurance industries. Students must be familiar with traditional methods of identifying and describing locations using paper maps. The students will begin by examining the geographic basics of mapping and examine the processes in which spatial data can be recorded, captured, stored, processed using computers. Next, the students will introduce the methods used in spatial analysis.

References

1. Gina Clemmer. 2018. The GIS 20:Essential Skills, 3rd Edition, Esri Press.
2. De By, R.A et al. 2000. R.A. De By (eds). Principles of Geographic Information Systems. ITC Educational Text Book Series:1 ISBN 90-6164-184-5, ISSN1567-5777 ITC Educational Textbook Series, ITC. Enschede HollandBruce E.Davis, GIS : A Visual Approach, 2nd Edition, OnWord Press, ISBN 0-7668-2765-X.
3. Chang, Kang-tsunf, 2016, Inntroduction to Geographic Information Systems, 8th Edition, McGraw-Hill
4. Paul Bolstad, 2016, GIS Fundamentals: A First Text on Geographic Information Systems, 5th Edition.
5. Micheal Law, Amy Collins, 2016, Getting to know ArcGIS Pro, 1st Edition, Esri Press.
6. Wilpen L. Gorr, Kristen S. Kurland, 2017, GIS Tutorial 1 for ArcGIS Pro, a platform wookbook, Esri Press.
7. Cynthia A Brewer, 2016, Designing Better Maps: A guide for GIS users, 2nd Edition, Esri Press.

BITS 2313 Local Area Network

Learning Outcomes

Upon completion this course, students will be able to:

1. Identify the suitable hardware and software for LAN communication
2. Evaluate the fundamental principles that influence the selection of LAN hardware, LAN topology and LAN protocols
3. Demonstrate the setup of LAN and the alternative that exist in the selection of hardware and transmission facilities when design and implementing LANs

Synopsis

This course is an introduction to the current methods and practices in the use of Local Area Networks (LANs). The emphasis will be placed on LAN hardware and software, installation management and connection to other networks. Topics covered include network architecture, network communication protocols, end-to-end protocol stacks, network components, network management and the Open Systems Interconnection (OSI) reference model.

References

1. Steve McQuerry, David Jansen, David Hucaby, Cisco LAN Switching Configuration Handbook, 2nd Edition, CISCO Press (2009), ISBN-10: 1-58705-610-0
2. Wayne Lewis, LAN Switching and Wireless, CCNA Exploration Companion Guide (Cisco Networking Academy Program), CISCO Press (2012), ISBN 1587132737
3. Jr. Kenneth C. Mansfield, James L. Antonakos, Computer Networking for LANs to WANs: Hardware, Software and Security (Networking (Course Technology)), Delmar Cengage Learning; 1 edition (2009), ISBN-10: 1423903161
4. James F. Kurose, Keith W. Ross, Computer Networking (Fourth Edition), Pearson Addision Wesley(2008), ISBN 0-321-51325-8
5. Behrouz A. Forouzan, Data Communications and Networking (4th Edition), McGraw-Hill Forouzan Networking Series(2006), ISBN 978-0073250328
6. William Stalling, Wireless Communications and Networks (2nd Editions), Pearson Education International(2005), ISBN 0-13-196790-8)
7. Behrouz A. Forouzan, Local Area Networks, McGraw-Hill Forouzan Networking Series (2003), ISBN 0-07-233605-6
8. Donald C. Lee, Enhanced IP Services for Cisco Networks Cisco Press (2002), ISBN1-57870-247-X

BITS 2323 Wide Area Network

Learning Outcomes

Upon completion this course, students will be able to:

1. Explain about the wide area network concept and technology
2. Identify the suitable method in selecting server, WAN devices and an appropriate network technology
3. Demonstrate the integration of different network topology, security, reliability and management capabilities
4. Construct the network architecture design using structure design approach to solve wide area network problem

Synopsis

This course introduces the concepts, practices, and technologies used in the design and implementation of Wide Area Networks. Topics will include; overview of network fundamentals, considerations for LAN and WAN implementations, network security requirement, and trends in the carrier network services. Students will also be able to understand, explain

and apply the fundamentals of Wide Area Network technology concepts and skills in network applications, troubleshooting, and preparing for CCNA examinations.

References

1. Rick Graziani and Bob Vachon, 2014, Accessing The WAN, Companion Guide, 1st Edition, CISCO Press.
2. Patrick Regan, Wide Area Network, Pearson Prentice Hall, 2004, ISBN: 0-13-046578-X
3. Cisco Networking Academy, 2014, Routing and Switching Essentials Companion Guide, 1st Edition, Cisco Press.
4. Cisco Networking Academy, 2017, Connecting Networks v6 Companion Guide, CISCO Press.
5. Douglas E. Comer, 2004, Computer Networks and Internets with Internet Applications, 4th edition
6. Cisco Networking Academy, 2013, Connecting Networks Lab Manual (Lab Guide), 1st Edition, CISCO Press.
7. Allan Johnson, 2014. Scaling Networks Companion Guide, 1st Edition, Cisco Press.

BITS 2333 Network Analysis and Design

Learning Outcomes

Upon completion this course, students will be able to:

1. Manipulate the understanding of issues related to current computer network design, processes, tools and techniques
2. Analyze the methodology for effective computer networking design
3. Demonstrate the analysis and design of specific projects related to an organization proposed by students

Synopsis

This course covers a systems approach to network design, the concept, guidelines and practice for Requirement analysis and Flow Analysis. The technology choices, interconnection mechanism, network management and security will be covered in logical design. Some issue on network design will be included in Physical design and addressing and routing. Software for network analysis and design namely the Microsoft Visio will be introduced and used to help in understanding and applying the network analysis and design knowledge areas and processes.

References

1. Scott A.Helmers (2013). “Microsoft Visio 2013 step by step”. O’Reilly Media, ISBN: 978-0-7356-6946-8.
2. Oppenheimer, P. (2011), “Top Down Network Design – Third Edition”, Cisco Press, ISBN: 978-1-58720-283-4
3. Larry L. Peterson and Bruce S. Davie (2011). “Computer Networks: A systems approach-Fifth Edition”. Morgan Kaufman. ISBN: 9780123850607
4. Kaufmann, M. and Mc Cabe, J. (2007). “Network Analysis, Architecture, and Design”, Morgan Kaufman, ISBN: 978-0-12-370480-1
5. Yusof, R. (2007), “Network Analysis and Design”, UTeM.

6. James D Mc Cabe. (1998), "Practical Computer Network Analysis and Design". Morgan Kaufmann, ISBN: 978-1-55860-498-8

BITS 2343 Computer Network

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Determine the basic concepts, elements and uses of Local Area Network (LAN) and Wide Area Network (WAN).
2. Demonstrate the ability to install, configure and operate networking hardware and software such as router, switch and Wireshark.
3. Justify the alternatives that exist in the selection of hardware, software and transmission facilities from different resources when designing and implementing network in a project.

Synopsis

This course is an introduction to the current methods and practices in the use of Local and Wide Area Networks. The emphasis will be placed on LAN hardware and software, installation management and connection to other networks. Topics covered include network architecture, network communication protocols, end-to-end protocol stacks, network components, network management and the Open Systems Interconnection (OSI) reference model. Furthermore, Wide Area Network technologies such as Ethernet, Token Ring, ATM and FDDI also will be covered.

References

1. James F. Kurose, Keith W. Ross, "Computer Networking: a top-down approach", Pearson Education, 2017, ISBN-10:0133594149
2. Douglas E. Comer, "Computer Networks and Internet", Pearson Higher Education, 2016, ISBN-10: 1292061820
3. William Stallings. "Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud". Addison-Wesley Professional, 2015. ISBN-10: 0134175395
4. Cisco Networking Academy, Introduction to Networks v6 Companion Guide, Cisco Press, 2017. ISBN-10: 1-58713-360-1

BITS 2413 Network Security Infrastructure and Design

Learning Outcomes

Upon successful completion of this subject, the student should be able to:

1. Select a suitable technology to secure the network infrastructure.
2. Build the network topology with or without the cyber security policy.
3. Develop skills and knowledge in various settings and platforms to ensure a highly secured network infrastructure.

Synopsis

This course is designed to provide fundamental knowledge in planning and designing a secure

network infrastructure. Topics covered include how to analyze security policies, procedures, and requirements as well as how to identify and design for potential security threats. Students will also be exposed to designing a network infrastructure security, authentication strategy for the organisation domain, access control strategy for network resources and public key infrastructure with certificate services. They will also be involved in designing security for internet information services, servers with specific roles, as well as designing an infrastructure for updating computers and secure network management infrastructure.

References

1. Aaron Woland, Vivek Santuka, Mason Harris, Jamie Sanbower, "Integrated Security Technologies and Solutions - Volume I: Cisco Security Solutions for Advanced Threat Protection with Next Generation Firewall, Intrusion Prevention, AMP, and Content Security", Cisco Press, 2018, ISBN: 1-58714-706-8
2. Joseph Migga Kizza, "Guide to Computer Network Security". Springer International Publishing, 2017, ISBN: 978-3-319-55606-2
3. Santhosh Sivarajan, "Getting Started with Windows Server Security". Packt Publishing, 2015, ISBN: 9781784398729
4. Santos, O., Stuppi, J., "CCNA Security 210-260 Official Cert Guide", Cisco Press, 2015, ISBN: 1-58720-566-1.
5. Joseph Muniz, Nadhem AlFardan, Gary McIntyre, "Overview of Security Operations Center Technologies", Cisco Press, 2015
6. Joseph Muniz., "5 Steps to Building and Operating an Effective Security Operations Center (SOC)", Cisco Press, 2015

BITS 2423 Physical Security and Electronic Surveillance

Learning Outcomes

At the end of this course, students will be able to:

1. Demonstrate methods in physical security and electronic surveillance.
2. Analyze and explains steps in producing policies of physical security and electronic surveillance.
3. Organize by using appropriate equipments in designing physical security and electronic surveillance.

Synopsis

This course is designed to provide fundamental knowledge in physical security and electronic surveillance. It addresses the threats, vulnerabilities, and countermeasures that can be utilized to physically protect an enterprise's resources and sensitive information. These resources include people, the facility in which they work, and the data, equipment, support systems, media, and supplies they utilize. Topics cover protection techniques for the entire facility, from the outside perimeter to the inside office space, including all of the information system resources. These focus on the methods of recognition, anticipation, selection, and design of security technologies as well as examining the principles and applications of security systems.

References

1. Lawrence J. Fennelly, "Effective Physical Security", ISBN: 978-0-12-804462-9, Todd Green, 2017.
2. Lionel Silverman, "Physical Security and Wireless Access Control Systems", Taylor and Francis Publisher, 2016.
3. Dr. Paul R. Baker and Dr. Daniel J. Benny. "The Complete Guide to Physical Security, ISBN: 978-1-4200-9964-5, CRC Press, 2013.
4. Houston H. Carr; Charles A. Snyder; Bliss N. Bailey "The Management of Network Security: Technology, Design, and Management Control" Prentice Hall, 2009
5. Brian T. Contos, William P Crowell, Colby Derodeff, Dan Dunkel, Eric Cole. "Physical and logical security convergence powered by enterprise security management". Syngress Publishing, Burlington, 2007

BITS 2523 Cyber Law and Security Policy

Learning Outcomes

Upon successful completion of this subject, the student should be able to:

1. Discuss the concept of Cyber Law, Security Policy, Intellectual Property and cybercrime issues in cyber world.
2. Report on the scope of protection covered by each type of Cyber Law.
3. Explain about security policies based on related Acts and Laws.

Synopsis

This course is designed to provide fundamental skills needed to understand cyber laws related to copyright, patents, digital rights, computer crimes, privacy issues, hacking and prosecution in Malaysia. This course will also covers the scope and enforcement bodies in Malaysia. Furthermore, students will be exposed to design and produce security policies accordance with legal laws.

References

1. Patricia Bellia, Paul Berman, Brett Frischmann, David Post, "Cyberlaw: Problems of Policy and Jurisprudence in the Information Age (American Casebook Series)", West Academic Publishing, 2018.
2. Brian Craig, "Cyberlaw: The Law of the Internet and Information Technology," 1 Edition, Prentice Hall, 2012.
3. Matt Bishop, "Computer Security: Art and Science (2 Edition)", Addison Wesley, 2018
4. Geoffrey Corn and Jimmy Gurule, "National Security Law: Principles and Policy", Wolters Kluwer Law & Business, 2015.
5. Mohamed Chawki, Ashraf Darwish, Mohammad Ayoub Khan, Sapna Tyagi,"Cybercrime, Digital Forensics and Jurisdiction (Studies in Computational Intelligence)", Springer, 2016
6. Yvo Desmedt, "Secure Public Key Infrastructure: Standards, PGP and Beyond (Advances in Information Security)", Springer, 2018.
7. Douglas J. Landoll, "Information Security Policies, Procedures, and Standards: A

Practitioner's Reference", Auerbach Publications; 2016.

BITS 3313 Network Administration and Management

Learning Outcomes

Upon completion this course, students will be able to:

1. Categorize the standards and protocols used for network administration and management
2. Propose suitable technique of problem solving in network administration and management
3. Manipulate the software tools for network administration and management.

Synopsis

This course covers the topics in network administration and management, duties as network administrators/managers, host management, infrastructure components, users management, Simple Network Management Protocol, Management Information Base, Remote Monitoring, web-based management and network security management.

References

1. Douglas E Comer, Automated Network Management Systems, Publisher, Addison-Wesley, 2007
2. Alexander Clemm, Network Management Fundamentals, Cisco Press, 2006
3. Benoit Claise & Ralf Wolter, Network Management: Accounting and Performance Strategies, Cisco Press, 2007.
4. Thomas A. Limoncelli, Christina J. Hogan and Strata R. Chalup, The Practice of System and Network Administration, Second Edition, Pearson Education Inc., 2007
5. Adrian Farrel, Network Management Know It All, Morgan Kaufmann, 2008
6. Robiah Yusof, Mohd. Faizal Abdollah & Shahrin Sahib, Network Administration and Management, 2007.
7. Mani Subramanian, Network Management: Principles and Practices (2nd Edition), Prentice Hall; 2 edition, 2012
8. David D. Coleman , David A. Westcott, CWNA: Certified Wireless Network Administrator Official Study Guide: Exam CWNA-106 4th Edition, Sybex; 4 edition, 2014

BITS 3323 Network Project Management

Learning Outcomes

Upon completion this course, students will be able to:

1. Manipulate the concept of network project management in term of processes, tools and technique
2. Demonstrate the understanding of all the project management body of knowledge, processes, tools and techniques
3. Organize projects related to information technology and specifically related to computer network

Synopsis

This course covers project management body of knowledge (project integration management,

scope management, time management, cost management, quality management, and human management). It also covers the processes or steps in project management (project initiation, planning, executing, controlling and project closing or termination). Software for project management (Microsoft Project and Microsoft Excel) will be introduced and used to help in understanding and applying the project management knowledge areas and processes.

References

1. Schwalbe, Kathy. (2013). Managing Information Technology Projects, 7th Ed. Course Technology, Cengage Learning, ISBN No. 1133526853
2. Harold Kerzner, (2009). Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Wiley; 10th edition.
3. PMI. (2008). A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – 4th Ed.
4. Douglas E. Comer. (2007). Automated Network Management System, Pearson International Edition.
5. Sazilah Salam, Nurazlina Mohd Sanusi, Fararishah Khalid, Robiah Yusof, Khadijah Wan Mohd Ghazali and Edna Buyong. Project Management. FTMK & FPTT, UTeM, 2009.

BITS 3333 Multimedia Networking

Learning Outcomes

Upon completion this course, students will be able to:

1. Identify the suitable technique to solve networking problems related to multimedia networks
2. Compare various concepts of data representations, compression techniques, QoS mechanisms and applications in multimedia networking
3. Manipulate the mechanisms that support the multimedia application in multimedia networking environment

Synopsis

This topic covers the subject-topics basic and advanced network multimedia. Certain topics will be selected from multimedia information representation, compression, network High-speed such as Frame Relay, and ATM Network Local High-Speed Computers. The emphasis will also be given to the transmission protocol (TCP / IP, RSVP, MPLS, RTP) and Quality of Service (QoS) in networks such as Intergrated Services and Differentiate Services.

References

1. Jenq-Neng Hwang (2009), Multimedia Networking: From Theory to Practice. Cambridge University Press.
2. James F. Kurose and Keith W. Ross (2012), Computer Networking: A Top-Down Approach (6th Edition). Pearson Education

3. Santiago Alvarez (2012), QoS for IP/MPLS Networks, Cisco Press.
4. W. Stallings, (2002) High Speed Networks and Internets – Performance and Quality of Service.Prentice Hall
5. F. Halsall, (2001) Multimedia Communication – Applications, Networks, Protocols, and Standards. Pearson Education

BITS 3353 Network Security Administration and Management

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Analyse the principles, strategies and standard practices in network security administration and management.
2. Verify the system in operation is secured according to accepted industry practices, and in compliance with any specific organization policies and procedures.
3. Manipulate appropriate network tools for security monitoring, network administration and management in accordance to current scenario.

Synopsis

This course covers the topics in network security administration and management. The students will be equipped with the knowledge and practicality of a network security administrator/ manager. Together with the tools used in lab sessions and the skills trained, the students will be educated and qualified enough to be network security practitioners.

References

1. Security+ Guide to Network Security Fundamentals 6th Edition, 2018, Mark Ciampa, Course Technology
2. CompTIA Security+ Study Guide: Exam SY0-501 7th Edition,2017, Emmett Dulaney, Sybex
3. CISSP All in one Exam Guide 7th Edition, 2016,
4. Shon Harris, McGraw-Hill Education Guide to Computer Network Security, 2015, Joseph Migga Kizza, Springer
5. Network Flow Analysis, 2010, Michael Lucas, No Starch Press5
6. Network Security and Management 3rd Edition, 2012, Brijendra Singh, PHI Learning
7. Principles of Computer Security – Lab Manual, 2014, Vincent Nestler et.al, McGraw-Hill Education

BITS 3363 Network Security Project Management

Learning Outcomes

Upon completion of this subject, students should be able to:

1. Identify the processes, tools and techniques in network security project management.
2. Demonstrate the understanding of all the project management body of knowledge, processes, tools and techniques.
3. Organize projects that are related to information technology and computer network security in groups.

Synopsis

This course provides distinct knowledge in network security project management. The topics

cover project management body of knowledge namely managing projects in aspects of integration, scope, time, cost, quality and human resource. It also covers the phases of network security project management namely project initiation, planning, executing, controlling and closing or termination. Software for security project management such as Microsoft Project and Microsoft Excel will be introduced and used to help in applying the network security project management knowledge areas and processes

References

1. Schwalbe Kathy. Information Technology Project Management, 9th Edition Cengage Learning Custom Publishing, 2018.
2. Stephen Pryke, Managing Networks in Project-Based Organizations, John Wiley & Sons Ltd, 2017.
3. Joseph Phillips, Project Management with CompTIA Project+: On Track From Start to Finish 4th Edition, Mc Graw Hill, 2017.
4. Carl Chatfield & Timothy Johnson D. Microsoft Project 2010 Step by Step. Microsoft Press. ISBN: 978-073-5626959, 2010.
5. Paul E Harris, Planning and Control Using Microsoft Office Project and PMBOK Guide 4th Edition, Eastwood Harris, 2010
6. Larry Webber, Federick Webber, IT Project Management Essentials, Aspen Publisher, 2009
7. Susan Snedaker, Syngress IT Security Project Management Handbook, 6th Edition, Syngress, 2006

BITS 3413 Information Technology and Network Security

Learning Outcomes

Upon completion this course, students will be able to:

1. Distinguish the appropriate methods to safeguards the elements of information technology and network
2. Build the elements in information technology and network with the appropriate methods and tools / software
3. Explain issues related to ethics and law in information technology and networks and relate it with cyber laws in Malaysia

Synopsis

This course covers background views of ICT threats and the needs to have theoretical security method on Information Security in Software, Operating System, Data Center, Computer Networks. The course will also cover the basic cryptographic elements and authentication, IP Security, Firewalls, Security Management, and the related issue in Computer Crimes and Cyber Laws. Security related computing namely Microsoft Excel and Windows 2012 will be introduced and used to help in understanding and applying the security mechanism and algorithms.

References

1. Siti Rahayu, Robiah, Mohd Faizal and Nazrulazhar (2006), Information Technology Security, Pearson, ISBN 13 978-983-3655-47-2.

2. C.P. Pfleeger, S. L. Pfleeger (2003). Security in computing 3rd Ed., Prentice Hall International, Inc., ISBN 0-13-035548-8.
3. W. Stallings (2003). Network Security Essentials: Applications and Standards, 2nd edition, Prentice Hall, Inc, ISBN 0-13-016093-8.
4. D. Gollmann (2005). 2nd Edition, Computer Security, John Wiley & Sons, Inc, ISBN 0-470-86293-9
5. James M. Stewart, Mike Chapple, Darril Gibson, (2015), CISSP (ISC)2 Certified Information Systems Security Professional Official Study Guide 7th Edition, Sybex, ISBN-13: 978-1119042716
6. Michael E. Whitman, Herbert J. Mattord, (2015), Principles of Information Security 5th Edition, Course Technology, ISBN-13: 978-1285448367
7. Mark Merkow and Jim Breithaupt (2006), Information Security: Principles and Practices, Pearson Prentice Hall, ISBN 0-13-154729-1.
8. Sean-Philip Oriyano, (2014) CEH: Certified Ethical Hacker Version 8 Study Guide, Wiley, ISBN: 978-1-118-64767-7

BITS 3423 Information Technology Security

Learning Outcomes

1. Explain the concept and issues of information technology security
2. Distinguish the suitable components in providing security services and mechanism in computer software, operating system, database and network system
3. Manipulate an appropriate security system mechanism ethically

Synopsis

Security in Information Technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this subject, student will be able to learn security services that covered Confidentiality, Integrity and Availability (CIA) in ICT based system. This subject also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

1. Michael Goodrich, and Roberto Tamassia (2013), Introduction to Computer Security, Pearson New International Edition, ISBN 9781292025407.
2. W. Stallings (2014). Network Security Essentials: Applications and Standards, 5th edition, Pearson Education Limited, ISBN 9780273793809.
3. C.P. Pfleeger, S. L. Pfleeger (2011). Analyzing Computer Security: A Threat/ Vulnerability/ Countermeasure Approach 1st Ed., Prentice Hall International, Inc., ISBN 978-0132789462.
4. D. Gollmann (2011). 3rd Edition, Computer Security, John Wiley & Sons, Inc, ISBN 9780470741153.
5. J.M. Stewart, M.Chapple and D.Gibson (2015). Certified Information Systems Security Professional Study Guide, 7th edition, Sybex, ISBN 9781119042754.

6. Mark Ciampa (2014), Security+ Guide to Network Security Fundamentals, 5th edition, Cengage Learning, ISBN 9781305093911
7. William Stallings (2014), Cryptography and Network Security: Principles and Practice, 6th Edition, Pearson International Edition, ISBN 9780273793762 EC-Council (2010), Disaster Recovery, 1st Edition, ISBN 9781435488700.

BITS 3433 Information Technology and Database Security

Learning Outcomes

Upon completing this course, students should be able to:

1. Explain security issues in the design, implementation and management of database systems.
2. Analyze security requirements for database application system development.
3. Construct a database with strong protection of data confidentiality, integrity and availability.

Synopsis

This course introduces the basic concepts of data security in an environment that involves databases, computer systems and networks, and the Internet. It outlines fundamental data security requirements and explains the risks that threaten the integrity and privacy of organizational data. Students are introduced to several technologies that can contribute to system and database security such as Access Control, Cryptography, Authentication Methods, User Administration, Virtual Private Database and Database Auditing. In the aspect of Database Security students will be exposed to the standard practices and procedures in security implementation within Oracle9i database environment. Other security issues such as risk management, computer crime and cyber law will also be covered in this course.

References

1. C.P. Pfleeger, S.L. Pfleeger (2015). Security in computing 5th Edition, Prentice Hall International, Inc.
2. Afyouni, Hassan A. (2006) Database Security And Auditing – Protecting Data Integrity And Accessibility. Thomson-Course Technology.
3. Craig S., Mullins (2013) Database Administration – The Complete Guide to DBA Practices and Procedures. Addison-Wesley.
4. Merkow, M. and Breithaupt, J. (2011) Information Security: Principles and Practices. Pearson Prentice Hall.
5. Maiwald, E. (2013) Network Security – A Beginner's Guide. Mac Graw-Hill

BITS 3463 Cryptography Application and Information Theory

Learning Outcomes

Upon completion of this subject, students should be able to:

1. Differentiate the basic concept of probability theory, information theory, complexity theory, number theory, abstract algebra and finite fields.

2. Build symmetric systems, asymmetric systems and cryptanalysis in cryptography.
3. Illustrate on the usage of information theory in cryptographic system.

Synopsis

This course covers the probability theory concept, information theory, complexity theory, number theory, abstract algebra and finite fields to understand the ideas regarding the discrete log problem, strength of an algorithm, information security, encryption, decryption, symmetric systems, symmetric systems and cryptanalysis in cryptography. The symmetric and asymmetric cryptosystems and its cryptographical mathematical theory behind it are emphasized.

References

1. Robert M. Gray, Entropy and Information Theory, 2nd Ed., Springer, 2011.
2. William Stallings, Cryptography and Network Security: Principles and Practice, 5th Ed., Prentice Hall, 2011.
3. Abhijit Das and C. E. Veni Madhavan, Public-Key Cryptography: Theory and Practice, Pearson 2009.
4. Harald Niederreiter and Chaoping Xing, Algebraic Geometry in Coding Theory and Cryptography,
5. Princeton University Press, 2009.
6. Ranjan Bose, Information Theory, Coding and Cryptography, 2nd Ed., McGraw Hill, 2008
7. Douglas Robert Stinson, Cryptography: Theory and Practice, Chapman & Hall/CRC, 3rd Ed., 2006.

BITS 3513 TCP/IP Programming

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate various techniques and concepts of network programming
2. Discover several common programming interfaces for network communication
3. Manipulate advanced knowledge of programming to solve the network programming problem

Synopsis

This subject intended to expose student on how network programming works. Since Java is one of the most demanding skill in industry, so this subject will emphasize on how to write a network programming by using Java language. This subject will show students on how to use Java's network class library to quickly and easily write programs that accomplish many common networking tasks.

References

1. Elliotte Rusty Harold, Java Network Programming 4th Edition, O'Reilly & Associates. (2013)
2. Jan Graba, An Introduction to Network Programming with Java 3rd Edition, Springer (2013)
3. Esmond Pitt, Fundamental Networking in Java, Springer (2006).
4. Bryan Basham, Kathy Sierra, Bert Bates, Head First Servlets and JSP, 2nd Edition, O'Reilly Media (2008)

BITS 3523 Computer Audit and Risk Management

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explore and analyze the concepts as well as elements of computer audit and risk management.
2. Recommend the appropriate response in conformity with security issues in computer security audit.
3. Manage and manipulate on audit and mechanisms in physical security, operating systems, networks, and administrations of computer security from various resources.

Synopsis

This course focuses on the fundamental knowledge of computer security and risk management. In addition, emphasizes has given to the importance of computer audit and risk management. The enclosed topics are mainly related to security audit analysis, security monitoring, environmental security and follow up auditing in security concern. The student will be exposed to the field of risk and incident response, recovery and disaster recovery.

References

1. R. Benham, Cyber-Risk Management: Practical Strategies to Protect Your Organization from Cyber Threats. Kogan Page, 2018.
2. T. Campbell, Practical Information Security Management: A Complete Guide to Planning and Implementation. Berkeley, CA: Apress, 2017.
3. R. Pompon, IT Security Risk Control Management: An Audit Preparation Plan. Berkeley, CA: Apress, 2016.
4. D. Landoll, The Security Risk Assessment Handbook. CRC Press, 2016.
5. M. E. Whittman, Management of Information Security. Cengage Learning, 2016.

BITS 3533 Wireless Network and Mobile Computing

Learning Outcomes

Upon completion this course, students will be able to:

1. Differentiate standards of cellular telecommunication and wireless networks
2. Identify different types of wireless network, its protocols, and applications
3. Construct online applications utilizing wireless networks technologies

Synopsis

This course is designed to give the knowledge of the concept of mobile computing and wireless networks, by exploring the relationship between hardware, software and development kits. Through class, research and application development, students will understand the current mobile technology and the relation to operating systems and standards. Students will be exposed to the challenges to handle the constraints of memory and storage of these hardware.

References
1. A. Osseiran, J.F. Monserrat, P. March and J. Lianghai "5G Mobile and Wireless Communications Techology," ISBN: 9781107130098, 2016
2. Jack L. Burbank, "Wireless Networking and Communications" 2016
3. J. Liu, F.Wang, X. Ma, and Z.Yang, "Recent Advances in Wireless Communication Protocols for Internet of Things," Wireless Communications and Mobile Computing,Vol. 2017, Article ID 8791485
4. Paul Bedell, Cellular Networks: Design and Operation – A Real World Perspective, ISBN: 1478732083, Outskirts Press Aug 2014.
5. Mr Mark A Lassoff, Mr Tom Stachowitz, Mobile App Development with HTML5, ISBN: 0692405054, LearnToProgram, Incorporated Mar 2015
6. Thomas J. Duffy, Programming with Mobile Applications: Android(TM), iOS, and Mobile Phone 7, ISBN: 1133628133, Course Technology, 2012.

BITS 3613 Hacking Techniques and Prevention

Learning Outcomes

Upon completion of this subject, the student should be able to:

1. Explain the fundamentals concept of hacking technique and prevention.
2. Applied the tools and methods to protect computers and networks against hacker attacks.
3. Measure the major software security design flaws such as buffer overflow and race condition and provide best practices for defending against attacks.

Synopsis

In this course, students will study and gain experience with the role of defending hosts and networks from attack as well as learning how the hacker uses tools to attack and penetrate networks. Students will be able to use several open software tools that will analyze host and networks for vulnerabilities and be exposed to the hacker technique of "thinking outside the box". It will immerse the student into an interactive environment where they will be shown how to scan, test, hack and secure their own systems. The lab intensive environment gives each student in-depth knowledge and practical experience with the current essential security systems. Students will begin by understanding how perimeter defences work and then be lead into scanning and attacking their own networks, no real network is harmed. Students then learn how intruders escalate privileges and what steps can be taken to secure a system.

References
1. Matt Walker, CEH Certified Ethical Hacker Bundle, Second Edition (All-in-One) 3rd Edition, McGraw-Hill Education, 2017.
2. Sean-Philip Oriyano, CEH v9: Certified Ethical Hacker Version 9 Study Guide, Wiley, ISBN 978-1119252245, 2016

3. Peter Kim, The Hacker Playbook 2: Practical Guide To Penetration Testing, CreateSpace Independent Publishing Platform, 2015
4. Kevin Beaver and Stuart McClure, Hacking For Dummies (For Dummies (Computers)) 5th Edition, 2015
5. Engebretson, Patrick. The basics of hacking and penetration testing: ethical hacking and penetration testing made easy. Elsevier, 2013

BITU 3923 Workshop II (Bengkel II)

Learning Outcomes

Upon completing this course, students should be able to:

1. Analyze project scopes based on their majoring.
2. Construct the project by applying the concept of system design and development learnt in the previous subjects.
3. Organize the group project properly and able to present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem solving techniques to solve a particular problem based on their respective project scopes. The project scope is based on their majoring and they are required to develop their projects in groups of four or five.

References

1. Any related references according to their respective majoring.

Reference (BITC)

1. Hassell, J., 2013. Hardening Windows. Apress.
2. Krause, J., 2015. Windows Server 2012 R2 Administrator Cookbook. Packt Publishing Ltd.
3. Lammle, Todd. CCNA Routing and Switching Complete Deluxe Study Guide: Exam 100-105, Exam 200-105, Exam 200-125. John Wiley & Sons, 2016.
4. Minasi, M., Greene, K., Booth, C., Butler, R., McCabe, J., Panek, R., Rice, M. and Roth, S., 2013. Mastering Windows Server 2012 R2. John Wiley & Sons.
5. Petersen R., 2016. Ubuntu 16.04 LTS Server: Administration and Reference. Surfing Turtle Press.
6. Santos, O. and Stuppi, J., 2015. CCNA Security 210-260 Official Cert Guide. Cisco Press.
7. Tevault, D.A., 2018. Mastering Linux security and hardening: secure your Linux server and protect it from intruders, malware attacks, and other external threats. Packt Publishing Ltd.

DITM 2113 Multimedia System

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the core concept of multimedia systems.

2. Prepare multimedia applications by combining elements of text, graphic, audio, video and animation according to current needs.
3. Apply problem solving skills in planning and developing multimedia project.

Synopsis

This course is conducted to give an exposure to students with regards to core concepts of multimedia, technology and the importance of multimedia applications. The topics which the students will learn include introduction to media, implementation of multimedia graphics, graphics and 2D/3D animation, video, audio, multimedia authoring, multimedia integration and application development. Lab sessions will introduce students to a variety of media software for the integration of medias. Students will also be exposed to practical sessions of media preparation like image editing, animation and audio production, short video and to apply it effectively in a multimedia project done in groups. At the end of the semester, each group is required to present their projects in a formal session.

References

1. Vaughan, T., (2014), Multimedia: Making It Work: 9th Edition, McGraw-Hill Osborne Media.
2. Siti, N. M. and Norasiken, B. (2016), Cara Mudah Belajar Photoshop, Dewan Bahasa & Pustaka.
3. Norasiken, B. & Faaizah, S., (2012), Adobe Flash CS5 Professional Includes Exercise Files and Training Videos, University Technical Malaysia Melaka, ISBN: 978-967-0257-19-8.
4. Vic Costelo., (2016), Multimedia Foundations: Core Concept for Digital Design (Second Edition), Routledge, ISBN: 978-0415740036
5. Savage T.M. and Karla E. Vogel (2013), An Introduction to Digital Multimedia
6. MOOC, UTeM OpenLearning, https://www.openlearning.com/courses/multimedia-system/HomePage

DITM 2123 Web Programming

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the concept and the principle of Internet and WWW based on the latest technologies.
2. Use the important components in web applications which are Client Site Technology, Server Site Technology, Database Server and Web Server.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are:

- Client Site Technologies: HTML, XHTML, HTML5, CSS, XML, and JavaScript
- Server Site Technologies: PHP

- Database Server: MySQL.
- Web Servers: Apache

This course also brings together all of the elements of Web site design, graphics, animation, data storage in the construction of fully functional commercial Web site applications.

References

1. Robert W.Sebesta (2014), Programming The World Wide Web – 8th Edition, Pearson, ISBN: 0133775984
2. Paul Dietel, Harvey Dietel, and Abbey Dietel (2011). Internet & World Wide Web- How to Program – 5th Edition. Prentice Hall. ISBN: 0132151006
3. Robin Nixon (2014), Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5 (Learning Php, Mysql, Javascript, Css & Html5) 4th Edition, O'Reilly. ISBN: 1491918667
4. Jennifer Niederst Robbins(2012), Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics 4th Edition, O'Reilly. ISBN:1449319270
5. Jeremy Osborn (2011), HTML5 Digital Classroom, John Wiley & Sons, Inc. ISBN: 978111801618.

DITP 1123 Programming II

Learning outcome

Upon completion of this course, students will be able to:

1. Illustrate program codes by tracing and debugging in troubleshooting program applications
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Apply suitable programming structures and techniques in problem solving.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes problem solving using array, file, structured data and pointer are among the topics covered in the course.

References

1. Gaddis, T., (2012), "Starting Out with C++: From Control Structures Through Objects 7th Edition", Pearson Education International.
2. Malik, D.S (2018), "C++ Programming from Problem Analysis to Program Design 8th Edition", Cengage Learning.
3. Liang, Y. D.(2010), "Introduction to Programming with C++ 2nd Edition", Pearson Education International.
4. Friedman, Koffman (2011), "Problem Solving, Abstraction and Design using C++ 6th Edition", Pearson

DITP 1333 Database

Learning outcome

Upon completion of this course, students will be able to:

1. Illustrate Entity Relationship Diagram (ERD) based on database and data modelling concepts.

2. Construct simple and complex SQL queries.
3. Apply suitable data modelling concepts and SQL in problem solving.

Synopsis

This is an introductory course to database and file management system. It assists students to form an understanding to data modelling, file management and database system functionality in information system. The students will be introduced to the process of designing, developing and executing database applications. This course focuses on practical skills to create, control and execute SQL statement.

References

1. Coronel, C., and Morris, S. (2017) Database Systems: Design, Implementation and Management, 12th Edition, Cengage Learning.
2. Connolly, T. and Begg, C. (2015) Database Systems: A practical approach to design, implementation, and management, 6th Edition, Pearson Education.
3. Hoffer, J.A., Ramesh, V. and Topi, UH (2015). Modern Database Management, 12th Edition, Pearson Education.
4. Elmasri, R and Navathe, S.B. (2015) Fundamentals of Database Systems, 7th Edition, Addison-Wesley.

DITP 2113 Data Structure and Algorithm

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the usage of various data structures.
2. Recognize the associated algorithm's operations and complexity.
3. Apply appropriate data structures for solving computing problems.

Synopsis

This course is to develop students' knowledge of data structures and algorithms. The course begins with the introduction of concepts and techniques of structuring and operating on Abstract Data Types in problem solving. Followed with the discussion of the operations of maintaining common data structures. Students' are exposed on how to recognize the associated algorithms' operations and complexity. Common sorting, searching and graph algorithms will be discussed and the complexity and comparisons among these various techniques will be studied.

References

1. Malik, D. S., "Data Structures Using C++".2nd, edition, Cengage Learning, 2010.
2. Malik, D., "C++ programming: Program design including data structures". Nelson Education, 2012.
3. Michael Main & Walter Savich, "Data Structures and Other Objects Using C++",4thEdition, Addison Wesley, 2011.
4. Michael T. Goodrich, Tamassia, R & Mount, D. M., "Data Structures and Algorithms in

C++",2nd edition, Wiley, John & Sons, Inc., 2011.
5. Drozdek, A., "Data Structures and Algorithms in C++ 4th Edition", Cengage Learning, 2013.

DITP 2123 Event-Driven Programming

Learning outcome

Upon completion of this course, students will be able to:

1. Discuss the concepts of event driven programming and data access technology.
2. Construct programs with suitable GUI interface and event handling.
3. Apply the event-driven programming concepts and manipulate the databases to software development related to current problem requirements.

Synopsis

This course will introduce the concepts of Windows programming (applications with GUI) through C#. It will begin with an introduction to event-driven programming which includes types of programming, differences, and advantage of event-driven programming. Followed by creating forms with suitable Graphical User Interface, event handling that includes mouse and keyboard interactions as well as how to handle data storing with LINQ. Students are exposed in designing suitable problem solution which combines their basic programming concepts skills and their comprehension in C# and LINQ.

References

1. Skeet, J. (2018) C# in Depth, Manning Publications;
2. Gaddis, T. (2016) Starting out with Visual C# (4th Edition), Pearson
3. Deitel, P. And Deitel, H. (2016) Visual C# How to Program (6th Edition), Pearson
4. Deitel, P. And Deitel, H. (2016) C# 6 for Programmers (6th Edition), Pearson
5. Boehm, A. and Murach, J. (2016) Murach's C# 2015, Mike Murach & Associates.
6. Johansen, A. (2016) C#: The Ultimate Beginner's Guide!, CreateSpace Independent Publishing Platform.

DITP 2213 System Analysis and Design

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the information systems and system development methodology.
2. Use several tools and techniques to plan, analyse and design a new system.
3. Apply the waterfall methodology to develop a system.

Synopsis

In this course, students will be introduced to a variety of information systems. Then, this course explains the development methodology especially the Waterfall and RAD. After that, it discusses the planning phase with a focus on project management and project identification. The analysis phase will emphasize on the

determination of user requirements, DFD and ERD in structuring user's needs. The design phase then discusses form design and report, database, and interface design. Final phase of system development will cover the coding, testing and system maintenance..

References

1. Hoffer, Jeffrey A., George, Joey F., Valacich, Joseph S., (2017) Modern System Analysis & Design, 10th Edition, Prentice Hall.
2. Kendall, Kenneth E., Kendall, . J., (2011) System Analysis and Design, 8th Edition, Prentice Hall
3. Whitten, J., Bentley L., Dittman, K., (2007) Systems Analysis and Design for Global Enterprise, 7th Edition, McGraw-Hill
4. Dennis, A., Barbara, H. W., (2003) System Analysis & Design, 2nd Edition, John Wiley & Sons, Inc.

DITP 3113 Object-oriented Programming

Learning outcome

Upon completion of this course, students will be able to:

1. Define and explain object oriented programming principles and apply tools such as UML to model problem solutions and express the relationship among classes.
2. Demonstrate the understanding of object oriented principles such as abstraction, encapsulation, polymorphism and inheritance by program design.
3. Perform implementation of classes and methods using object oriented concept and making appropriate use of advanced features such as inheritance, exception handling and GUIs.

Synopsis

This subject will discuss about the concept of object oriented approach by using Java programming language. The student will be able to apply and construct the object oriented programming basic structures (such as polymorphism, inheritance, encapsulation and abstration), GUI, swing, event handling, interface components, exception handling, database, multimedia, networking and threads. The student should be able to develop a complete Java application with database.

References

1. Nagaraj Rao, Dr. John Yoon, Introduction to Java Programming, Indo American Books, 2016.
2. Deitel, H. M. & Deitel, P. J., Java How To Program, 10th Ed., Pearson Education International, 2014.
3. Liang, Y. Daniel, Introduction Java Programming, 10th Ed., Prentice Hall, 2014.
4. Savitch, Walter, Java: An Introduction to Problem Solving and Programming (7th Edition), Addison Wesley, 2014.
5. Cadenhead, Rogers, Java in 24 Hours, Sams Teach Yourself (Covering Java 8) (7th Edition), SAMS, 2014.

6. Baesens, Bart, and Backiel, Aimee, Beginning Java Programming: The Object-Oriented Approach, WROX, 2015.

DITS 1133 Computer Organization & Architecture

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the principles and techniques used in implementing a computer architecture and organization concept.
2. Differentiate the concept of functional computer components and the detail interactions in computer systems.
3. Assemble basic computer components and its architectural attributes, including instruction set and technique for addressing memory

Synopsis

This subject provides a detail of computer system's functional components, their characteristics, their performance and their interactions including system bus, different types of memory and Input/ Output and CPU, as well as practical implementations of the components. Besides, the architectural issues, such as instruction set design and data types, are covered. In addition to this, students are introduced to the increasingly important area of parallel organization.

References

1. William Stallings, (2015). Computer Organization & Architecture, 10th Edition. Prentice Hall.
2. Linda Null and Julia Lobur (2014). The Essential of Computer Organization and Architecture, 4nd Edition. Jones & Bartletts Pub.
3. Syarulnaziah, Zakiah, Marliza., Aslinda. Lab Module: Computer Organization and Architecture With MIPS Programming.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, (2011). Computer Organization, 6th Ed. McGraw Hill.
5. Irv Englander, (2014). The Architecture of Computer Hardware and System Software: An Information Technology Approach., 5rd Edition. John Wiley & Sons.
6. David A. Patterson and John L. Hennessy (2013). Computer Organization and Design: The Hardware / Software Interface, 5rd Edition. Morgan Kauffman.

DITS 2213 Operating System

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the major components and functionalities of operating system and the underlying structure.
2. Justify different types of operating system algorithms such as I/O scheduling, memory scheduling and uniprocessor scheduling.

3. Demonstrate basic system administration task in different operating system

Synopsis

This course is designed to give an exposure to students about the fundamental of operating system including process, management of memory, file and I/O and also about CPU scheduling. The introduction part consists of the evolution of operating system since it started until now. Student will also learn about the basic concepts, technology and theory used in operating system such as concurrency, kernel, deadlock and multithreading. In addition, students will be introduced to few types of operating systems at basic administrative level.

References

1. Stallings, W. (2015), Operating Systems: Internals and Design Principles 8th Ed., Prentice Hall International, Inc.
2. Anderson, T. and Dahlin, M. (2014), Operating Systems: Principles and Practice 2nd Edition, Recursive Books.
3. Tanenbaum, A.S. (2014). Modern Operating Systems. 4th Ed., Prentice Hall International, Inc.
4. McHoes, A. and Flynn, I. M (2013). Understanding Operating System, 6th Ed. Course Technology.
5. Silberschatz, A., Galvin, P.B. and Gagne, G. (2011). Operating System Concept 8th.Ed., John Wiley and Sons, Inc.
6. Jason W., Eckert, M. and John Schitka. Linux Guide to Certification.
7. Md. Shah, W., Anawar, S. and Zakaria, N.A. (2016). Ubuntu Guide for Basic Administration, Module 23, Teaching and Learning Series, Penerbit UTeM.

DITS 2313 Data Communication and Networking

Learning outcome

Upon completion of this course, students will be able to:

1. Understands the knowledge of data communication fundamental and networking concepts.
2. Differentiate types of media, network topology, network technologies and signal data transmissions.
3. Demonstrate skills to configuring and troubleshooting basic wired and wireless network

Synopsis

This course introduces the fundamental concepts and terminologies of data communication and networking, encompassing both technical and managerial aspects and to help students better understand the challenges and opportunities faced by modern business. Topics will include fundamentals of communications, process of data signals transmission, network media, IP addressing and managing the network.

References

1. Forouzan, Behrouz A., 2013. Data Communications and Networking, 5th Edition, McGraw-Hill.

2. Jerry FitzGerald, Alan Dennis, Alexandra Durcikova, 2014, Business Data Communications and Networking, 12th Edition, John Wiley & Sons
3. Zurina Saaya, Marliza Ramly, Nazrulazhar Bahaman, Muhammad Syahrul Azhar Sani, Norharyati Harum, Haniza Nahar and Othman Mohd, 2014. Lab Companion: Data Communication and Networking, 1st Edition.
4. Randall J. Boyle, Jeffrey A. Clements, 2014. Applied Networking Labs, 2nd Edition, Prentice Hall
5. Curt M. White, 2015. Data Communications and Computer Networks, 8th ed. Cengage Learning.

DITS 2413 Computer Security

Learning outcome

Upon completion of this course, students will be able to:

1. Provides foundation knowledge for further advanced study of security issues in computer systems and legal or ethical issues knowledge.
2. Manage to configure a workstation to monitor the system's performance.
3. Manage hard disks, data storage and disaster recovery and device drivers with device drivers signing and driver restoring.

Synopsis

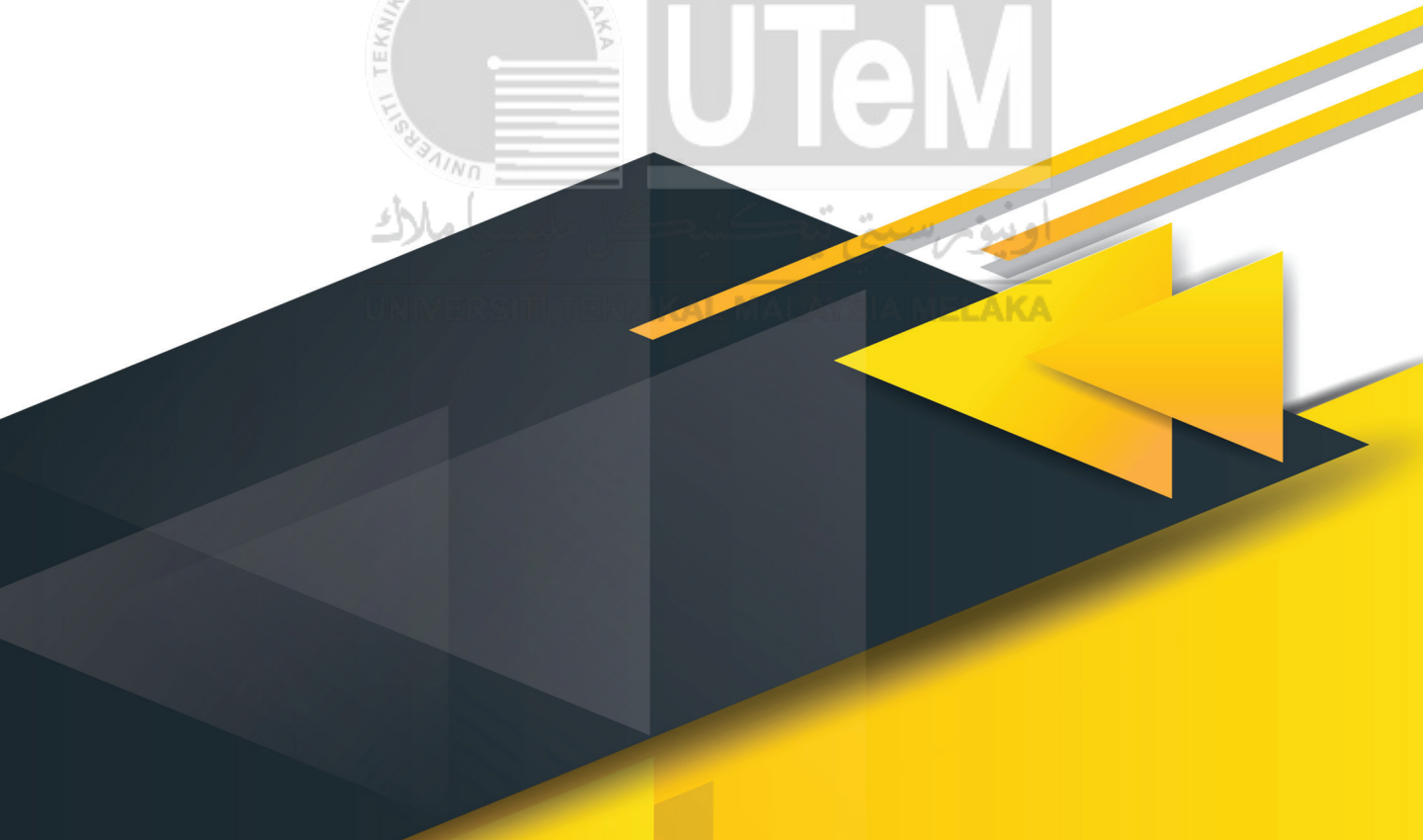
This subject provides students with the knowledge and skills that are needed to effectively maintain Workstation resources, monitor Workstation performance, and safeguard data on a computer running one of the operating systems in the Microsoft® Windows.

References

1. Windows Server ® Administration Fundamentals, Microsoft® Official Academic Course, John Wiley, 2011, ISBN 978-0-470-90182-3.
2. Security+ Guide to Network Security Fundamentals, 5th edition, Cengage Learning, Mark Ciampa, 2014, ISBN 9781305093911
3. Introduction to Computer Security, Pearson New International Edition, Michael Goodrich, and Roberto Tamassia, 2013, ISBN 9781292025407.
4. Network Security Essentials: Applications and Standards, 5th edition, Pearson Education Limited, W. Stallings, 2014, ISBN 9780273793809.
5. Certified Information Systems Security Professional Study Guide, 7th edition, Sybex, J.M. Stewart, M.Chapple and D.Gibson, 2015, ISBN 9781119042754.
6. Lab Manual for Security+ - Guide to Network Security Fundamentals, Mark Ciampa, Cengage Learning, USA, 2011, ISBN 978-1111640132.
7. Information Security: Principles and Practices, 2nd Edition, Mark Stamp, Wiley, New Jersey, 2011, ISBN 978-0470626399.

UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FREE/ ELECTIVE MODULES



UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FREE (ELECTIVE) MODULES COURSES

BITE 3523 Game Physics

Learning Outcomes

Upon completing this subject, students should be able to:

1. Identify and manipulate the concept of mathematics and physics in computer games programming.
2. Describes the application of computer games physics in problem solving computer game development.
3. Correlating techniques of 3D graphics in computer games physics to generate realistic design idea.

Synopsis

This course discusses techniques to create realistic 3D graphics environments using advanced computer game programming (C ++). The emphasis is on mathematics and physic concepts in the development of computer games. The topics discussed range from geometry, matrix, kinematics, rotation and offense and its application in the development of computer games.

References

1. John Patricks Flynt & Danny Kodicek (2012), Mathematic and Physics For Programmers. 2nd Edition. Course Technology. Cengage Learning.
2. David H Eberly and Ken Shoemake (2006), Game Physics, Morgan Kaufman.
3. J. Van Verth, L.M. Bishop, (2008), Essential Mathematics for Games and Interactive Applications 2nd Edition.

BITE 3623 Motion Graphics

Learning Outcomes

Upon completion of this course, the student should be able to:

1. Apply the knowledge and concept of visual effects and motion graphics development.
2. Solve a visual effects and motion graphics problem with selected approach using appropriate application.
3. Select a suitable approach from relevance information to solve a visual effects and motion graphics application.

Synopsis

This course is designed to expose the students to the basic visual effect and motion graphics. This includes understanding and designing aspects by using a visual effect and motion graphics application. The students will be exposed to the skill of using a visual effect and motion graphics software such as After Effect.

References

1. T. Meyer & C. Meyer, (2008), Creating Motion Graphics with After Effect, Focal Press.

2. C. Fahs & L. Weinman. (2007), Adobe After Effect 7 Hands-On Training, Peachpit Press.
3. M. Christiansen, (2009), Adobe After Effects CS4 Visual Effects and Compositing Studio Technique. Peachpit Press.
4. T. Meyer & C. Meyer, (2009), After Effects Apprentice, Focal Press.

BITE 3633 Gameplay

Learning Outcomes

Upon completion of this course the student will able to:

1. Show understanding and explaining the concepts of game theory in solving computer problems.
2. Reproduce computer game design skills to apply basic design according to industry specifications.
3. Describe issues related to computer games according to various sources of information.

Synopsis

This course is designed to provide fundamental level and basic requirement aspects of game design and gameplay. Topics include basic understanding of casual gaming, game mechanic, and gameplay type such as matching, sorting, seeking, managing, hitting, chaining, constructing, bouncing, tossing, rolling, stacking and socializing. Other topics include such as game reward and ranking in game. Current issues related to the latest trends and trend game players and platforms were also discussed at the end of the course.

References

1. G G. Trefry (2010), Casual Game Design: Designing Play for the Gamer in ALL of US, Morgan Kaufmann.
2. K. Oxland. (2004), Gameplay and Design, Addinson-Wesley.
3. K. Salen, E. Zimmermen. (2004), Rule of Play: Game Design Fundimental, MIT Press.ame Development with Unity", Cengage Learning PTR, ISBN 978-1435456587.

BITE 3723 Game Mechanics

Learning Outcomes

Upon completion of this course the student will able to:

1. State and explain the core concepts of the game mechanic.
2. Develop applications combining elements of the game such as text, graphics, audio, video and animation according to the current requirements.
3. Apply learned skills to solve the problem by selecting some game mechanic environment in which can be used in the game presentation.

Synopsis

This course focuses on the game's graphics, physics, sound, and input of artificial intelligent, networking and recognition levels. This course

provides a comprehensive foundation in the relevant field of computer games, serving as a premier and provides a context for special courses in final year. This course provide students with an introduction to the theory and practice of video game programming. Students will be involved in lab training sessions and also work together as a team for the awakening of the real game, designing and building their own game works by using the existing game engine (eg OPENGL C++ or Micosoft XNA or DirectX)

References

1. Ernest Adams and Joris Dormans (2012), "Game Mechanics: Advanced Game Design (Voices That Matter)". New Riders. ISBN-13: 978-0321820273.
2. Troy Dunniway and Jeannie Novak (2008)," Game Development Essentials: Gameplay Mechanics 1st Edition". Delmar Cengage Learning. ISBN-13: 978-1418052690
3. Jason Gregory (2010). "Game Engine Architecture". AK Peters. ISBN 978-1-56881-413-1.
4. Ian Millington (2008), "Game Physics Engine Development: How to Build a Robust Commercial-Grade Physics Engine for your Game", CRC Press, ISBN 978-0123819765.
5. Dave Shreiner, Graham Sellers, John M. Kessenich, & Bill M. Licea-Kane, "OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 4.3 (8th Edition)", Addison-Wesley Professional, ISBN 978-0321773036.
6. Michelle Menard, "Game Development with Unity", Cengage Learning PTR, ISBN 978-1435456587.

BITI 2113 Logic Programming

Learning Outcomes

By the end of the semester, student should be able to:

1. Identify elements and concepts of logic and procedural programming.
2. Reproduce the Prolog algorithm for solving logic programming problems.
3. Demonstrate basic programs using logic programming structures.

Synopsis

Students are exposed to the basic of logic programming which include the syntax and semantics of Prolog software. Elements such as predicate logic, rules, queries, recursive rule, controlling backtracking, unification and input output are the main concern while conducting this course. This course use Prolog software to develop the simple computer solution of some AI applications such as problem solving, and expert systems.

References

1. Ivan Bratko (2012), Prolog Programming For Artificial Intelligence, Addison Wesley (http://www.pearsoned.co.uk/bratko).

2. Max Bramer, Johan Bos and Kristina Striegnitz, (2013), Logic Programming with Prolog, Springer.
3. Randall Scott, (2010), A Guide to Artificial Intelligence with Visual Prolog, Outskirts Press.
4. Richard O'Keefee (2009). The Craft of Prolog. The MIT Press.
5. Saroj Kaushik (2007), Logic And Prolog Programming, New Age International.

BITI 2513 Introduction to Data Science

Learning outcome

Upon completion this course, students will be able to:

1. Analyse a data science problem.
2. Define the computing requirements appropriate to a data science problem.
3. Demonstrate computer program based on data science fundamental for problem solving.

Synopsis

This course delivers an essential exposure on the fundamental concepts and techniques of data science. It is divided into two parts. Part 1 is the introductory lecture and guided practical session for the first 5 weeks. The main topics covers the five important phases in understanding data science: introduction to data science, data wrangling, exploratory data analysis, data manipulation, applied machine learning, and data visualization and communication. Part 2 is a guided capstone project for another 9 weeks. The capstone project provides a platform to the students to applied their previously learn knowledge especially in artificial intelligent, statistics, analytics, project managements and data science in a real project setting. The last 3 weeks is the project presentation and technical report submission. There is no final written examination for this course.

References

1. EMC Education Services (Ed.). (2015). Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, 1st Edition, John Wiley.
2. Thomas, E., Wajid, K., Paul, B. (2016). Big Data Fundamentals: Concepts, Drivers & Techniques, 1st Edition, Prentice Hall.
3. Nolan, D., Lang, D. T. (2015). Data Science in R: A Case Studies Approach to Computational Reasoning and Problem Solving, CRC Press.
4. David Donoho. (2015). 50 Years of Data Science. http://courses.csail.mit.edu/18.337/2015/docs/50YearsDataScience.pdf, Accessed: 12 February 2016.
5. Robert Kabacoff. (2015). R in Action: Data Analysis and Graphics with R. 2nd Edition. Manning Publications.

BITI 3113 Intelligent Agent

Learning Outcomes

By the end of the semester, student should be able to:

1. Differentiate various concepts of intelligent agent.
2. Organise solution steps in solving intelligent agent problem.
3. Manipulate computer programme based on fundamental techniques of intelligent agents for problem solving.

Synopsis

This course will cover the underlying theory of agents, the common agent architectures, methods of cooperation and communication, and the potential applications for agents. Students will be exposed to the concept of intelligent agent and multiagent systems. Students will also construct their own agents for solving different types of problems. The potential applications of agents are numerous including web search assistants, travel advisors, electronic secretaries, bidders in on-line auctions, tutoring systems, and actors in games or simulations. Some of the tools to be used are Jade and Jason.

References

1. Gerhard Weiss (2013), Multiagent Systems, 2nd Edition, MIT Press
2. Rafael H. Bordini, Mehdi Dastani and Amal El Fallah Seghrouchni (2013), Multi-Agent Programming: Languages, Platforms and Applications (Multiagent Systems, Artificial Societies, and Simulated Organizations).
3. Uri Wilensky and William Rand (2015), An Introduction to Agent-Based Modeling: Modeling Natural, Social, and Engineered Complex Systems with NetLogo, MIT Press.
4. Yulia Kahl and Michael Gelfond (2014), Knowledge Representation, Reasoning, and the Design of Intelligent Agents: The Answer Set Programming Approach 1st Edition, Kindle Edition, Cambridge University Press
5. S.M. Farrukh Akhtar (2017) Practical Reinforcement Learning: Develop self-evolving, intelligent agents with OpenAI Gym, Python and Java, Packt Publishing.

BITI 3213 Decision Support Systems

Learning Outcomes

By the end of the semester, student should be able to:

1. Differentiate various concept of decision support system.
2. Organise solution steps in solving decision support system problem.
3. Manipulate computer programme based on fundamental techniques of decision support system for building intelligent system.

Synopsis

The course aims to provide students with an overview of various decision support systems (DSS) and artificial intelligence systems and the ways in which they support effective decision

making in organisations. Topics covered are introduction to DSS, decision makers, types of DSS, development of DSS, modelling and optimization, group DSS, executive ESS, and intelligent DSS.

References

1. Douglas Schwartz, 2015, Decision Support Systems, Clanrye International, ISBN: 1632401363.
2. Michael S. Scott Morton, 2015, Decision Support Systems: Emerging Tools for Planning, Leopold Classic Library, ASIN: B00WVTC8Z8.
3. S. Christian Albright, 2015, VBA for Modelers: Developing Decision Support Systems with Microsoft Office Excel, 5 edition, South-Western College Pub, ISBN: 1285869613.
4. Ramesh Sharda, Efraim Turban, Dursun Delen, Janine Aronson, Ting-Peng Liang, 2014, Business Intelligence and Analytics: Systems for Decision, Pearson. ISBN: 0133050904.
5. Eta S. Berner, 2016, Clinical Decision Support Systems: Theory and Practice (Health Informatics) 3rd Ed., Springer, ISBN: 3319319116

BITI 3313 Image Processing & Pattern Recognition

Learning Outcomes

By the end of the semester, student should be able to:

1. Differentiate various concepts of image processing and pattern recognition.
2. Organise solution steps in solving image processing and pattern recognition problems.
3. Manipulate computer programme based on fundamental techniques of image processing and pattern recognition for building intelligent systems.

Synopsis

This course introduces essential image processing techniques, such as image enhancement, image restoration, colour image processing, image morphology, segmentation, feature extraction, and motion from image sequences. Students will also be exposed with MATLAB programming in order to implement the image processing techniques. The image processing implementation makes use images from different sources including internet, satellite, UAV and digital camera.

References

1. Gonzalez, R.C. & Woods, R.E. (2017) Digital Image Processing, 4th Edition, Pearson
2. Scott, E.U. (2017) Digital Image Processing And Analysis: Applications With Matlab® And Cviptools, Third Edition 3rd Edition, Crc Press.

3. Mcandrew, A. (2015) A Computational Introduction To Digital Image Processing, 2nd Edition, Chapman And Hall/Crc.

BITI 3513 Artificial Intelligence in Manufacturing

Learning Outcomes

By the end of the semester, student should be able to:

1. Analyze the situation of manufacturing operation.
2. Organize solution steps in solving intelligent manufacturing problem.
3. Manipulate computer program based on fundamental techniques of artificial intelligence in manufacturing for problem solving.

Synopsis

Students are exposed to manufacturing operations in several areas/domain such as system design, planning, scheduling, monitoring and control. The theory and principles accompanied by the real world problem in each area will be studied. It will then be extended with the applications of AI techniques such as Knowledge-Based System, Neural Network and other that the students already learn from previous Artificial Intelligence subject. At the end of the course, students will involve in the development of intelligence manufacturing module system by using appropriate AI techniques..

References

1. Darrel Ryan (2017), Expert Systems: Design, Applications and Technology (Computer Science, Technology and Applications)
2. Negnevitsky, M., (2011), "Artificial Intelligence: A Guide to Intelligent System", 3rd Edition, Addison Wesley.
3. Zongwei, L. (2014), "Smart Manufacturing Innovation and Transformation: Interconnection and Intelligence (Advances in Logistics, Operations, and Management Science)", 1st Edition, IGI Global.
4. Kalpakjian, S. (2013), "Manufacturing Engineering & Technology", 7th Edition, Prentice Hall.

BITM 2323 Digital Imaging for Multimedia

Learning Outcomes

By the end of the semester, student should be able to:

1. Apply the knowledge and principles of digital imaging
2. Demonstrate the skills in using photography software and hardware.
3. Demonstrate life long learning by applying photography understanding in other related courses.

Synopsis

This beginner digital imaging course is meant to help students to master the creation of one of the multimedia elements; image, using digital camera. They will learn the basic functions of

DSLR camera, capturing high-quality images suitable for industry standard multimedia production. Lecturer will show them how to see the world like a photographer, whether they are just starting out or have been taking photos for years. This course focusing on practical training, rather than just theory.

Throughout the course, they will complete a series of photo projects that will help them practice the skills of photography. The lecurer will work with them, reviewing their photos and helping them to improve as they complete the program. A critics session among peers and audience will be held to help students to get better exposure in the process of learning. At the end of the course, they will have the skills and know-how to take professional-quality photographs.

References

1. Chris Gatcum (2016), The Beginner's Photography Guide, 2nd Edition, Dorling Kindersley Limited
2. Bryan Peterson, (2016) Understanding Exposure, Fourth Edition: How to Shoot Great Photographs with Any Camera, Amphoto Books
3. Tom Ang (2016) Digital Photography Complete Photographer, Dorling Kindersley Limited
4. Syl Arena, (2012) Lighting for Digital Photography: From Snapshots to Great Shots (Using Flash and Natural Light for Portrait, Still Life, Action, and Product Photography), Peachpit Press
5. Brenda Tharp (2012), Extraordinary Everyday Photography: Awaken Your Vision to Create Stunning Images Wherever You Are, Amphoto Books..

BITP 3233 Strategic Information System Planning

Learning Outcomes

Upon completing this subject, the students should be able to:

1. Explain the business organization components, environment, challenges and objectives of information systems (IS) investment.
2. Use the Information System and strategic planning tools in planning process.
3. Propose information systems strategically appropriate for the business organization.

Synopsis

This subject will introduce the importance of information systems (IS) to enhance organisation competitiveness. Therefore the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitive than other organisations. Then students will work to integrate organisation's business objectives with IS that support its business direction and creating competitive advantage to the organisation.

References
1. Patricia Wallace, 2015. Introduction to Information Systems, Second Edition, Pearson.
2. Laudon, Kenneth C. & Laudon, Jane P.2011. Essentials of Business Information Systems, 9th Edition, Pearson.
3. Laudon, Kenneth C. & Laudon, Jane P.2012. Management Information Systems: Managing The Digital Firm, 12th Edition, Pearson.
4. Robson, Wendy. 1997. Strategic Management & Information Systems, 2nd Edition, Prentice Hall.
5. Ward, John & Peppard, Joe.2002. Strategic Planning for Information Systems, 3rd Edition, John Wiley & Sons.
6. McNurlin, Barbara C. & Sprague, J.R 2006. Information Systems and Management in Practice, 7th Edition, Pearson Prentice Hall.
7. Saunders, S. & Pearlson, E. 2004. Managing and Using Information System – A Strategic Approach, 2nd Edition, John Wiley & Sons.

BITP 3253 Software Requirements and Design

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the principle of verification and validation focusing on testing the software as well as quality assurance.
2. Develop test requirements, test cases and test script for real software projects.
3. Classify the test design techniques and tools that could satisfy the quality of software products.

Synopsis

This course gives exposure to the students about the software testing concept and focus on process to develop and implement testing plan, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activity such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation..

References
1. Black, R., Veenendaall, E. V., Graham, D. (2012) Foundations of Software Testing ISTQB Certification. 3rd ed., Cengage Learning.
2. ISTQB (2011) ISTQB Certified Tester Foundation Level Syllabus. International Software Testing Qualification Board.
3. Galin, D. (2004). Software Quality Assurance, From Theory to Implementation. Pearson Addison-Wesley.
4. John Watkins. (2001). Testing IT – An Off-the-Shelf Software Testing Process. Cambridge University Press.
5. Glenford J. Myers. (2004). The Art of Software Testing. Second Edition. John Wiley & Sons.

BITP 3423 Special Topic in Software Engineering

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the importance of IT Architectureand it's elements.
2. Explain the IT Architecture and how it can be transformed into value centric initiative.
3. Demonstrate the ability of developing an IT Architecture initiative by using Business Model Canvas.

Synopsis

This course provides the students with the foundation in rationalizing the critical skill sets of the core architectural principles and alignment to the IT Architecture Body of Knowledge. Ultimately, the focus of IT Architecture for Special Topic in Software Engineering this semester underlies the need for a holistic IT Architecture approach, skills requirements and strategically equips individual roles in the enterprise to realize the business values of a sound technology adoption.

References

1. Lankhorst, M., Enterprise Architecture at Work: Modelling, Communication and Analysis, Springer, 2013.
2. Hausman, K. K., Cook, S.L., IT Architecture for Dummies, Wiley Publishing, 2010.
3. Tinsley, T., Enterprise Architects: Masters of the Unseen City, BookSurge Publishing, 2009.
4. Perks, C., Beveridge, T., Guide to Enterprise IT Architecture, Springer, 2003.
5. Brooks, F.D., The Mythical Man-Month: Essays on Software Engineering, U.S: Addison-Wesley, 1995.

BITP 3443 Enterprise Application Development

Learning Outcomes

Upon completion this course, students will be able to:

1. Point out the knowledgebase and skill sets required for enterprise application development.
2. Define a prescriptive technical framework for raising a typical enterprise application.
3. Construct the enterprise application based on the construction map that bridges the gap between designers and developers.
4. Report the project deliverables for each development stage until roll out of the project.

Synopsis

This subject exposes the students to the various process, life cycle stages, patterns, frameworks, tools and technologies required to build a successful enterprise pplication catering to the business needs of today's enterprises. The students will experience the overall journey of building enterprise application from inception to rollout phase. Enterprise application case study will helps the student to point out the required skills sets for developing enterprise application.

Enterprise analysis and business modeling is conducted in inception phase using tools such as UML (use case) and prototype. Framework and architecture of typical enterprise application will be defined in the next stage where several tools, framework, technologies and best practices are applied. A construction map will be layout to bridge the gap between designer and developer that deals with layers and layers of component. The student will construct the application using the construction map. Several of testing techniques and tools will be introduced to test the application. Finally, the project will be roll out and wrap. A report is produced for each deliverables of the project.

References

1. Heffelfinger D. R., Java EE 8 Application Development, Packt Publishing, 2017.
2. Senthilvel, G., Khan, O. M. A., Qureshi, H. A., Enterprise Application Architecture with .NET Core, Packt Publishing, 2017.
3. Daschner, S. Architecting Modern Java EE Applications: Designing lightweight, business-oriented enterprise applications in the age of cloud, containers, and Java EE 8, Packt Publishing, 2017.
4. Pradhan, A., Nanjappa, S.B., Nallasamy S.K, Esakimuthu, E, Raising Enterprise Application, Wiley India Pvt Ltd, 2010.

BITP 3473 Formal Methods

Learning Outcomes

Upon completing this subject, the students should be able to:

1. Demonstrate the understanding of the usage of formal method and its function in general.
2. Apply formal method for specification, analysis and design.
3. Assess analysis techniques for appropriate usage.

Synopsis

This course covers the fundamentals of formal methods and can be used as a breadth course for Software Engineering. We will examine techniques for modeling and formally analyzing computing systems and will consider applications in software and hardware. Students will learn the fundamentals of classical logic, induction and recursion, program semantics, rewriting, reactive systems, temporal logic, model checking, and abstraction. We will examine how these methods can be used to build reliable software and hardware.

References

1. Formal Methods: Industrial Used from Model to the Code. Boulanger, Jean-Louis (Ed.),Wiley, 2012. (ISBN: 978-1-84821-362-3).
2. Formal Methods and Models for System Design. A system level perspective. Gupta, R.; Le Guernic, P.; Shukla, S.K.; Talpin, J.-P. (Eds.),Springer-Verlag, 2004.

3. Mathematical Logic, Second Edition. H.-D. Ebbinghaus and J. Flum and W. Thomas. Springer-Verlag, 1994.
4. Computer-Aided Reasoning: An Approach. Matt Kaufmann, Panagiotis Manolios, and J Strother Moore. Kluwer Academic Publishers, June, 2000. (ISBN: 0-7923-7744-3).
5. Term Rewriting and All That. Franz Baader and Tobias Nipkow. Cambridge University Press, 1998. (ISBN: 0-521-77920-0).
6. Model Checking. Edmund M. Clarke, Jr., Orna Grumberg, and Doron A. Peled. MIT Press, 1999. (ISBN: 0-262-03270-8).

BITP 3523 Advanced Database Administration

Learning Outcomes

Upon completion this course, students will be able to:

1. Build form modules that consist of various component for database interaction with GUI control.
2. Demonstrate the form and report modules that are created using the web server and the three-tier environment.
3. Create triggers that consist of various event such as function addition, transaction processing control, and user interaction control.

Synopsis

This course gives opportunity for the students to develop, test and deploy interactive Internet applications using Oracle Forms and Reports Developer software. Working in a graphical user interface (GUI) environment, student will learn how to create and customize forms with user input items such as check boxes, list items, and radio groups. Student will also learn how to modify data access by creating event-related triggers, and display Forms elements and data in multiple canvases and windows. This course is designed to prepare the students for the corresponding Oracle Certified Professional (OCP) certification.

References

1. Oracle Forms and Reports 12.2.1 Documentation. Accessed Online (2018): https://docs.oracle.com/middleware/1221/formsandreports/docs.htm
2. Palinski, J. (2003) Oracle 9i Developer Developing Web Application with Forms Builder, Thomson Learning.
3. Koletzke P. and Mills D. (2006) Oracle JDeveloper 10g for Forms & PL/SQL Developers: A Guide to Web Development with Oracle ADF (Osborne ORACLE Press Series)
4. Sunderraman, Rajshekar,Riccardi, Greg (2004), Database Management: With Website Development Applications AND Oracle 9i Programming – A Primer. Pearson Higher Education.
5. Lulushi, A.,(2002) Oracle Forms Developers Handbook. Pearson Professional.

BITS 2513 Internet Technology

Learning outcome

Upon completion of this course, students will be able to:

1. Discover the concepts of computer networks, core components of the Internet infrastructure, protocols and services.
2. Select the system requirements aligned with the current technology advancement.
3. Display the ability to configure and implement the Internet basics, clients and networking.

Synopsis

Internet has become a major tool in doing business today. The evolutions of web-based knowledge also contribute to this phenomenon. This course is purposely designed to provide an introduction to Internet technologies. This course covers a wide range of material about the Internet and the major areas of study include: basic concepts and client, networking, programming on the Internet, security and Internet applications.

References

1. Jean Andrews, Wally Beck (2004). i-Net Guide to the Internet. 3rd Edition, Cengage Learning.
2. Douglas E. Comer (2014). Computer Networks and Internets: Global Edition. Pearson.
3. Brian Williams, Stacey Swayer (2010). Using Information Technology 9e Complete Edition.Career Education
4. Steinberg Geoffrey (2010). Information Technology: Skills, Concepts and Problem Solving. 2nd Edition. Kendall Hunt Publishing.
5. Wahidah, Robiah, Siti Rahayu, Nurul Azma and Norharyati (2013). Internet Technology Lab Module. Pernerbit Universiti, UTeM..

BITS 3343 Fiber Optic

Learning Outcomes

Upon completion this course, students will be able to:

1. Illustrate the concept of fiber optic basic theories
2. Assemble the suitable cable and network devices for fiber optic.
3. Demonstrate a network design using fiber optic cable and appropriate tools.

Synopsis

This subject covers basic and advanced applications that will relate to optical fiber in common usage in the network. Specific mechanism will be discussed from operating principles of optical communication device to fiber optic communication technology.

References

1. Norharyati H., Wahidah M. S and Marliza R., Fiber Optic Lab Companion (2018).

2. Gerd E. Keiser (2010), Fiber Optic Communications, 4st Edition, Mc-Graw Hill
3. Jeff Hecht, (2005) , Understanding Fiber Optic, 5th Edition, Prentice Hall.
4. John M. Senor (2009),Optical Fiber Communications, Principles and Practice, 3rd Edition, Prentice Hall
5. GovindP.Agrawal (2010) Fiber Optic Communication Systems, 4th Edition, John Wiley &Sons.
6. Rajiv Ramaswarmi, Kumar N. Sivarajan, Galen Hajime Sasaki, (2009),Opticals Network: A Practical Perspective, 3rd Edition
7. Jim Hayes (2010), Fiber Optics Technician's manual, 4rd Edition, Delmar Cengage Learning.
8. S. Kumar, M. Jamal Deen (2012), "Fiber Optic Communications: Fundamental and Applications

BITS 3443 Digital Forensics

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the concept of digital forensic and investigation.
2. Distinguish multi-operating system nuance with respect to digital forensics.
3. Manipulate the process of forensic investigation using particular tools by referring the digital forensic investigation methodology.

Synopsis

This course is an introduction to digital forensics reflects the need for conducting professional computing investigations. Students will explore general computer investigations, security issues with operating systems, setup and maintenance of a digital forensics lab, use of computer forensics tools, digital evidence controls, data acquisition and analysis, e-mail investigations, and the preparation of investigation report.

References

1. John Sammons, 2012, the Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, Syngress, ISBN 978-1597496612
2. Cory Altheide, Harlan Carvey, 2011, Digital Forensics with Open Source Tools, Syngress, ISBN 978-1597495868
3. Casey E, 2011. Digital Evidence and Computer Crime, 3rd Edition, Academic Press, ISBN–13: 978-0123742681
4. Nelson B., Phillips A., Enfinger F. and Steuart C., 2015. Guide to Computer Forensics and Investigations, 5th Edition, Thomson Course Technology, ISBN 978-1285060033
5. Marjie T. Britz, 2013. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, 3rd Edition, Prentice Hall, ISBN–13: 978-0132677714.

BITS 3453 Malware Analysis and Digital Investigation

Learning Outcomes

Upon completion of this course, students will be able to:

1. Identify the malware taxonomy and malware intrusion.
2. Analyze the behavior of malware.
3. Manipulate the digital forensics investigation framework in malware intrusion.

Synopsis

This course presents the malware issues that cover malware taxonomy, malware intrusion and malware behavior. The course also offers the malware intrusion investigation based on digital forensic investigation framework. The goal is to provide an understanding of digital forensic investigation process implemented in malware intrusion crime. This course will use lectures, homework assignments, case studies, and group projects to promote learning. Students are expected to be active participants, asking questions, challenging instructors, and generally taking responsibility for their own learning.

References

1. Monnappa K A,"Learning Malware Analysis: Explore the concepts, tools, and techniques to analyze and investigate Windows malware" ,Packt Publishing Ltd, 9781788397520. 2018
2. Christopher C. Elisan, "Advanced Malware Analysis", McGraw Hill Professional, ISBN 9780071819756, 2015
3. Michael Hale Ligh, Andrew Case, Jamie Levy, AAron Walters, “The Art of Memory Forensics: Detecting Malware and Threats in Windows, Linux, and Mac Memory”, Wiley 1st Edition,2014.
4. M. Sikorski and Andrew H., “Practical Malware Analysis: The Hands-On Guide to Dissecting Malicious Software”, No Starch Press; 1 edition, ISBN-13: 978-1593272906, 2012
5. Casey E, “Handbook of Computer Crime Investigation: Forensic Tools and Technology”, 3th Edition, Elsevier Academic Press, ISBN–13: 978-0-12-163103-1. 2011.
6. Skoudis E, “Malware: Fighting Malicious Code”, Prentice Hall, ISBN–13: 978-0-13-101405-3. 2008.

BITS 3473 Digital Watermarking and Steganography

Learning Outcomes

Upon completion of this course, students will be able to:

1. Determine and explain basic techniques of digital watermarking for embedding an ownership code and steganography (hiding information) to do digital image and audio processing.

2. Manipulate the types of digital watermarking techniques based on characteristics as well as applications using media editing platform.
3. Differentiate the mechanism of current and future intellectual property management and protection of multimedia.

Synopsis

This subject provide students with the basic concept of digital watermarking, steganography including knowledge on fingerprint and biometric. It covers the introduction to the theoretical background on above-mentioned area and development as well as implementation of fundamental techniques in digital watermarking and steganography. In the lab session, students will be introduced to selected editing software for embedding information in the media. Students will be trained for practical embedding on text, image, audio and video. Students will be exposed to teamwork, leadership, problem-solving and communication skills while performing their various tasks and project.

References

1. Shih, F. Y. (2017). Digital Watermarking and Steganography: Fundamentals and Techniques. CRC Press. Retrieved from https://books.google.com.my/books?id=AApEDwAAQBAJ
2. Su, Q., & Press, T. U. (2017). Color Image Watermarking: Algorithms and Technologies. De Gruyter. Retrieved from https://books.google.com.my/books?id=TReyDQAAQBAJ
3. Stim, R. (2016). Patent, Copyright and Trademark: An Intellectual Property Desk Reference. NOLO.
4. Wang, C. and Gerdes, R.M. and Guan, Y. and Kasera, S.K. (2016). Digital Fingerprinting. Springer Science+Business Media New York.
5. Fridrich, J. (2015). Steganography in digital media: Cambridge University Press.
6. Ngo, D.C.L. and Teoh, A.B.J. and Hu, J. (2015). Biometric Security. Cambridge Scholars Publisher.
7. Lin, Y., & Abdulla, W. H. (2014). Audio Watermark: A Comprehensive Foundation Using MATLAB. Springer International Publishing

BLHL 1012 Bahasa Melayu Komunikasi (International)

Learning Outcomes

By the end of the course, students should be able to:

1. Respond to information from oral texts and face-to-face interactional activities (HPP5)
2. Relate the basic sounds of Bahasa Melayu in terms of grammar, phonology and oral communication skills related to oneself, family, university and daily activities. (HPP5)
3. Construct sentences and communicate well in Bahasa Melayu (HPP5)

Synopsis

This subject introduces the grammar of the language. Students will be exposed to the aspects

of grammar, clause, terminology, sentence construction, collective nouns and literature. It is hoped that students will be able to use correct Malay grammar.

Reference

1. Zarina Othman, Roosfa Hashim & Rusdi Abdullah. (2012). Modul Komunikasi Bahasa Melayu Antarabangsa. Bangi, Selangor: Penerbit Universiti Kebangsaan Malaysia.
2. Daftar Ejaan Rumi Bahasa Malaysia. (2006). Kuala Lumpur: Dewan Bahasa dan Pustaka.
3. Daftar Istilah Majlis Bahasa Indonesia-Malaysia. (2005). Kuala Lumpur: Dewan Bahasa dan Pustaka.
4. Yong Chyn Chye, Rohaidah Mashudi dan Maarof Abd Rahman. (2012). Bahasa Kebangsaan untuk pelajar luar negara (Malay Language for International Students). Kuala Lumpur: Pearson Malaysia Sdn. Bhd.

BLHH 1032 Industrial Psychology and Organization

Hasil Pembelajaran

Pada akhir kursus ini, pelajar akan dapat:

1. Menghubung kait proses persekitaran dan teori di tempat kerja dalam dunia organisasi dan perindustrian.
2. Mempamerkan ciri-ciri kepimpinan dalam aktiviti tugasan kumpulan.
3. Memberi tindak balas terhadap peranan dan tanggungjawab sebagai seorang bakal pekerja di dalam organisasi.

Sinopsis

Kursus ini memberi pendedahan kepada aspek psikologi dalam dunia pekerjaan dalam sektor industri serta permasalahan yang berhubung dengan tingkah laku dalam organisasi. Terdapat beberapa topik yang dibincangkan termasuk isu-isu semasa dalam psikologi di tempat kerja, perancangan personel, tekanan di tempat kerja dan psikologi kejuruteraan.

Rujukan

1. Azlina Abu Bakar (2013). Psikologi Industri dan Pengurusan Sumber Manusia. Terengganu: Penerbit Universiti Malaysia Terengganu.
2. Schultz & Schultz, Duane (2010). Psychology and Work Today. New York: Prentice Hall.
3. Yukl, G. (2010). Leadership in Organizations.

BLHC 4012 Organizational Communication

Hasil Pembelajaran

Pada akhir kursus ini, pelajar akan dapat:

1. Membincangkan prinsip-prinsip asas kemahiran komunikasi organisasi untuk tujuan interaksi dalam organisasi.
2. Memberikan maklum balas mengenai isu-isu yang berkaitan dengan pembangunan kemahiran komunikasi organisasi.
3. Menyelesaikan masalah komunikasi organisasi berdasarkan konteks persekitaran organisasi sebenar

Sinopsis

Kursus ini akan mendedahkan pelajar kepada idea-idea asas organisasi dalam komunikasi umum dan organisasi. Selain itu, pelajar juga akan dapat mengetahui teori-teori yang berkaitan dengan komunikasi organisasi dan memahami elemen-elemen penting dalam organisasi seperti kepimpinan, komunikasi rasmi dan komunikasi tidak rasmi. Selain itu, pelajar akan menyedari halangan, penyelesaian masalah dan membuat keputusan kemahiran dalam komunikasi organisasi. Akhirnya, pelajar akan mempunyai pemahaman iklim organisasi, hubungan teknologi dan organisasi dan komunikasi korporat dalam organisasi.

Rujukan

1. Miller, K. (2012). Organizational Communication. (4rd. ed). Belmont: Thomson Wadsworth Publishing Company.
2. Dennis K. Mumby (2018). Organizational Communication: A Critical Approach. (2nd ed). SAGE Publications, Incorporated.

BLHC 4022 Negotiation Skills

Hasil Pembelajaran

Pada akhir kursus ini, pelajar akan dapat:

1. Mengenalpasti konsep-konsep asas dalam proses perundingan menggunakan amalan komunikasi berkesan.
2. Membuat kesimpulan terhadap teknik-teknik perundingan yang terbaik berdasarkan pendekatan teori yang pelbagai.
3. Menyelesaikan isu-isu perundingan berdasarkan teknik-teknik kemahiran perundingan yang berkesan berasaskan pelbagai situasi.

Sinopsis

Kursus ini akan membincangkan konsep asas perundingan, teknik berfikiran secara kritis dan kreatif, teknik komunikasi berkesan dan teknik mendengar dan menyoal secara berkesan. Pelajar turut didedahkan dengan pengetahuan dan kemahiran yang diperlukan untuk menjalankan dan meguruskan proses perundingan pelbagai secara berkesan. Selian itu, kemahiran berfikir secara kritis dan kreatif, serta kemahiran komunikasi berkesan yang diperlukan bagi menjalankan proses perundingan juga akan dibincangkan.

Rujukan

1. Lemiwki, R., Barry, B. & Saunders, D. (2016). Essentials of negotiation. USA: McGraw Hill Education.
2. Fisher, R & Ury. (2011). Getting to YES: Negotiating agreement without giving in. Third Edition. Penguin Books.
3. Covey, S. (2013) The 3rd Alternative: Solving Life's Most Difficult Problems. New York: Free Press.

BLHC 4032 Critical and Creative Thinking

Hasil Pembelajaran

Pada akhir kursus ini, pelajar akan dapat:

1. Mengenalpasti prinsip asas kemahiran pemikiran kritis dan kreatif dalam menyelesaikan masalah harian.
2. Memberi maklum balas terhadap isu berkaitan perkembangan kemahiran pemikiran kritis dan kreatif.
3. Menyelesaikan masalah kajian kes terhadap isu semasa yang berkaitan bidang pengajian mereka.
4. Menganalisis kehendak pasaran akan datang dan mencadangkan penyelesaian berasaskan produk

Sinopsis

Mata pelajaran ini direka untuk memberi pendedahan kepada pelajar tentang prinsip-prinsip asas dalam pemikiran kritis dan kreatif. Pelajar akan mengaplikasikan kaedah pemikiran kritis dan kreatif dalam penyelesaian masalah melalui pendekatan pembelajaran berpusatkan pelajar termasuk pendekatan pembelajaran berasaskan permasalahan (PBL). Pelajar akan dipandu di dalam projek akhir di mana penganalisaan kehendak pasaran akan datang akan dilaksanakan dan cadangan penyelesaian adalah berasaskan produk keperluan pasaran dari pelbagai perspektif dan pemikiran di luar kotak (*out of the box*).

Rujukan

1. Aziz Yahya, Aida Nasirah Abdullah, Hazmilah Hasan, Raja Roslan Raja Abd Rahman., 2011, Critical and Creative Thinking Module 2. Melaka. Penerbit UTeM.
2. Buzan, T., 2009, Mind maps for business : revolutionise your business thinking and practice, New York : Pearson BBC Active.
3. Claxton, G., Lucas, B., 2007, The Creative Thinking Plan, London: BBC Books.
4. Fisher, A., 2011, Critical Thinking: An Introduction. London: Cambridge University Press.

BENT 4733 Digital Signal Processing

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the basic theory in digital signal processing.
2. Apply the concepts of digital signal processing such as discrete-time signals & systems and spectrum representations.
3. Analyze the impulse response, signal flow graph using difference equations, stability determination using z-transform.

Synopsis

This course consists of topics: Introduction to DSP, discretetime signals and systems, spectrum of representation of discrete-time signals, discrete Fourier transform, difference equations and discrete-time systems, z-transform and its

applications, analysis and design of digital filters and random signal processing.

References

1. SanjitK.Mitra, Digital Signal Processing: A Computer Based Approach, 4th Edition, Mc Graw Hill, 2011
2. Oppenheim, Schafer, Discrete-time Signal Processing, 3rd Edition, Prentice-Hall, 2010.
3. Proakis, Manolikas, Digital Signal Processing: Principles, Algorithms, and Applications, 4th Edition, Prentice-Hall, 2007.
4. E. C. Ifeachor, B. W. Jervis, Digital Signal Processing: A Practical Approach, 2nd Edition, Prentice Hall, 2002.
5. S. Poornachandra, B. Sasikala, Digital Signal Processing, 3th Edition, McGraw-Hill, 2010

BTMT 3323 Contemporary Business Management

Learning outcome

Upon completion of this course, students will be able to:

1. Demonstrate an understanding of technology ventures approaches in advancing the digitization, disruptive and converging technologies for societal and economic progress in the 4th Industrial Revolution.
2. Critically appraise the impact of digitization, disruptive and converging technologies on business strategies and competitive advantage in the Industry 4.0.
3. Identify strategic challenges, formulate strategic solutions, and propose new and disruptive business models to take advantage of technology-enabled business opportunities of Industry 4.0.

Synopsis

This subject is designed to develop business talent for the future world of production. Students will be guided through the process of creating, analyzing, planning and implementing disruptive and innovative business models with its operational strategies pertaining to the Industry 4.0.

Students will be exposed to the theoretical and hands-on exercises of Industry 4.0 business management to enable them to apprehend the concept of the 4th Industrial Revolution.

Topics discuss will include the Emergence of Business Model 4.0, Coopetition and Co-innovation, 4.0 Products and Services, Industrial Internet of Things (IIoT), Cyber-Physical System, Digital Business Transformation, Digital Enterprise, Smart Factory, Intelligent Robots and, Intelligent Production and Manufacturing. In the hands-on exercises, students will use visualization software as well as stationary modules or simulators.

Students are expected to acquire the skills and knowledge to utilize the Industry 4.0 model in the current and future global marketplace. These would enhance their professional career as

technopreneur, executive or consultant in the field of Industry 4.0 transformation. By end of this course, students should able to define, discuss, understand and apply the business strategies and tactics learnt in the context of Industry 4.0..

References

1. Klaus Schwab (2017), The Fourth Industrial Revolution. Crown Business
2. Patrick Van Der Pijl, Justin Lokitz & Lisa Kay Solomon (2016), Design a Better Business: New Tools, Skills, and Mindset for Strategy and Innovation. Wiley
3. Alec Ross (2016), The Industries of the Future. Simon & Schuster.
4. Erik Brynjolfsson & Andrew McAfee (2016), The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologist. W. W. Norton & Company.
5. Greg Satell (2017) Mapping Innovation: A Playbook for Navigating a Disruptive Age. McGraw-Hill Education.
6. Anand Swaminathan & Jürgen Meffert (2017), Digital @ Scale: The Playbook You Need to Transform Your Company. Wiley.
7. Mathias Kirchmer (2017), High Performance Through Business Process Management: Strategy Execution in a Digital World. 3rd edition. Springer.
8. Alexander Chernev (2017), The Business Model: How to Develop New Products, Create Market Value and Make the Competition Irrelevant. Cerebellum Press.
9. Dirk Slama, Frank Puhlmann, Jim Morrish, Rishi M Bhatnagar (2015), Enterprise IoT: Strategies and Best Practices for Connected Products and Services. O'Reilly Media.
10. Christoph Franz, Thomas Bieger, Andreas Herrmann (2017), Evolving Business Models: How CEOs Transform Traditional Companies (Management for Professionals). Springer.
11. Tessaleno Devezas (Editor), João Leitão (Editor), Askar Sarygulov (Editor) (2017), Industry 4.0: Entrepreneurship and Structural Change in the New Digital Landscape. Springer.
12. Alfred Oswald (2017), Management 4.0. Books on Demand.
13. Saul Kaplan (2012), The Business Model Innovation Factory: How to Stay Relevant When The World is Changing.Wiley.

BLHL ---2*** Third Language

BLHL 1112 Arabic I

Learning Outcomes

1. Demonstrate the ability to converse in Arabic with correct and accurate pronunciation and respond to it accordingly.
2. Identify basic vocabulary and demonstrate writing skills.
3. Interpret the information in the simple text and construct sentences with correct grammar.

Synopsis

This subject is designed for students who do not have prior knowledge in Arabic. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This subject encompasses the listening, speaking, reading and writing components. This subject aims to help students to obtain enough exposure of the Arabic language skills. The basic grammar introduced is related to the language used daily in conversation. Particular care is also taken to ensure the development of verbal communication and written skills in Arabic.

References

1. M. Helmi Omar & Ab Rahim Ibrahim (2016). Mari Belajar Bahasa Arab. Melaka, Universiti Teknikal Malaysia Melaka.
2. Che, R. M. & Norhayuza, M. (2011). Kosa kata Arab: Teori dan aplikasi. Serdang, Selangor: Penerbit Universiti Putra Malaysia.
3. Mohd, A. G. (2010). Kamus mini: Asas perbualan dan perkataan. Kajang, Selangor: Awfal Enterprise.
4. Noorli, M. N. (2012). Bahasa Arab mudah. Kota Bharu, Kelantan: AE Books Enterprise.
5. Othman, A. (2009). Cara mudah belajar bahasa Arab (Buku 3). Kuala Lumpur: Al-Hidayah Publication.
6. Ragy, I. (2009). Learn Arabic the fast and fun way. New York: Barron's Educational Series.

BLHL 1212 Mandarin I

Learning Outcomes

At the end of the subject, students should be able to:

1. Demonstrate the ability to converse in Mandarin with correct and accurate pronunciation and respond to it accordingly.
2. Construct sentences with correct grammar and demonstrate writing skills.
3. Interpret the information in the simple text.

Synopsis

This subject is designed for students who do not have prior knowledge in Mandarin. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This subject encompasses the listening, speaking, reading and writing components. This subject aims to help students to obtain enough exposure of the Mandarin

phonetics (Han Yu Pin Yin). The basic grammar introduced is related to the language used daily by the Chinese. Particular care is also taken to ensure the development of verbal communication and written skills in Mandarin.

References

1. Cheong, K. M. (2015). Mari belajar Mandarin. Penerbit: Universiti Teknikal Malaysia Melaka.
2. Ang, L.H. & Ooi, B.L. (2012). Basic Chinese for everyone. Selangor: Pelanduk Publications.
3. Wu, J. & Bai, L. (2011). Chinese grammar step by step. Singapore: Cengage Learning Asia Pte Ltd.
4. Soh W. N., Chia T.H., San, L. & Mok, S. S. (2009). Conversational Mandarin Chinese for non-native speakers. Selangor: Xueer publisher.
5. Alison, L.M. (2006). The first 100 Chinese characters. Hong Kong: Tuttle Publishing.

BLHL 1312 Japanese I

Learning Outcomes

By the end of the subject, students should be able to:

1. Demonstrate the ability to converse in Japanese with correct and accurate pronunciation and respond to it accordingly.
2. Identify basic vocabulary and demonstrate writing skills.
3. Interpret the information in the simple text and construct sentences with correct grammar.

Synopsis

This subject is designed for students who do not have any background in Japanese. It provides students with the knowledge to enable them to understand and communicate in the oral and written forms. This subject encompasses the listening, speaking, reading and writing components. The grammar introduced is related to the language used daily by the Japanese. In addition, two types of Japanese language writing systems; Hiragana and Katakana are also introduced. Students are also exposed to elementary reading materials.

References

1. Minna no Nihongo shokyu 1 (2012). (Beginners 1) Sentence Pattern Workbook. 3A Network.
2. Minna no Nihongo shokyu 1 (2012). (Beginners 1) Translation & Grammatical Notes. 3A Network.
3. The Association For Overseas Technical Scholarship (AOTS) (2009). Shin Nihongo No Kiso 1-English Translation. Asian Edition.
4. The Association for Japanese-Language Teaching (2009). Shin Nihongo No Kiso 1-English Translation. Asian Edition.

BLHL 1412 German I

Learning Outcomes

At the end of the course, students should be able to:

1. Demonstrate the ability to converse in basic German with correct and accurate pronunciation and respond to it accordingly.
2. Identify basic vocabulary and demonstrate writing skills.
3. Interpret the information in the simple text and construct sentences with correct grammar.

Synopsis

This subject is designed for students who do not have prior knowledge in German. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This subject encompasses the listening, speaking, reading and writing components. This subject aims to help students to obtain basic exposure of the German phonetics. The basic grammar introduced is related to the language used daily by the German. Particular care is also taken to ensure the development of verbal communication and written skills in German.

References

1. H. Aufderstrasse, H. Bock, M. Gerdes, M. Gerdes, J. Mueller, H. Mueller (2003). Themen 1 aktuel, Hueber Publishing.
2. Funk, H. Etl. (2002), Geni@l Deutsch als Fremdsprache fuer Jugendliche. Berlin, Germany Langenscheidt

BLHL 1612 Korean Language

Learning Outcomes

At the end of the subject, students should be able to:

1. Demonstrate the ability to converse in Korean with correct and accurate pronunciation and respond to it accordingly.
2. Identify basic vocabulary and demonstrate writing skills.
3. Interpret the information in the simple text and construct sentences with correct grammar.

Synopsis

This subject is designed for students who do not have prior knowledge in Korean. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This subject encompasses the listening, speaking, reading and writing components. This subject aims to help students to obtain basic knowledge about Korean language. The basic grammar introduced is related to the language used daily by the Korean. Particular care is also taken to ensure the development of verbal communication and written skills in Korean.

References
1. K. Park (2015). Essential Korean Vocabulary. Tuttle Publishing.
2. P. Jun Seok & S. Chaemin. 2015. Korean: Language 1 for Beginners. Institut Terjemahan & Buku Malaysia.
3. J. Hong & W. Lee. 2008. Korean for Dummies. Wiley Publishing Inc.

DITI 3113 Artificial Intelligence

Learning outcome

Upon completion of this course, students will be able to:
1. Define the basics of Artificial Intelligence.
2. Describe the components of Artificial Intelligence techniques.
3. Follow the Artificial Intelligence techniques in problem solving.

Synopsis

Students are exposed to the basic and branches of Artificial Intelligence such as the various search techniques, knowledge representation and reasoning, inference techniques, learning from experience and planning. Besides, some applications of AI including game playing, expert systems, and machine learning will be introduced.

References
1. Ertal, W. (2017). Introduction to Artificial Intelligence, Springer.
2. Kopec, D., Shetty, S & Pileggi, C (2014), Artificial Intelligence Problems and Their Solutions (Computer Science), T Mercury Learning & Informationd.
3. Negnevitsky, M., (2011), Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley.
4. Russel, S & Norvig, P. (2009). Artificial Intelligence: A Modern Approach, 3rd Edition, Prentice Hall.
5. Luger, G. F. (2009). Artificial Intelligence: A Guide to Intelligent System, 3rd Edition, Addison Wesley..

DITI 3123 Logic Programming

Learning outcome

Upon completion of this course, students will be able to:
1. Use the elements and concepts of logic and procedural programming.
2. Reproduce the Prolong algorithm for solving logic programming problems.
3. Construct basic programs using logic programming structures

Synopsis

Students are exposed to the basic of logic programming which include the syntax and semantics of Prolog software. Elements such as predicate logic, rules, queries, recursive rule, controlling backtracking, unification and input output are the main concern while conducting this course. This course use Prolog software to develop a simple computer solution of some AI

applications such as problem solving, and expert systems.

References

1. Ivan Bratko (2012), Prolog Programming For Artificial Intelligence, Addison Wesley (http://www.pearsoned.co.uk/bratko).
2. Max Bramer, Johan Bos and Kristina Striegnitz, (2013), Logic Programming with Prolog, Springer.
3. Randall Scott, (2010), A Guide to Artificial Intelligence with Visual Prolog, Outskirts Press.
4. Richard O'Keefee (2009). The Craft of Prolog. The MIT Press.
5. Saroj Kaushik (2007), Logic And Prolog Programming, New Age International.

DITI 3513 Artificial Intelligence in Robotic and Automation

Learning outcome

Upon completion of this course, students will be able to:

1. Analyse fundamental concepts related to robotic.
2. Organize solution steps in solving robotic manipulator's dynamic equations.
3. Construct robotic programming for human function simulation

Synopsis

This course covers introduction of robotics, which includes mechanical structure of robot systems, mechanics of robot manipulators and control systems. The students also will be exposed to the principles of automation and robotic programming, which are employed in the derivation of the principles of robot dynamics.

References

1. Robin R. Murphy (2000) "Introduction to AI Robotics". The MIT Press.
2. Sebastian Thrun, Wolfram Burgard & Dieter Fox (2005) "Probabilistic Robotics". The MIT Press.
3. Gordon McComb,(2011), Robot Builder's Bonanza, McGraw-Hill
4. Widodo Budiharto & Paulus Andi Nalwan (2013), Membuat Sendiri Robot Humanoid, Synergy Media.
5. Widodo Budiharto (2013), Membuat Sendiri Robot, Synergy Media.
6. John J. Craig (2018) Introduction to Robotics: Mechanics and Control, Pearson.
7. David J. Gunkel(2012),The Machine Question: Critical Perspectives on AI, Robots, and Ethics, The MIT Press.

DITM 3133 Digital Audio and Video Technology

Learning outcome

Upon completion of this course, students will be able to:

1. Explain and apply the knowledge and principles of digital audio and video.
2. Demonstrate advanced skills in using audio video software and hardware including the

digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Choose and organize audio video software and hardware in the conducive production environment with the latest and relevance information

Synopsis

This course is an extension from Multimedia System. It will give details and valuable insight of the wonderful world of digital audio and video. Throughout the semester, candidates will be introducing to topics on digital audio and video hardware, the art of audio production, recording techniques, video production, indoor and outdoor shooting procedure, implementing special effects, and storyboarding. Besides, various tools for editing, practical as well as composing digital audio and video will be taught during the course.

References

1. Mohd Hafiz Zakaria, Zulisman Maksom, Wan Sazli Nasaruddin Saifudin, and Mohd Haziq Lim Abdullah, in Press. 2012 Digital Audio and Video Technology: Classroom in a book, Penerbit Universiti UTeM.
2. Mohd Haziq Lim Abdullah, Mohd Hafiz Zakaria, and Wan Sazli Nasaruddin Saifudin, 2010. Digital Audio and Video Technology: Lab Module, Penerbit Universiti UTeM.
3. Ken C. Pohlmann, 2010. Principles of Digital Audio, Sixth Edition, McGraw-Hill Professional
4. Ananda Mitra, 2010. Digital Video: Moving Images and Computers, Facts on File Publishing
5. Adobe Creative Team, 2010. Adobe Premiere Pro CS5 Classroom in a Book, Adobe Press.

DITM 3143 Digital Media Design

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the concepts, techniques, basic desktop publishing production process, and graphic design theory.
2. Produce desktop publishing output by combining the use of text, colour selection, layout objects, graphics, and image according to current needs.
3. Respond to the theory and applied skill in production design and layout of the interface and all areas of design, printing and publishing

Synopsis

This course provides students with the concepts, techniques and desktop publishing process used in the industry. It emphasizes the use of text (typography), colour selection, paragraph, objects, graphics and images composition. At the end of the course, students can master the principles in generating design cases and printing for desktop publishing by using the appropriate software and tools.

References
1. Susan Lake and Karen Bean, Digital Desktop Publishing, the Business of Technology, Div of Thomson Learning, 2007
2. The Story of Graphic Design. From The Invention of Writing to the Birth of Digital Design. Patrick Cramsie. Abrams Press 2010
3. Christopher Smith, Adobe Creative Team, Adobe InDesign CS5 Classroom in a Book, Adobe Press, 2010.
4. Aquent Creative Team, and AGI Creative Team, Illustrator CS4 Digital Classroom, John Wiley & Sons, 2009.
5. Packaging Design: A Cultural Sign. Edwin Visser. Sylvie Estrada. 2009
6. Sandee Cohen, From Design into Print: Preparing Graphics and Text for Professional Printing, Peachpit Press, 2009.

DITM 3313 User Interface Design

Learning outcome

Upon completion of this course, students will be able to:

1. Understand and describe the definition and concept of user interface design components in interactive system.
2. Apply problem solving skill by identifying and using design components in user interface design.
3. Demonstrate lifelong learning by applying interaction design understanding in other related courses

Synopsis

This course is preparing the students with the knowledge about concepts and user interface design techniques. Students will be exposed to the user interface design processes for interactive information system. This includes user scenario development, user object model, navigation model and components design.

References
1. Yvonne Rogers, Helen Sharp, Jenny Preece, Interaction Design: Beyond Human – Computer Interaction, 4th Edition. Wiley, 2015.
2. Tania Schlatter, Deborah Levinson, Visual Usability: Principles and Practices for Designing Digital Application. Morgan Kaufman, 2013.
3. James Pannafino, Interdisciplinary Interaction Design: A Visual Guide to Basic Theories, Models and Ideas for Thinking and Designing for Interactive Web Design and Digital Device Experiences, Assiduous Publishing, 2012.
4. Interaction Design: Beyond Human-Computer Interaction. Third Edition. John Wiley and Sons, Ltd Publication. 2011.
5. Jenifer Tidwell, Designing Interfaces. O'Reilly Media, 2011.

DITM 3323 Introduction to Computer Games Programming

Learning Outcomes

By the end of this course, student should be able to;

1. Describe the basic concept related to 2D/3D game development based on the latest technology.
2. Identify skills, techniques and components for 2D/3D game development.
3. Relate and integrate the components that involved in producing a 2D/3D application game which consists of various genres.

Synopsis

This course aims to equip the students with basic concepts and techniques in 2D/3D game development. Student will be provide with some exposures on computer game theories, game design, and game logic. This includes teaching the students on how to develop game engine. Student will also expose related 2D game development such as 2D/3D graphic integration and content development. At the end of the course, student will be able to develop simple 2D/3D game based on the specified game genre.

References

1. Ernest Adams (2014), Fundamentals of Game Design (3rd Edition), New Riders, ISBN: 0-321-92967-5
2. Jeremy Gibson (2015), Introduction to Game Design, Prototyping, and Development. Addison-Wesley by Pearson. ISBN 0-321-93316-8
3. Steve Rabin (2010), Introduction to Game Development (2nd Edition), Cengage Learning, ISBN: 1584506792.
4. Andy Harris (2007), Game Programming: The L Line, The Express Line to Learning, John Wiley & Sons, 2011. ISBN: 1118085450
5. Roger Pedersen, Game Design Foundations, Jones & Bartlett Publishers.ISBN 1449663923

DITP 2313 Database Programming

Learning outcome

Upon completion of this course, students will be able to:

1. Explain features, syntax, purpose and benefits of SQL and PL/SQL to developer and database administrator.
2. Use the procedures, functions, packages and database triggers, and manipulate large object sizes.
3. Use the Oracle supplied packages.

Synopsis

The contents of this course are based on the syllabus of two modules in Oracle certification (Oracle Certified Associate). The first part of the lesson introduces the concepts of relational database and SQL syntax. This includes topics related to Oracle database architecture, its ability, constraints in data integrity, and other database objects such as views, index, sequence and synonyms. The second part of the lesson

explains the objectives, functions and benefits of PL/SQL in developing database applications. This includes the development, implementation and maintenance of procedures, functions, packages and database triggers. The lesson also explains the use of stored procedures and triggers in retrieving data and executing complex business rules to enhance data integrity. Students will be introduced to Oracle packages, subprograms and PL/SQL triggers.

References

1. Pataballa, N. and Nathan, P. (2001), Introduction to Oracle 9i: SQL, Volume 1 and Volume 2, Oracle University.
2. Pataballa, N. and Nathan, P. (2001), Introduction to Oracle 9i: Program with PL/SQL, Volume 1 and Volume 2, Oracle University.
3. Feuerstein, S and Pribyl, B. (2014), Oracle PL/SQL Programming, 6th Edition, O'Reilly Media.
4. Morris-Murphy, L. L., (2003), Oracle 9i: SQL with Introduction to PL/SQL, Course Technology.
5. Urman, S., (2002), PL/SQL Programming, Berkeley, CA. Osborne McGraw-Hill, Oracle Press.

DITP 3213 Software Engineering

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the concept of software engineering for system development.
2. Explain concepts of Software Process and Model in the system development.
3. Prepare formal specifications and software modelling in a collaborative team environment for the purpose of system development.

Synopsis

This subject introduces the basic concept of software engineering to the student. It covers all the software development process which includes analysis, requirement, design, implementation and testing. This subject also covers support areas such as project management and quality management. This subject exposes the student to structured approach and object-oriented approach using UML.

References

1. Pfleeger, S. L., Atlee, J.M., Software Engineering, Theory and Practice, 4th Edition, 2010, Pearson.
2. Sommerville, I., Software Engineering, 9th Edition, International Edition, 2011, Addison-Wesley.

3. Pressman, R..S., Software Engineering: A Practitioner's Approach, 7th Edition, 2010, McGraw-Hill.
4. Dennis, A, Wixom B.H., & Roberta M. R., 2012 System Analysis and Design with UML, 5th Edition, WileyDITP 3213 Software Engineering

DITP 3253 Software Requirements and Design

Learning outcome

Upon completion of this course, students will be able to:

1. Analyse software requirement and design the software using object-oriented approach and UML.
2. Model software analysis, software requirement and software design using object-oriented approach supported by case tool, StarUML.
3. Write formal software specification document and software design document.

Synopsis

This course introduces the student to the object-oriented approach using UML such as object-oriented concept, object oriented application development life cycle, UML history and notation, comparison between OOAD and SDM and introduction to object and class. The topics includes the use-case, use case diagram and use case description. Student will learn to identify the uses cases, actors, perform analysis modelling using dynamic or static diagram such as activity diagram, sequence diagram, collaboration diagram and class diagram.

References

1. Klaus Pohl, Chris Rupp, Requirement Engineering Fundamentals, 2nd Edition, Rocky Nook, 2015;
2. Kenneth E. kendall, Julie E. Kendall, System Analysis and Design, 9th Edition, Pearson 2014;
3. Lamsweerde, A. van (Axel). (2009), "Requirements Engineering", Wiley Education International

DITP 3263 Software Verification and Validation

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the principle of verification and validation focusing on software testing and quality assurance.
2. Develop test requirements, test cases and test script for real software projects.
3. Report software test plan and results using IEEE standard.

Synopsis

This course gives exposure to the students on the principles and terms of verification and validation. It will focus on the process of designing testing plan, test requirements and test cases to satisfy the quality of a software product. The study will also cover software quality

assurance activities such as quality requirement, quality criteria, software metrics, software quality model, software evaluation, review, audit and accreditation.

References

1. Debbabi, M., Hassaïne, F., Jarraya, Y., Soeanu, A., Alawneh, L. (2010) Verification and Validation in Systems Engineering. Springer.
2. Fisher, M. S. (2007) Software Verification and Validation: An Engineering and Scientific Approach. Springer.
3. Muller, Thomas et. al., (2007) ISTQB Certified Tester: Foundation Course in Software Testing. International Software Testing Qualification Board.
4. Galin, D. (2004). Software Quality Assurance, From Theory to Implementation. Pearson Addison-Wesley.
5. Glenford J. Myers. (2004). The Art of Software Testing. Second Edition. John Wiley & Sons.
6. Khan, RA., Mustafa K., Ahson, SI., (2006). Software Quality: Concepts and Practices. Alpha Science.

DITP 3273 Strategic Information System Planning

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the business organization components, environment, challenges and objectives of information systems (IS) investment.
2. Discuss the IS and strategic planning tools used in planning process.
3. Propose information systems strategically appropriate for small enterprise.

Synopsis

This subject will introduce the importance of information systems (IS) to enhance organisation competitiveness. Therefore, the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitive than other organisations. Then students will work to integrate organisation's business objectives with IS that support its business direction and creating competitive advantage to the organisation.

References

1. Patricia Wallace, 2015. Introduction to Information Systems, Second Edition, Pearson.
2. Laudon, Kenneth C. & Laudon, Jane P.2011. Essentials of Business Information Systems, 9th Edition, Pearson.
3. Laudon, Kenneth C. & Laudon, Jane P.2012. Management Information Systems: Managing The Digital Firm, 12th Edition, Pearson.

DITP 3313 Database Design

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the characteristics of advanced database systems.
2. Construct data model using relational and non-relational data modelling techniques.
3. Explain database design issues in specialized applications such as DSS and e-commerce.
4. Apply the best approach in building a database system that meets the functional requirements with the required quality of service.

Synopsis

Fundamental principles and design issues related to non-relational data models like object-oriented and object-relational data model together with the enhanced features of ERD. Advanced database concepts and applications such as data warehouse, OLAP, data mining, database in electronic commerce and distributed databases systems.

References

1. Coronel, C., Morris, S. and Rob, P. (2016) Database Systems: Design, Implementation and Management, 12th Edition, Course Technology.
2. Connolly, T. and Begg, C. (2015) Database Systems: A practical approach to design, implementation and management, 6th Edition, Pearson Education.
3. Elmasri, R and Navathe, S. (2016) Fundamentals of Database Systems, 7th Edition, Addison-Wesley.
4. Silberschatz, A., Korth, H. F. and Sudarshan, S. (2010) Database System Concepts, 6th Edition, McGraw-Hill.

DITP 3323 Database Administration

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the concept of database administration system.
2. Describe the roles and responsibilities of a database administrator.
3. Explore the functions, architectures and performance of database management systems

Synopsis

This subject focus on the roles, issues and responsibilities of database administrators, functions of the DBMS such as storage, access and data updates; database objects; indexes and data integrity; planning and implementation of performance activities, upgrading and user management.

References

1. Mullins, C.S. (2012) Database Administration: The Complete Guide to DBA Practices and Procedures, 2E. Addison-Wesley.
2. Bryla, B. & Loney, K. (2008) Oracle Database 11g DBA Handbook. Oracle Press.

3. Matishak, D. & Fuller, M. (2009) Oracle Database 11g: Administration Workshop I. Oracel Corp.
4. Fogel, S. et. al (2015) Oracle Database Administrator's. Oracle Corp.

DITS 3613 Basic Networking

Learning outcome

Upon completion of this course, students will be able to:

1. Apply mathematics, terminology, and the network model to solve problems.
2. Propose the network specifications and functions when appropriate in accordance with the requirements.
3. Build local area networks using Cisco routers

Synopsis

This subject is the beginning of the course of four preparatory course towards professional certification CCNA. DITS3613 introduce students to the field of networking. This course focuses on network terminology, network protocol, local area networks, wide area networks, open-system model of the connection, cabling, cabling tools, routing, routing programming, technology, Ethernet, Internet protocol addressing and network standards.

References

1. Mark A.Dye, Allan D. Reid. (2013), "Introduction to Networking Companion Guide", Cisco Press.
2. Erman Hamid, Nazrulazhar Bahaman, Mohd Fairuz Iskandar Othman, (2008) "Networking Basic, Practical Approach", Venton.
3. Introduction to Networks v5.0 Lab Manual (Lab Companion), 1st Edition, 2013, Cisco Press
4. Anthony Sequeira, John Tiso (2013). "Cisco CCNA Routing and Switching 200-120 Foundation Learning Guide Library, Cisco Press.

DITS 3623 Network Routing

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the critical role routers play in enabling communications across multiple Networks.
2. Configure and verify networking by applying static and dynamic routing.
3. Apply and implement suitable routing with a classless IP addressing scheme

Synopsis

This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyse, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. By the end of this course, students will be able to recognize and correct common routing issues and problems. Students complete a basic procedural lab,

followed by basic configuration, implementation, and troubleshooting labs in each chapter.

References

1. Cisco Networking Academy, 2014, Routing and Switching Essentials Companion Guide, 1st Edition, Cisco Pressmat Ariff,
2. N.A. Bahaman, N. Wan Ghazali, K. Hamid, E (2008) Routing Fundamental: Practical Approach, Venton.
3. Online Notes, CCNA 2 Exploration Http://Cisco.Netacad.Net
4. Sudip Misra, Sumit Goswami, 2016, Network Routing: Fundamentals, Applications and Emerging Technologies 1st Edition, Wiley
5. Scott Empson, 2016, CCNA Routing and Switching Portable Command Guide (Icnd1 100-105, Icnd2 200-105, And CCNA 200-125) 4th Edition, Cisco Press
6. Wendell Odom, Sean Wilkins, 2013, CCNA Routing and Switching 200-120 Network Simulator, Pearson It.

DITS 3633 Implementing and Administering Active Directory

Learning outcome

Upon completion of this course, students will be able to:

1. Explain the term, concept, and the usage of Directory Services in various sources.
2. Apply the installation, configuration and management of Active Directory features.
3. Select and demonstrate Active Directory administration through the use of security features, group policy and software deployment tools

Synopsis

This course teaches the student on how to implement and configure Active Directory. Besides, it guides to manage name resolution, schema and replication. The purpose of active directory usage is to manage users, groups, shared folder and network resource, and to administer the user environment and software with group policy. It also will cover monitoring and optimizing Active Directory.

References

1. Dan Holme, Nelson Ruest, Danielle Ruest, Jason Kellington: Self-Paced Training Kit (Exam 70-640): Configuring Windows Server 2008 Active Directory, Microsoft Press; Second Edition 2011.
2. John Policelli: Active Directory Domain Services 2008 How-To, Sams Publishing; 1st Edition 2009.
3. Brian Svidergol, Robbie Allen: Active Directory Cookbook, O'Reilly Media 4th Edition 2013.
4. John Policelli: Active Directory Domain Services 2008 How-To, Sams Publishing 2009.DITS 3633 Implementing and Administering Active Directory

DITS 3643 Implementing and Administering Network Infrastructure

Learning outcome

Upon completion of this course, students will be able to:

1. Describe the term, concept and goals for network infrastructure
2. Explain the network environment using network infrastructure elements.
3. Demonstrate the installing, configuring, monitoring, optimizing server and managing network infrastructure

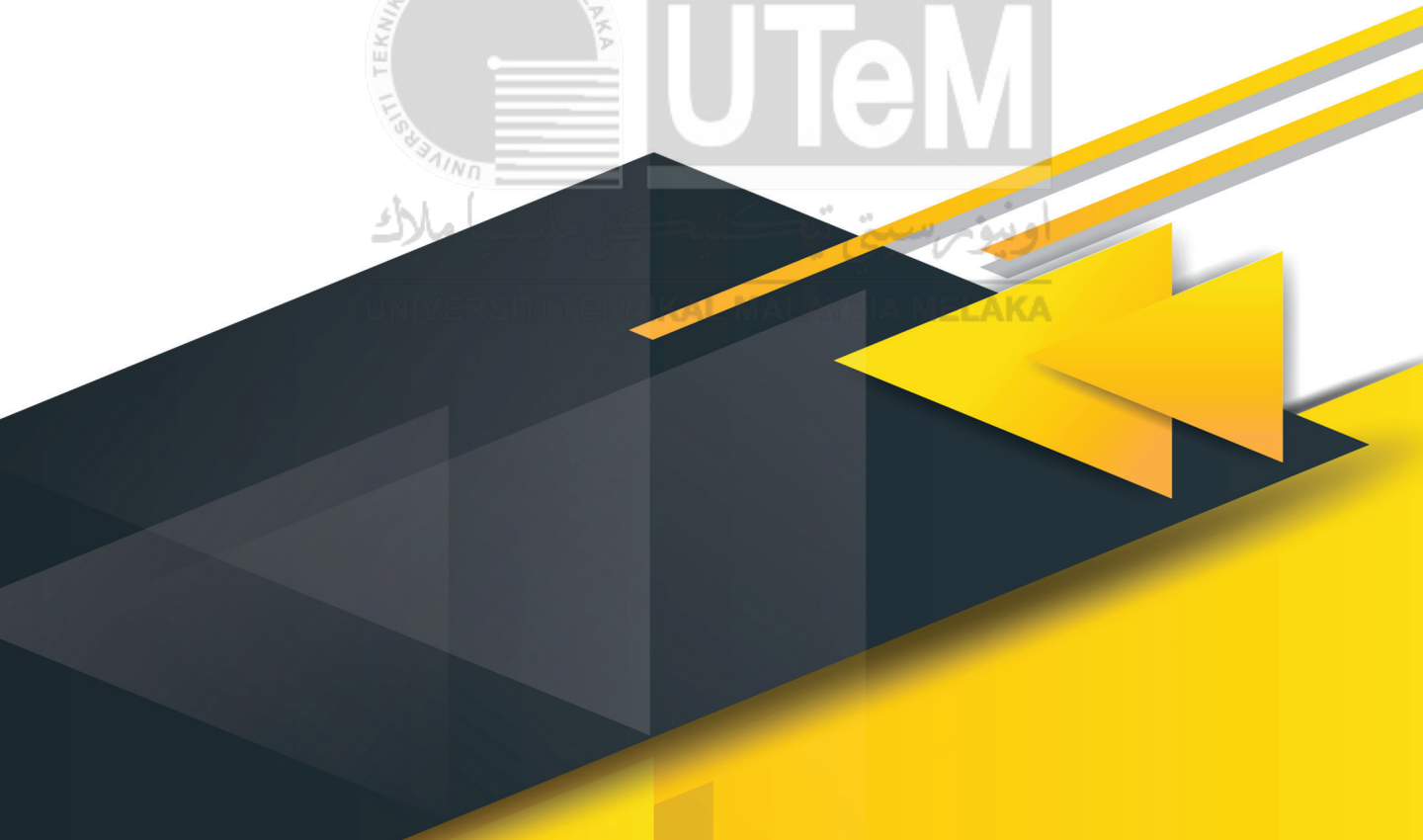
Synopsis

The course teaches the student how to install and configure Microsoft Windows 2008 server. Student will learn how to install the Windows 2008 Server through standard installation routines. Inside the server environment, student will learn various file system and disk management function. This course will explain the elements of the network infrastructure such as intranet, remote access, remote office, internet and extranet. Student should able to configuring and managing network infrastructures such as DHCP, DNS, WINS, and FTP.

References

1. Microsoft: “Windows Server 2008 Inside Out”, William R. Stanek
2. Mc Graw Hill: “Microsot Windows Server 2008 A Beginner’s Guide”, Marty Matthews
3. Microsoft: “Windows Server 2008 Administrator’s Pocket Consultant”, William R. Stanek
4. Network+Guide to Network (4th Edition), Tamara Dean.

FTMK
STAFF DIRECTORY



UNIVERSITI TEKNIKAL MALAYSIA MELAKA
UTeM
اونيۏرسيتي تيکنيکل مليسيا ملاک
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FTMK STAFF DIRECTORY

DEPARTMENT OF SOFTWARE ENGINEERING

PROF. DR. MOHD KHANAPI ABD GHANI
BSc. Computer Science (UTM)
MSc. Software Engineering (UTM)
PhD. Biomedical Computing (Coventry, UK)
• khanapi@utem.edu.my

PROF. DR. NANNA SURYANA
BSc. Soil & Water Eng (Univ. Padjadjaran, Indonesia)
MSc. Comuter Science (Wageningen University, Holland)
PhD GIS (RUW, Holland)
• nsuryana@utem.edu.my

ASSOC. PROF. Ts. DR. NURUL AKMAR EMRAN
BSc. (Hons.) MIS (Database) (UIAM)
MSc in Database & Internet Technology (London South Bank University, UK)
PhD in Computer Science (Data Quality)
(The University of Manchester, UK)
• nurulakmar@utem.edu.my

ASSOC. PROF DR. MASSILA KAMALRUDIN
BSc. Computer Science (Software Engineering) (UPM)
MSc. in Computing & Software Technology (Swansea, UK)
PhD Electrical and Electronic Eng.
(University of Auckland, N.Zealand)
• massila@utem.edu.my

ASSOC. PROF. DR. MOHD SANUSI AZMI
BSc. Information Technology (UKM)
MSc. Information Technology (UKM)
PhD Computer Science (UKM)
• sanusi@utem.edu.my

ASSOC. PROF. DR. SABRINA AHMAD
BIT (Hons.) (UUM),
MSc. Real-Time Software Engineering (UTM)
PhD in Computer Science
(University of Western Australia)
• sabrinaahmad@utem.edu.my

DR. ABDUL KARIM MOHAMAD
BSc. of BA (Management Information System) from University Of Missouri-St. Louis (UMSL), USA
MSc. of Computer Science (Software Engineering) from Universiti Putra Malaysia, Malaysia
PhD. in Information and Communication Technology (UTeM)
• karim@utem.edu.my

DR. INTAN ERMAHANI A. JALIL
BSc. Computer Science (UTM),
MSc. Software Engineering (Brighton, UK)
PhD in Computer Science (UTM)
• ermahani@utem.edu.my

DR. NOR HAFEIZAH HASSAN
BIT (Hons) (UUM),
MSc. Computer Science (UPM)
PhD in Information and Communication Technology (UTeM)
• nor_hafeizah@utem.edu.my

DR. ZAHRIAH OTHMAN (Medical leave)
BIT (Hons.) (UUM)
MSc. Software Engineering (Bradford, UK)
PhD in Information and Communication Technology (UTeM)
• zahriah@utem.edu.my

Gs. Ts. DR. SAFIZA SUHANA KAMAL BAHARIN
Dip. Regional & Town Planning (UTM)
BSc. Geoinformatics (UTM)
MSc. Geoinformatics (UTM)
PhD in Information and Communication Technology (UTeM)
• safiza@utem.edu.my

Ts. DR. LIZAWATI SALAHUDDIN
BSc. Computer Science (UTM),
MSc. Biosystem (Information and Communication University, South Korea)
PhD in Computer Science (UTM)
• lizawati@utem.edu.my

Ts. DR. NORASHIKIN AHMAD
BIT (Hons.) Comp. Sc. (UKM)
MSc. Computer Science (UTM)
PhD. Information Technology (Monash University)
• norashikin@utem.edu.my

Ts. DR. NORASWALIZA ABDULLAH
BSc (Hons.) Comp. Sc. (USM)
MSc. Computer Science (UPM)
PhD. Computer Science
(Queensland University of Technology, Brisbane)
• noraswaliza@utem.edu.my

Ts. DR. RAJA RINA RAJA IKRAM
BEng (Software) and Bachelor of Commerce (Finance) (University of Melbourne, Australia)
Masters in Health Informatics and Health Information Systems (UTeM)
PhD in Information and Communication Technology (UTeM)
• raja.rina@utem.edu.my

Ts. DR. UMMI RABA'AH HASHIM
BSc. Computer Science (UTM)
MSc. Multimedia E-Learning Technologies (MMU)
PhD in Computer Science (UTM)
• ummi@utem.edu.my

Ts. DR. YAHAYA ABD RAHIM
Dip. in Human Development (UPM)
BIT (UUM)
MSc. Info.Tech (UTM)
PhD in Information and Communication Technology (UTeM)
• yahaya@utem.edu.my

DATIN Ts. NURAZLINA MD SANUSI
BSc. (IT) (UKM)
MSc. (IT) (UKM)
• nurazlina@utem.edu.my

Ts. AZLIANOR ABDUL AZIZ
Adv. Dip. Information Technology (UniKL-IIM),
BSc. (Hons) Information Technology (UiTM),
MSc. Computer Science (Salford, UK)
• azlianor@utem.edu.my

Ts. HIDAYAH RAHMALAN
Dip. in Computer Science (UTM)
B. Computer Science (UTM),
MSc. Computer Science (UTM)
MPhil. Computer Vision (University of Southampton, UK)
• hidayah@utem.edu.my

Ts. MASHANUM OSMAN
BSc. (Hons) Information Technology (UiTM),
MSc. Computer Science (USM)
MPhil Computer Science (Loughborough University, UK)
• mashanum@utem.edu.my

Ts. MASLITA ABDUL AZIZ
BIT (Hons) (UUM)
MSc. of Information Technology
(Rochester Institute of Technology, USA)
• maslita@utem.edu.my

Ts. MUHAMMAD SUHAIZAN SULONG
Adv. Dip Information Technology (UniKL-IIM),
BSc. (Hons) Information Technology (UiTM),
MSc. Comp. Sc. (Salford, UK)
• suhaizan@utem.edu.my

Ts. NOR HASLINDA ISMAIL
BSc Information Technology (UKM)
MSc. Information Technology (UPM)
• lynda@utem.edu.my

Ts. NOR MAS AINA MD BOHARI
BIT (Hons) (UUM),
MSc. Object-Oriented Info. Sys.
(London South Bank Univ., UK)
• aina@utem.edu.my

Ts. ROSLEEN ABDUL SAMAD
MSc IT (UPM)
BSc. Bus. Adm-MIS (Nebraska-Lincoln, USA)
• rosleen@utem.edu.my

ABDUL RAZAK HUSSAIN
BSc. Civil Eng (Burnell, USA)
MSc. IT for Manufacturing (Warwick, UK)
• razak@utem.edu.my

AMIR SYARIFUDDIN KASIM
BSc. IS (UiTM)
MSc. Knowledge Extraction (East Anglia Uni., UK)
• syarifuddin@utem.edu.my

ANIZA OTHMAN
BSc. Computer Science (UPM)
MSc. Computer Science (Multimedia) (UPM)
• aniza@utem.edu.my

EMALIANA KASMURI (Study leave)
BSc. Computer Science (UTM),
MSc. Computer Science (Real-time Software Engineering)
(UTM)
• emaliana@utem.edu.my

KASTURI KANCHYMALAY
BSc. Computer Science (Hons.) (UM)
MSc. in Information Technology (UPM)
• kasturi@utem.edu.my

MOHD FADZIL ZULKIFLI
BSc. (Hons.) Computer Science (USM)
MSc. Information Technology (UiTM)
• fadzil@utem.edu.my

MOHD HARIZ NAIM @ MOHAYAT
BSc Netcentric Computing (UiTM)
MSc Computer Network (UiTM)
• mohdhariz@utem.edu.my

NOOR AZILAH DRAMAN @ MUDA
BSc. Agribusiness (UPM)
MSc. Computer Science (UTM)
• azilah@utem.edu.my

NURIDAWATI MUSTAFA (Study leave)
BSc. Computer Science (UTM),
MIT Software Engineeering
(Swinburne University, Australia)
• nuridawati@utem.edu.my

ROSMIZA WAHIDA ABDULLAH
BSc. Computer Science (UTP)
Master of Software Engineerring (UM)
• rosmiza@utem.edu.my

SYAHIDA MOHTAR
BSc. Information Technology (UiTM)
MSc. Information Technology (UKM)
• msyahida@utem.edu.my

YAHYA IBRAHIM
B. Computer Science (UM)
MIT (Computer Science) (UKM)
• yahya@utem.edu.my

ZARITA MOHD KOSNIN
BSc. Computer Science (UKM),
MSc. Interactive Computing Systems Design (Loughborough, UK)
• zarita@utem.edu.my

DR. SATRYA FAJRI PRATAMA
BCS. Software Development (UTeM)
MSc. In Information Technology (UTeM)
PhD in Information and Communication Technology (UTeM)
• satrya@utem.edu.my

DEPARTMENT OF INTERACTIVE MEDIA

PROF. Ts. DR. FAAIZAH SHAHBODIN
BIT (Hons.) (UUM)
MSc. IT (Queensland University of Technology, Australia)
PhD. Multimedia in Education (UKM)
• faaizah@utem.edu.my

PROF. Ts. DR. SAZILAH SALAM
Dip. Comp. Science,
BSc. Comp. Science (UTM),
PhD Multimedia Info. Systems (Uni. of Southampton, UK)
• sazilah@utem.edu.my

ASSOC. PROF. Ts. DR. AHMAD NAIM CHE PEE @ CHE HANAPI
BSc. Computer Science (Software Engineering) (Victoria University, Australia)
MSc. Computer Science (Multimedia) (UPM)
PhD in Computer Science (Computer Games) (The University of Nottingham, UK)
• naim@utem.edu.my

ASSOC. PROF. Ts. DR. NORASIKEN BAKAR
Dip. in Computer Science & Mathematics (ITM)
Advance Diploma in Education (UTM)
BSc. (Hons) Computer Science & Mathematics (ITM-UKM)
MSc. Education (Multimedia) (UTM)
PhD. Multimedia in Education (UKM)
• norasiken@utem.edu.my

Ts. DR. HAMZAH ASYRANI SULAIMAN
B. Eng (Computer) (UTM)
MSc. (Computer Graphic & Visualisation) (UTM)
PhD (Mathematic with Comp Graphics) (UMS)
• asyrani@utem.edu.my

Ts. DR. IBRAHIM AHMAD
Dip. in Education
BSc. Computer with Edu (Math/Comp) (UTM)
M. Edu (Edu. Multimedia)
PhD (Visual Informatics) (UKM)
• ibrahim@utem.edu.my

Ts. DR. MUHAMMAD HAZIQ LIM ABDULLAH
BSc. IT (Hons) (UKM)
Master of Multimedia (Swinburne Uni. of Technology) (Australia)
PhD in Computer Science
(Queenslands University of Technology, Australia)
• haziq@utem.edu.my

Ts. DR. SARNI SUHAILA RAHIM (Study leave)
BSc. Computer Science (UTM)
MSc. Computer Science (UPM)
PhD. In Computing (Coventry, UK)
• sarni@utem.edu.my

Ts. DR SITI NURUL MAHFUZAH MOHAMAD
B. IT (Artifical Intelligence) (UUM)
M Computer Science (Multimedia System) (UPM)
PhD (IT) (UTeM)
• mahfuzah@utem.edu.my

DR. MOHD HAFIZ ZAKARIA
BSc. IT (UKM),
MSc. Computer Science (Multimedia) (UPM)
PhD. Information Systems (Social Media)
(Queenslands University of Technology, Australia)
• hafiz@utem.edu.my

DR. FARAH NADIA AZMAN
BSc. Computer Science (UTM),
MSc. IT (UKM)
PhD in Multimedia (UUM)
• farah@utem.edu.my

DR. ZULISMAN MAKSOM
BA Comp. Graphic (Wanganui Polytechnic, NZ)
MA Design & Manufacture (De Monfort University, UK)
Doctor of Design (Swinburne University of Technology) (Australia)
• zulisman@utem.edu.my

Ts. AHMAD SHAARIZAN SHAARANI
BIT (Hons.) (UUM)
MSc. of IT (Hons.) (RIT, USA)
• shaarizan@utem.edu.my

Ts. SYARIFFANOR HISHAM (Sabatical leave)
BIT (Universiti Utara Malaysia)
MSc. Multimedia Technology (UMIST, UK),
• syariffanor@utem.edu.my

Ts. NORAZLIN MOHAMMED
BIT (Hons) (UUM),
MSc. Information & Comm. Technology for Engineers (Conventry, UK)
• norazlin@utem.edu.my

MOHAMAD LUTFI DOLHALIT
BSc. (Hons.) BioTech (UM)
MSc. IT (Multimedia) (USM)
• lutfi@utem.edu.my

MOHD ADILI NORASIKIN
BSc. Comp. Science (Interactive Media) (UTeM)
MSc. Computer Science (Multimedia) (UPM)
• adili@utem.edu.my

MUHAMMAD HELMY EMRAN (Study leave)
Bach. in Art and Design (Graphic Design) (UiTM)
Master in Art and Design (Visual Comm. & New Media) (UiTM)
• muhammad.helmy@utem.edu.my

NAZREEN ABDULLASIM
B. Sc Info Sys (IIUM)
M Sc Real Time Software Engineering (UTM)
Microsoft Certified Professional
• nazreen.abdullasim@utem.edu.my

SHAHRUL BADARIAH MAT SAH (Unpaid leave)
BSc. (Hons.) Computer Science (UTM)
MSc. Multimedia Application and Virtual Environment (Sussex, UK)
• badariah@utem.edu.my

SHAHRIL PARUMO
BSc. (Hons.) Comp. Science (Multimedia) (UTM)
MSc. Comp. Science (Multimedia) (UPM)
• shahrilparumo@utem.edu.my

WAN SAZLI NASARUDDIN SAIFUDIN (Study leave)
Dip. in ICT (KUTKM)
BSc. Comp. Science (UTeM)
MSc. Comp. Sc. (Interactive Media) (UTeM)
• wansazli@utem.edu.my

DEPARTMENT OF COMPUTER SYSTEM AND COMMUNICATION

PROF. DATUK Ts. DR. SHAHRIN BIN SHAHIB, FASc
BSc. Eng. Comp. Sys. (Purdue, USA)
MSc. Eng. Systems Software (Purdue, USA)
PhD Parallel Processing (Sheffield, UK)
• shahrinsahib@utem.edu.my

PROF. Ts. DR. RABIAH AHMAD
Dip. Computer Science (UTM)
Bachelor Computer Science (UTM)
Master Information Security (Royal Holloway University of London, UK)
PhD Health Informatics (University of Sheffield, UK)
• rabiah@utem.edu.my

ASSOC. PROF. DR. MOHD FAIZAL ABDOLLAH
BIT (UUM)
MSc. IT (UKM)
PhD. in Network Security (UTeM)
• faizalabdollah@utem.edu.my

ASSOC. PROF. DR. NUR AZMAN ABU
A.Sc. Comp. Science
BSc. (Hons.) Statistics (Purdue, USA)
MSc. Mathematics (Purdue, USA)
PhD in Information and Communication Technology (UTeM)
• nura@utem.edu.my

Gs. DR. OTHMAN MOHD
Dip. Computer Science (UiTM)
BSc. Computer Science (UTM)
MSc. Computer Science (UPM)
PhD in Information and Communication Technology (UTeM)
• mothman@utem.edu.my

Ts. DR. ASLINDA HASSAN
BSc. MIS (Univ. of Pittsburgh, USA),
MSc. Computer Science (UTM)
PhD in Electrical Engineering (Wireless Communication)
(Memorial University of Newfoundland, Canada)
• aslindahassan@utem.edu.my

Ts. DR. MOHD FAIRUZ ISKANDAR OTHMAN
BSc. Computer Science (UTM)
MSc. in Internetworking (UTS, Australia)
PhD in Information Technology (QUT, Australia)
• mohdfairuz@utem.edu.my

Ts. DR. MOHD RIZUAN BAHARON
BSc. Industrial Mathematics (UTM)
MSc. Mathematics (Pure Mathematics) (UTM)
PhD in Computer Science
(Mobile Network and Cloud Security) (LJMU, UK)
• mohd.rizuan@utem.edu.my

Ts. DR. MOHD ZAKI MAS'UD
B. Eng. (Hons) Electronics (MMU)
MIT Computer Science (UKM)
PhD in Information and Communication Technology (UTeM)
• zaki.masud@utem.edu.my

Ts. DR. NAZRULAZHAR BAHAMAN
Dip Electrical Engineering
B. Eng. (Hons.) Electrical
MSc. IT (UiTM)
PhD. in Computer Network Security (UKM)
• nazrulazhar@utem.edu.my

Ts. DR. NORHARYATI HARUM
B.Eng. in Computer & IS (Keio University, Japan)
Masters Engineering in Smart Media Comm. Eng.
(Keio University, Japan)
PhD Engineering in Smart Media Comm. Eng.
(Keio University, Japan)
• norharyati@utem.edu.my

Ts. DR. ROBIAH YUSOF
BSc. Computer Studies
(Liverpool John Moores Univ., UK)
MIT Comp. Science (UKM)
PhD in Information and Communication Technology (UTeM)
• robiah@utem.edu.my

Ts. DR. SITI RAHAYU SELAMAT
Dip. Computer Science (UTM)
BA (Hons.) Comp. Sc. (Industrial Computing) (UTM)
MSc. Comp. Sc. (UM)
PhD in Information and Communication Technology (UTeM)
• sitirahayu@utem.edu.my

Ts. DR. WAHIDAH MD SHAH
BIT (Hons.) (UUM)
MSc. Computer Science (UTM)
PhD in Computer Science (Lancaster University, UK)
• wahidah@utem.edu.my

Ts. DR. ZULKIFLEE MUSLIM
BSc. Computer Science (UTM),
MSc. Data Comm. and Software
(Univ. of Central England, UK)
PhD in Information and Communication Technology (UTeM)
• zulkiflee@utem.edu.my

DR. NURUL AZMA ZAKARIA
B. Eng. Electronic Comp. System (Salford, UK)
MSc. Information System Engineering (UMIST, UK)
PhD in Information & Mathematical Sciences
(Saitama Univ., Japan)
• azma@utem.edu.my

DR. NUR FADZILAH OTHMAN
Degree in Computer Engineering (UTM)
Master in Educational Technology (UTM)
PhD. in Information and Communication Technology (UTeM)
• fadzilah.othman@utem.edu.my

DR. RAIHANA SYAHIRAH ABDULLAH
BSC. Computer Science (Computer Networking) (UTeM)
MSc Computer Science (Internetworking Technology) (UTeM)
PhD in Information and Communication Technology (UTeM)
• raihana.syahirah@utem.edu.my

DR. S.M. WARUSIA S.M.M MOHAMED YASSIN
Dip. Computer Science (UPM)
Bsc. Computer Science (UPM)
Msc. Security in Computing (UPM)
PhD. Security in Computing (UPM)
• s.m.warusia@utem.edu.my

DR. SHEKH FAISAL ABDUL LATIP
Dip. Electronic Engineering (UTM)
BSc. (Hons.) Computer Science (UTM)
MSc. Information Security
(Royal Holloway University of London, UK)
PhD in Comp. Science
(University of Wollongong, Australia)
• shekhfaisal@utem.edu.my

DR. SYARULNAZIAH ANAWAR
BIT (Hons) (UUM)
MSc. Computer Science (UPM)
PhD in Computer Science (UiTM)
• syarulnaziah@utem.edu.my

DR. ZAHEERA ZAINAL ABIDIN
Dip. IT (Advanced Diploma) (Infotek MARA)
BIT (Uni. of Canberra, Australia)
MSc. Computer Networking (UiTM)
PhD. In Information Technology & Quantitative Sciences (UiTM)
• zaheera@utem.edu.my

DR. ZURINA SA'AYA
BIT (UUM)
MSc. Electronic Commerce Technology (Aberdeen, UK)
PhD Computer Science & Informatics
(University College Dublin, Ireland)
• zurina@utem.edu.my

Ts. ARIFF IDRIS
NCC International Diploma in Computer Studies
(NCC, UK)
Adv. Dip. in IT (UniKL-IIM)
BSc. (Hons.) IT (UiTM)
MIT Comp. Science (UKM)
• miariff@utem.edu.my

Ts. ERMAN HAMID
BIT (Hons) Multimedia (UUM)
MSc. Comp. Sc (UKM)
• erman@utem.edu.my

Ts. HANIZA NAHAR
BSc. Telecommunication Engineering (UM)
MSc. in ICT for Engineers (Distinction)
(Coventry University, UK)
• haniza@utem.edu.my

Ts. MUHAMAD SYAHRUL AZHAR SANI
BSc. Comp. Science (UTM)
MSc. Comp. Science (UTM)
• syahrul@utem.edu.my

Ts. SUHAIMI BASRAH
BSc. Physics & Maths (Alabama, USA)
NVQ Level IV (Adult Learning)
(Nene College, Northampton, UK)
MSc. IT (UiTM)
• suhaimibasrah@utem.edu.my

Ts. ZAKIAH AYOP (Medical leave)
BSc. Computer Science (UTM)
MSc. Computer Science (UPM)
• zakiah@utem.edu.my

IRDA ROSLAN
BSc. Computer Science (UTM)
MSc. Computer Science (UTM)
• irda@utem.edu.my

KHADIJAH WAN MOHD GHAZALI
BIT (Hons.) Systems Science & Management (UKM)
MSc. Comp. Science (UTM)
• khadijah@utem.edu.my

MARLIZA RAMLY
Dip. Computer Science (UPM)
BSc. Computer Science (UPM)
MSc. in ICT for Engineers (Coventry University, UK)
• marliza@utem.edu.my

MOHAMMAD RADZI MOTSIDI
Dip. Computer Science (UiTM)
BSc. IT (UiTM)
MSc. in Computer and Information Networks (Essex, UK)
• radzi@utem.edu.my

MOHD HAKIM ABDUL HAMID
BSC. Computer Science (UPM)
Master of Science (Distributed Computing) (UPM)
• mohdhakim@utem.edu.my

MOHD NAJWAN MD. KHAMBARI
BSc. Comp. Science (Hons.) Computer Network (UTeM)
MSc. Information Technology (UTeM)
• najwan@utem.edu.my

NOR AZMAN MAT ARIFF
Dip. Computer Science (UTM)
BSc. Computer Science (UTM)
MSc. Computer Science (UKM)
• nazman@utem.edu.my

DEPARTMENT OF INTELLIGENT COMPUTING & ANALYTICS

PROF. DR. MOHAMMAD ISHAK DESA
BSc Maths (UKM)
PG-Dip Operational Research and Systems Analysis (Aston, UK)
MA Math. Sc. (Illinois-Springfield, USA)
PhD Operational Research (Salford, UK)
• mohammad.ishak@utem.edu.my

PROF. Ts. DR. GOH ONG SING
BA Education (USM)
MSc. (UMIST, UK)
PhD (Murdoch, Australia)
• goh@utem.edu.my

ASSOC. PROF. Gs. DR. ASMALA AHMAD
B.App.Sc. Geophysics (USM)
MSc. Remote Sensing (UTM)
PhD in Applied Mathematics (Remote Sensing) (University of Sheffield, UK)
• asmala@utem.edu.my

ASSOC PROF. Ts. DR. ZURAIDA ABAL ABAS
BSc. Industrial Mathematics (UTM)
MSc. Operational Research (London School of Economics, UK)
PhD. in Mathematics (UTM)
• zuraidaa@utem.edu.my

ASSOC. PROF. DR. ABD SAMAD HASAN BASARI
BSc. Mathematics (Hons.) (UKM)
MSc. IT-Education (UTM)
PhD. In Information and Communication Technology (UTeM)
• abdsamad@utem.edu.my

ASSOC. PROF. DR. AZAH KAMILAH MUDA @ DRAMAN
BSc. Computer Science (Software Engineering) (UTM)
MSc. Computer Science (Software Engineering) (UTM)
PhD. in Computer Science (Pattern Recognition) (UTM)
• azah@utem.edu.my

ASSOC. PROF. DR. CHOO YUN HUOY
BSc. (Hons.) Science & Comp. with Education (Maths)(UTM)
MSc. IT (Education) (UTM)
PhD Sc. & Management Sys. (Data Mining) (UKM)
• huoy@utem.edu.my

ASSOC. PROF. DR. BURHANUDDIN MOHD ABOOBAIDER
Dip. Comp. Sc. (UiTM)
BSc. Comp. Sc. (UTM)
MSc. Mathematics (USM)
PhD. Computer Science (UTM)
• burhanuddin@utem.edu.my

ASSOC. PROF. DR. SHARIFAH SAKINAH SYED AHMAD
B.App.Sc. Comp. Aided Graphics Design (USM)
MSc. in Mathematics (USM)
PhD. in Software Engineering and Intelligent System (University of Alberta, Canada)
• sakinah@utem.edu.my

Ts. DR. GEDE PRAMUDYA ANANTA
BSc. (Hons) Mathematics & Mathematics Education (Universitas Udayana - ITB, Indonesia)
MSc. Computer Science (Macquarie University, Australia)
D.Ed. ICT in Education and Training (Wollongong University of Technology, Australia)
• gedepramudya@utem.edu.my

Ts. DR. HALIZAH BASIRON
Dip. Computer Science (UTM)
BSc. Computer Science (UTM)
MSc. Interactive Computing Sys Design (Loughborough, UK)
PhD in Comp. Science (University of Otago, NZ)
• halizah@utem.edu.my

Ts. DR. NGO HEA CHOON
BSc. (Hons.) Computer Science (UTeM)
MSc. IT (UNSW, Sydney)
PhD in Comp. Science (USM)
• heachoon@utem.edu.my

Ts. DR. NORZIHANI YUSOF
BSc. (Hons.) Maths (UKM)
MSc. Maths (UKM)
PhD in Mathematical Modelling (UM)
• norzihani@utem.edu.my

Ts. DR. SAZALINSYAH RAZALI
BSc. (Hons.) Information Technology (UiTM)
MSc. Computer Science (USM)
PhD. Computer Science (Loughborough University, UK)
• sazalinsyah@utem.edu.my

Ts. DR. SEK YONG WEE
BSc. (Hons.) Statistics (UKM)
MSc. IT (UPM)
PhD in Business Information System (RMIT University, Melbourne, Australia)
• ywsek@utem.edu.my

Ts. DR. ZERATUL IZZAH MOHD YUSOH
BSc. (Hons.) Computer Science in Software Eng (UTM)
MSc. Artificial Intelligence (Edinburgh Univ, UK)
PhD. in Information Technology (Queensland University of Technology, Australia)
• zeratul@utem.edu.my

DR. ABDUL SYUKOR MOHAMAD JAYA
BIT (Hons.) Industrial Computing (UKM)
MEng. Advanced Manufacturing Technology (UTM)
PhD in Computer Science (UTM)
• syukor@utem.edu.my

DR. FAUZIAH KASMIN
BSc. (Hons.) Mathematics (UPM)
MSc. (Applied Statistics) (UPM)
PhD in Computer Science (UKM)
• fauziah@utem.edu.my

DR. NORHAZWANI MD YUNOS
BSc. (Industrial Mathematics) (UTM)
MSc. (Mathematics) (UTM)
Doctor of Informatics (Applied Mathematics and Physics) (Kyoto University, Japan)
• wanie.my@utem.edu.my

DR. NUR ZAREEN ZULKARNAIN
BTech. (Hons) Information and Communication Technology (Universiti Teknologi PETRONAS)
MSc. Adv. Computer Science (AI) (The University of Manchester, UK)
PhD. in Computer Science (NLP) (University of Salford, UK)
• zareen@utem.edu.my

DR. SITI AZIRAH ASMAI
BSc. Computer Science (UTM)
MSc. ICT for Engineer (Coventry, UK)
PhD in Information and Communication Technology (UTeM)
• azirah@utem.edu.my

DR. YOGAN JAYA KUMAR
B.App.Sc. Mathematics (USM)
MSc. Mathematics (USM)
PhD in Information Retrieval (UTM)
• yogan@utem.edu.my

DR. ZAHRIAH SAHRI
Dip. Computer Science (UiTM)
BSc. Science (Comp) (UTM)
MSc. Computer Science (UPM)
PhD in Artificial Intelligence (UTM)
• szahriah@utem.edu.my

Ts. AHMAD FADZLI NIZAM ABDUL RAHMAN
B.App.Sc. (Hons.) Comp. Modelling (USM)
MSc. IT (UiTM)
• fadzli@utem.edu.my

NUZULHA KHILWANI IBRAHIM
BSc. Computer Science (UTM)
MSc. Computer Science (UTM)
• nuzulha@utem.edu.my

ZURAINI OTHMAN
B.App.Sc. Comp. Aided Graphics Design (USM)
MSc. of Mathematics (USM)
• zuraini@utem.edu.my

DR. NOOR FAZILLA ABD YUSOF
BSc. Information Technology (UNIRAZAK)
MSc. Computer Science (UTM)
PhD Computing Science (University of Aberdeen)
• elle@utem.edu.my

LAB TECHNICIANS / ASISSTANT ENGINEER

MOHD AEINI AMIN
Cert. in Electronic Communication Eng (Politeknik Ungku Omar)
Dip. In Electronic Eng (Politeknik Port Dickson)
Bachelor in Communication (Universiti Utara Malaysia)
• aeini@utem.edu.my

MOHD HAFFEZ KHALIK
Dip. in Multimedia (Cosmopoint)
BA (Hons.) Multimedia (OUM)
MSc. (Computer) in Internetworking Technology (UTeM)
• haffez@utem.edu.my

MOHD KAMAL TARMIZI RAZAK
Cert. in Electronic Eng. (Computer)
(Politeknik Sultan Hj. Ahmad Shah)
Dip. in Electronic Eng. (Politeknik Port Dickson)
BSc. (Hons.) IT (OUM)
MSc. (Computer) in Internetworking Technology (UTeM)
• mohdkamal@utem.edu.my

FAUZURA MOHD SALLEH
Cert. in Electronic Eng. (Computer) (Politeknik Port Dickson)
Dip. In Electronics Eng. (Communications) (Politeknik Ungku Omar),
BSc. (Hons.) Safety And Health Management (OUM)
• fauzura@utem.edu.my

HAZRE HARUN
Cert. in Electronic Eng. (Computer) (Politeknik Sultan Hj. Ahmad Shah)
• hazre@utem.edu.my

MOHD FAHRULRAZI SAJI
Cert. in Electronic Eng. (Computer)
(Politeknik Port Dickson)
• fahrulrazi@utem.edu.my

NORHAFIZAN MD YUSOF
Dip. Comp. Tech (DTK) (Politeknik Port Dickson)
• hafizan@utem.edu.my

MOHD RIF'AN ABDUL RAHMAN
Dip. (Politeknik Sultan Azlan Shah)
• rifan@utem.edu.my

JUNAIDI IBRAHIM
Cert. in Electrical & Electronik Eng
(Politeknik Port Dickson)
• junaidiibrahim@utem.edu.my

ZUBAIDAH ABD HAMID
Cert. in Electronik Eng (Comm)
(Politeknik Johor Bahru)
• zubaidah@utem.edu.my

SHARUDIN ABD. MAJID
Cert. in Electronic Eng. (Politeknik Port Dickson)
• sharudin@utem.edu.my

MOHD NIZAM SAID
Cert. in Electronic Eng (Computer)
(Politeknik Sultan Hj. Ahmad Shah)
• mohdnizam@utem.edu.my

SHAHRIZAN ABDULLAH
Cert. in Electronics (Politeknik Kota Melaka)
Diploma in Electronic Engineering (Politeknik Merlimau)
• shahrizan.abdullah@utem.edu.my

BADROLHISAM HARUN
Cert. in IT Informatics (Cosmopoint)
Cert. in Electronic Eng. (Politeknik Port Dickson)
Dip. in Electronics (Computer)
(Politeknik Sultan Hj. Ahmad Shah)
• badrolhisam@utem.edu.my

MOHAMMAD UZAINI AB RAHIM
Cert. in Engineering (Electronic Computer)
(Politeknik Port Dickson)
• uzaini@utem.edu.my

NORFAZLIZAH MAT SAPAR
Cert. in Electrical Engineering (Power)
• norfazlizah@utem.edu.my

NUR SYAHIDA YAHYA
BA in Electrical (UTM)
Diploma in Electronic Engineering
(Politeknik Port Dickson)
• syahida@utem.edu.my

JAZLAN JAMAL ABDUL NASIR
Diploma of Manufacturing Engineering
(Universiti Teknikal Malaysia Melaka)
• jazlan@utem.edu.my

ZURAIDA ABDUL HADI
Cert. in Mechanical Engineering
(Politeknik Seberang Prai)
• zuraida@utem.edu.my

MOHD YUZAIMIE MOHD YUNUS
Cert. in Electronic Engineering (Computer)
(Politeknik Port Dickson)
• yuzaimie@utem.edu.my

AZMI HUSSIN
Cert. in Electronic Communication
(Politeknik Kota Melaka)
• azmi.hussin@utem.edu.my

HAIRMI OTHMAN
Diploma in Mechanical Engineering
(Politeknik Johor Baharu)
• hairmi@utem.edu.my

ADMINISTRATIVE STAFFS

Deputy Registrar
SHARIFAH NURUL FARIDAH SYED ABU BAKAR
Degree in Law (Hons), LLB (UKM)
Master in Law, LLM (UKM)
• nurulfaridah@utem.edu.my

Senior Assistant Registrar
NORHIDAYAH MOHD ZAINUDIN
BBA Human Resource Management (UPM)
• norhidayah.zainudin@utem.edu.my

Office Secretary
NORASMARA MAHMUD
Dip. in Secretarial Science (UiTM)
• norasmara@utem.edu.my

Assistant Administrative Officer
NOOR AZMAN MANSOR
• noorazman@utem.edu.my

Assistant Accountant (W27)
RUMAIYAH SAAD
• rumaiyah@utem.edu.my

Senior Admin Assistant
ROHANA ABU BAKAR
• rohana2@utem.edu.my

Secretary
SITI NORHASHIMAH KOLAH
• hashimah@utem.edu.my

Admin Assistant
NUR AISHAH SHAFIE
• aishah.shafie@utem.edu.my

ROHAYA IBRAHIM
• rohaya@utem.edu.my

NORIDAYU BAHAROM
noridayu@utem.edu.my

IZWAN MOHAMAD
Izwan.mohamad@utem.edu.my

Operational Assistant
JASMI JOHARI
• jasmi@utem.edu.my

Faculty of Information & Communication Technology
Universiti Teknikal Malaysia Melaka
Hang Tuah Jaya, 76100 Durian Tunggal
Melaka, Malaysia

E-mail: ftmk@utem.edu.my
Telephone: +606 2702411
Fax: +606 2701048

UTeM
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
www.utem.edu.my

PENERBIT UTeM *Press*
Website : **www.utem.edu.my/penerbit**
Books Online : **utembooks.utem.edu.my**
Email : **penerbit@utem.edu.my**