

Faculty of Computer Systems & Software Engineering

FACULTY OF COMPUTER SYSTEMS & SOFTWARE ENGINEERING

INTRODUCTION

Faculty of Computer Systems & Software Engineering was established on 16 February 2002 to produce knowledgeable, high skilled and competitive graduates within the sphere of software engineering, system and computer network. At the beginning, the faculty had two fields which are Software Engineering and Networking.

The faculty has also embarked on research and development activities in the area such as information systems, software engineering, computer systems, communication systems, graphic and multimedia technology to produce technologies that are relevant to the needs of industries. Currently, the faculty has four research groups which are Network & Security, Modeling & Simulation, Data Mining & Knowledge Management and Graphic & Image Processing to support university's focus groups (Manufacturing & Automotive and Chemical & Biotechnology).

The faculty emphasizes on the development and growth of its students' enrolment and graduates. Through high quality teaching (by completing specific quality outcome and generic skills), great laboratories facilities, proper and careful advising and numerous professional activities, our students have opportunity to excel in the classroom and laboratory session. In a personable atmosphere, the students become well prepared in the term of software engineering knowledge and technical skills. Thus, they are ready and confident to begin their professional career or further their studies.

The faculty's current planning is to be an ICT reference centre in Pahang to support the development of East Coast Economic Region (ECER), Malaysia. To realize this, many activities which involve industries and government sectors have been carried out.

VISION

To be a world class competency-based faculty in computer technology.

MISSION

We provide computer technology education, high-quality research and consultation in line with the needs of industries through excellent academic programs by providing a conducive environment to produce creative and innovative human capital.

PROGRAMS OFFERED

Diploma in Computer Science

Bachelor of Computer Science (Software Engineering)

Bachelor of Computer Science (Computer Systems & Networking)

Bachelor of Computer Science (Graphics & Multimedia Technology)

Master by Coursework

Master of Science (Software Engineering)

Master of Science (Computer Networking)

Master of Science (Information & Communication Technology)

Master by Research

Master in Computer Science

Master in Software Engineering

Doctor of Philosophy (PhD in Computer Science)

Doctor of Philosophy (PhD in Software Engineering)

LABORATORIES AND FACILITIES

There are 21 laboratories at the faculty which are located in Block X, Y and M. These laboratories are listed as follows:

- CCNA Lab (2)
- Undergraduate Research Lab (1)
- Innovative Programming (2)
- Distributed Databases (1)
- SQL Databases Lab (1)
- Operating System Lab (1)
- ICT Lab (3)
- CISCO Lab (1)
- LAN Workshop Lab (1)
- Software Engineering Lab (3)
- Postgraduate Research Lab (3)
- Creative Lab (1)
- Modeling Lab (1)
- IBM Center Of Excellence

All these labs are managed by technical unit headed by Head of Technical Unit. Several sub-ordinates comprises of Vocational Training Officer, Information Technology Officer, Assistant of Vocational Training Officer and Technician are located at the laboratories to help in management and administration of all equipments and labs. There are three technical unit rooms provided services to our staffs and students such as printing services, maintenance services, repair and troubleshooting services, and lab management services. These technical unit rooms are placed at each block.

Among equipments (hardware and software) provided to assist teaching and learning in labs are as follows:

- Sun Server
- Server, High-End Desktop and PCs
- Switches and Routers
- Fiber Splicer
- Optical Time-Domain Reflectometer (OTDR)
- Fluke Cable Network Analyzer and Tester
- Wireless Access Point
- Wireless Network Interface Card (NIC)
- Antenna for Wireless Systems (indoor and outdoor)
- Hardware-based firewall
- Network Cabling Tools and Components

- PC Assembly and Disassembly Tools and Components
- Camcorder
- Digital Single-Lens Reflex (DSLR)
- Mobile Studio Lighting
- Radio Frequency Identification (RFID) System
- Fingerprint Reader
- Personal Digital Assistant (PDA) and Mobile Device
- Global System for Mobile Communications (GSM) Modem
- Xbox Set
- MyKad Reader
- Laser Scanner and Printer
- All Microsoft Softwares available through MSDN Academic Alliance Software Center
- Rational Suite
- Adobe Products
- Matrix Laboratory (MATLAB)
- Code Gear C++
- Sun Solaris, Linux and Microsoft Operating System
- S-Plus
- LEGO Robot

FACULTY MANAGEMENT**DEAN****Professor Dr. Jasni binti Mohamad Zain**

PhD (Digital Watermarking) (Brunel University, UK)

Med (U of Hull, UK)

PGCE (Math) (Sheffield Hallam, UK)

BSc (Hons) Computer Science (Liverpool, UK)

Telephone No.: 09- 5492013

Email: jasni@ump.edu.my

DEPUTY DEAN (ACADEMIC & STUDENT DEVELOPMENT AFFAIRS)**Dr. Adzhar bin Kamaludin**

PhD IT for Manufacturing (Loughborough, UK)

MSc IT for Manufacturing (U. of Warwick, UK)

BSc Computer Science (UTM)

Telephone No.: 09- 5492467

Email: adzhar@ump.edu.my

DEPUTY DEAN (RESEARCH & POSTGRADUATE)**Dr. Mazlina binti Abdul Majid**

PhD in Computer Science (University in Nottingham, UK)

MSc Software Engineering (UM)

BSc Computer Science. (UTM)

Telephone No.: 09- 5492468

Email: mazlina@ump.edu.my

HEAD OF PROGRAM (MASTER)**Associate Profesor Dr. Noraziah binti Ahmad**

PhD in Database (Universiti Malaysia Terengganu)

BSc Computer Science (UPM)

Telephone No.: 09- 5492121

Email: noraziah@ump.edu.my

HEAD OF PROGRAM (SOFTWARE ENGINEERING)**Dr. Rohani binti Abu Bakar**

Ph.D.(Eng) in DNA Computation(Waseda University)

M.Sc. in Software Engineering (UM)

B.Sc. (Hons) in Computer Science (UTM)

Telephone No.: 09- 5492109

Email: rohani@ump.edu.my

HEAD OF PROGRAM (COMPUTER SYSTEMS & NETWORKING)

Dr. Mohd Nizam bin Mohmad Kahar

Phd Computer Science (Nottingham University, UK)
MSc Mathematics (UTM)
BEng Computer Eng. (UTM)
Telephone No.: 09 5492108
Email: mnizam@ump.edu.my

HEAD OF PROGRAM (COMPUTER SCIENCE)

Dr. Mohamad Fadli bin Zolkipli

PhD Computer Science (USM)
MSc. Information Technology (UUM)
BIT (Hons) Information Technology (UUM)
Telephone No.: 09- 5492473
Email: fadli@ump.edu.my

HEAD OF PROGRAM (GRAPHICS & MULTIMEDIA TECHNOLOGY)

Dr. Tuty Asmawaty binti Abdul Kadir

PhD in Engineering Information Science (Khushu Institute of Technology, Japan)
MSc Software Engineering (UTM)
BSc Computer Science (UTM)
Telephone No.: 09-549 2123
Email: tuty@ump.edu.my

HEAD OF TECHNICAL

Mohd Tarmizi Ab Rahman

Master of Science (Computer Science - Real Time Software Engineering) (UTM)
Bach. of Information Technology (UKM)
CompTIA A+ Certified Professional
Microsoft Certified Professional (MCP)
Microsoft Certified Desktop Support Technician (MCDST)
Telephone No.: 09- 5492116

Email: tarmizi@ump.edu.my

ACADEMIC STAFF**PROFESSORS****Professor Dr. Jasni binti Mohamad Zain**

PhD (Digital Watermarking) (Brunel University, UK)

MEd (U of Hull, UK)

PGCE (Math) (Sheffield Hallam, UK)

BSc (Hons) Computer Science (Liverpool, UK)

Telephone No.: 09- 5492013

Email: jasni@ump.edu.my

Professor Dr. Kamal Zuhairi bin Ramli

PhD Software Engineering, (University of Newcastle Upon Tyne, UK)

MSc Software Engineering (UM)

BSc Computer Science. (UTM)

Telephone No.: 09- 5492468

Email: kamalz@ump.edu.my

Professor Dr. Abdullah bin Embong

Ph.D. Computer Science, (Loughborough University of Technology, UK)

M.S. Information Systems, (Indiana University, Bloomington, U.S.A.,)

B.Sc. (Hons.) Mathematics, (Universiti Sains Malaysia, Penang, Malaysia.)

Teacher Training Certificate, (Maktab Perguruan Temenggung Ibrahim, Johor)

Telephone No.: 09- 5492017

Email: abdullahbe@ump.edu.my

ASSOCIATE PROFESSORS**Associate Professor Dr. Wan Maseri binti Wan Mohd**

Ph.D (Management) (UTM)

MSc Computer Science (U of Miami, Florida, USA)

BSc Computer Science (U of Miami, Florida, USA)

Telephone No.: 09- 5492180

Email: maseri@ump.edu.my

Associate Professor Dr. Ruzaini bin Abdullah Arshah

Ph.D Computer Science (UTM, Skudai)

MSc Information Mgmt.(Uni.of Sheffield, UK)

BSc. Business Admin. (Comp. Information System) (California State U, USA)

Telephone No.: 09-549 2160

Email: ruzaini@ump.edu.my

Associate Professor Dr. Noraziah binti Ahmad

PhD in Database (UMT)

BSc Computer Science (UPM)

Telephone No.: 09- 5492121

Email: noraziah@ump.edu.my

SENIOR LECTURERS**Dr. Adzhar bin Kamaludin**

PhD IT for Manufacturing (Loughborough, UK)

MSc IT for Manufacturing (U. of Warwick, UK)

BSc Computer Science (UTM)

Telephone No.: 09- 5492127

Email: adzhar@ump.edu.my

Dr. Norrozila binti Sulaiman

Phd In Computer Engineering (University of New Castle Upon Tyne, UK)

MSc Information Technology (UiTM)

BSc Software Eng. (Sheffield Hallam)

Telephone No.: 09- 5492119

Email: norrozilla@ump.edu.my

Wan Muhammad Syahrir bin Wan Hussin

MSc Computer Science (Real-Time Software Eng.) (UTM)

BEng Electrical Eng. (Mechatronic) (UTM)

MCP (Microsoft Certified Professional)

Telephone No.: 09- 5492124

Email: wmsyahrir@ump.edu.my

Che Yahaya bin Yaakub

MSc Computer Science (UTM)
 BSc Computer Science (UKM)
 Telephone No.: 09- 5492105
 Email: yahaya@ump.edu.my

Dr. Rohani binti Abu Bakar

Ph.D.(Eng) in DNA Computation
 (Waseda University)
 M.Sc. in Software Engineering
 (UM)
 B.Sc. (Hons) in Computer Science
 (UTM)
 Telephone No.: 09- 5492109
 Email: rohani@ump.edu.my

Dr. Mohammad Masroor Ahmed

Ph.D Computer Science (UTM)
 M.Sc Computer Science (UTM)
 M.Sc Hamdard University Karachi
 (Islamabad Campus, Pakistan)
 B.Sc Computer Science (University
 of the Punjab, Lahore, Pakistan)
 Telephone No.: 09- 5492158
 Email: masroor@ump.edu.my

Dr. Lee Ho Cheong

PhD in Computing, Engineering
 and Product Design (The Hong
 Kong
 Polytechnic University)
 MSc. in Computer in Manufacturing
 (The University of Hong Kong)
 Bachelor Degree in Computer
 Science (Victoria University of
 Technology)
 Telephone No.: 09- 5492110
 Email: jackielee@ump.edu.my

Dr. Tuty Asmawaty binti Abdul Kadir

PhD of Engineering Information
 Science (Khushu Institute of
 Technology, Japan)
 MSc Software Engineering (UTM)
 BSc Computer Science (UTM)
 Telephone No.: 09-549 2123
 Email: tuty@ump.edu.my

Dr. Mazlina binti Abdul Majid

PhD
 in Computer Science (University in
 Nottingham, UK)
 MSc. Software Engineering (UM)
 BSc Computer Science (UTM)
 Telephone No.: 09-549 2205
 Email: mazlina@ump.edu.my

Dr Balsam Abdul Jabbar Mustafa

PhD Software Engineering (UTM)
 MSc. Computer Information
 Systems (UK)
 BSc. Electrical Engineering (Iraq)
 Telephone No.: 09- 5492140
 Email: balsam@ump.edu.my

Dr. Liew Siau Chuin

PhD in Computer Science (UMP)
 MSc Strategic Business I.T (UK)
 BIT.Information Technology
 (University Of Southern
 Queensland)
 Telephone No.: 09- 5492524
 Email: liewsc@ump.edu.my

Dr. Mohamed Ariff bin Ameen

PhD Computer Science
 (Birmingham University, UK)
 Bach. of Computer Science
 (Computer Systems & Network)
 (UMP)
 Telephone No.: 09- 5492472
 Email: mohamedariff@ump.edu.my

Dr. Mohd Nizam bin Mohmad Kahar

PhD Computer Science
 (Nottingham Univ, UK)
 MSc Mathematics (UTM)
 BEng Computer Eng. (UTM)
 Telephone No.: - 09-5492108
 Email: mnizam@ump.edu.my

Dr. Rahmah binti Mokhtar

PhD Information Technology
 (UKM)
 MSc. Information Technology
 (UKM)
 BSc. Library and Information
 Science (UiTM)
 Telephone No.: 09- 5492117
 Email: rahmahm@ump.edu.my

Dr. Mohamad Fadli bin Zolkipli

PhD Computer Science (USM)
 MSc. Information Technology
 (UUM)
 BIT (Hons) Information Technology
 (UUM)
 Telephone No.: 09- 5492473
 Email: fadli@ump.edu.my

Dr. Ngahzaifa binti Ab. Ghani

PhD An Evaluation of The Potential Adaptive-Fuzzy Inference System in Hydrological Modeling & Prediction (Nottingham Univ, UK)
 BSc (Hons). Geoinformatic (UTM)
 Telephone No.: - 09-5492102
 Email: ngahzaifa@ump.edu.my

Dr. Qin Hongwu

PhD Computer Science (UMP)
 MEng Computer Application Technology (University of Technology, Beijing)
 BEng Computer And Application. (Northwest Normal University, China)
 Telephone No.: - 09-5492696
 Email: qinhongwu@ump.edu.my

Dr. Muhammad Mansoor Alam

PhD Eng Technology (Electrical & Electronics Engineering (UniKL)
 PhD Computer Science (University De La Rochelle, France)
 MSc Information System Engineering (University of Reading, UK)
 BSc Mathematics (Punjab University, Pakistan)
 Telephone No.: - 09-5492419
 Email: mansoor@ump.edu.my

Dr. Luhur Bayuaji

PhD Remote Sensing & Earth Observation (Chiba University, Japan)
 MEng. Multimedia Over Computer Network (Chiba University, Japan)
 BEng Computer Network (University Indonesia, Indonesia)
 Telephone No.: 09- 5492249
 Email: luhurbayuaji@ump.edu.my

Dr. Abdulrahman Ahmed Mohammed Al-Sewari

PhD in Software Engineering Software Testing (USM)
 MSc. Information Technology (UUM)
 BEng Computer Engineering, (Military College Of Engineering, Iraq)
 Telephone No.:
 Email:

Dr. Ma Xiuqin

PhD Computer Science (UMP)
 MSc Engineering Computer Application Technology (Northwest Normal University, China)
 BEng Computer & Application (Central South University, China)
 Telephone No.:
 Email: xueener@gmail.com

LECTURERS**Aziman bin Abdullah**

MSc. Internet Computing (U. of Surrey, UK)
 BSc Computer Science (UTM)
 Telephone No.: 09- 549 2106
 Email: aziman@ump.edu.my

Abdullah bin Mat Safri

MSc Information Security (UTM)
 BIT. Hons Information Management (UUM)
 Telephone No.: 09- 5492125
 Email: abdullah@ump.edu.my

Muhammed Ramiza bin Ramli

MSc Computer Science (Real-Time Software Eng.) (UTM)
 BEng Computer Engineering (UTM)
 Telephone No.: 09- 5492115
 Email: ramiza@ump.edu.my

Jamaludin bin Sallim

MSc Software Engineering (UTM)
 BSc Computer Science (UTM)
 Telephone No.: 09- 5492152
 Email: jamal@ump.edu.my

Syarifah Fazlin binti Seyed Fadzir

MSc Computer Science (Soft. Engineering) (UPM)
 BSc Computer Science (UPM)
 Telephone No.: 09- 5492122
 Email: fazlin@ump.edu.my

Rahiwan Nazar bin Romli

MSc Computer Science (Software Engineering)
 BIT (Hons) Information Technology (Network)
 Telephone No.: 09- 5492134
 Email: rahiwan@ump.edu.my

Rozlina binti Mohamed

MSc Computer Science (Real-Time Software Eng) (UTM)
 BSc Computer Science (UTM)
 Telephone No.: 09- 5492131
 Email: rozlina@ump.edu.my

Mohd Hafiz bin Mohd Hassin

M.Sc (Information Technology), (UUM)
 B.IT(Hons) Information Technology, (UUM)
 Telephone No.: 09- 5492475
 Email: hafizhassin@ump.edu.my

Wan Nurulsafawati binti Wan Manan

MSc Information Technology (University of Queensland, Australia)
 BSc Computer Science (Networking) (UTEM)
 Telephone No.: 09- 5492151
 Email: safawati@ump.edu.my

Zalili binti Musa

MSc Computer Science (UTM)
 BSc Computer Science (UTM)
 Telephone No.: 09- 5492112
 Email: zalili@ump.edu.my

Nor Azhar bin Ahmad

MSc (Bioinformatics) (UTM)
 Bach. of Computer Science (Software Engineering) (UTM)
 Telephone No.: 09- 5492107
 Email: nazhar@ump.edu.my

Syahrizal Azmir bin Md. Sharif

MSc (Information Security) (UTM)
 Bach. of Computer Science (Computer Systems & Network) (UMP)
 Telephone No.: 09- 5492436
 Email: svazmir@ump.edu.my

Nurzety Aqtar binti Ahmad Azuan

MSc Computer Science (Monash University, Melbourne)
 Bach. of Computer Science (Software Engineering) (UMP)
 Telephone No.: 09- 5492159
 Email: aqtar@ump.edu.my

Abbas Saliimi bin Lokman

MSc. Computer Science (UMP)
 BSc. Computer Science (Software Engineering) (UMP)
 Telephone No.: 09- 5492423
 Email: abbas@ump.edu.my

Imran Edzereiq bin Kamarudin

MSc Computer Network (UiTM)
 B.Sc. Data Communications & Networking (UiTM)
 Telephone No.: 09- 5492431
 Email: edzereiq@ump.edu.my

Noraniza binti Samat

MSc Science (Information Technology)
 BIT.Information Technology (Multimedia Studies)
 Telephone No.: 09- 5492162
 Email: noraniza@ump.edu.my

Toh Chin Lai @ Mohd Zulfahmi**Toh bin Abdullah**

MSc Computer Science (Real-Time Software Eng.) (UTM)
 B.Sc. Computer Science (Software Engineering) (UMP)
 Telephone No.: 09- 5492351
 Email: zulfahmi@ump.edu.my

Azlinaz binti Zainuddin

MSc Computer Science (Real-Time Software Eng.) (UTM)
 B.Eg. Computer (UTM)
 Telephone No.: 09- 5492352
 Email: azlinaz@ump.edu.my

Muhamad Idaham bin Umar Ong

MSc Information Technology Management (UTM)
 B.Sc. Computer Science (Software Engineering) (UMP)
 Telephone No.: 09- 5492438
 Email: idaham@ump.edu.my

Roslina binti Abdul Hamid

MSc Computer Science (UTM)
 BSc Computer Science (USM)
 Telephone No.: 09- 5492469
 Email: roslina@ump.edu.my

Syahrulanuar bin Ngah

MSc Computer Science (UPM)
 BSc Computer Science (UPM)
 MCP (Microsoft Certified
 Professional)
 Telephone No.: 09-5492440
 Email: syahrulanuar@ump.edu.my

Suryanti binti Awang

MSc Computer Science (UTM)
 BSc Computer Science (UTM)
 Telephone No.:
 Email: suryanti@ump.edu.my

Azma binti Abdullah

MSc Computer Science (Real-Time
 Software Eng.) (UTM)
 BSc Computer Science (UTM)
 Telephone No.: -
 Email: azma@ump.edu.my

**Noorhuzaimi@Karimah binti
Mohd Noor**

Pursuing PhD in Technology and
 Information Science (UKM)
 MSc Computer Science (UPM)
 BSc Computer Science (UPM)
 Telephone No.: -
 Email: nhuzaimi@ump.edu.my

Zarina binti Dzolkhifli

MSc. Of Science (Database
 System), (UPM)
 B.Sc (Hons) Computer Science
 (UPM)
 Telephone No.: 09- 5492474
 Email: dzarina@ump.edu.my

Ku Saimah binti Ku Ibrahim

MSc Software Engineering (UPM)
 BSc Computer Science (Software
 Engineering) (UMP)
 Telephone No.: 09- 5492145
 Email: saimah@ump.edu.my

Siti Normaziah binti Ihsan

M.S.ComputerScience(Multimedia
 System),(UPM)
 BSc Computer Science (Software
 Engineering) (UMP)
 Telephone No.: 09- 5492150
 Email: normaziah@ump.edu.my

**Abdul Sahli bin Fakhrudin
*Study Leave**

Pursuing PhD Computer Science
 (UPM)
 M.IT (System Management &
 Sciences) (UKM)
 B.IT (System Management &
 Sciences) (UKM)
 Telephone No.: -
 Email: sahli@ump.edu.my

**Mohd Azwan bin Mohamad
@Hamza *Study Leave**

Pursuing PhD Computer Science
 (UKM)
 MSc. Software Engineering (UTM)
 BSc Computer Science (UTM)
 Telephone No.: -
 Email: azwan@ump.edu.my

Fauziah binti Zainuddin

***Study Leave**
 Pursuing PhD Computer &
 Information Science, Hosei
 University, Japan
 MSc Information Technology
 (Computer Science) (UKM)
 Bach. of Information Technology
 (UUM)
 Telephone No.: -
 Email: fauziahz@ump.edu.my

Noor Yati binti Talib

***Study Leave**
 Pursuing PhD Computer Science
 (Bradford University, UK)
 M.Sc. (Computer Science- Real
 Time Software Eng.) (UTM)
 B.Sc. Computer (Hons) (UTM)
 Dip. In Computer Science (UTM)
 Telephone No.: -
 Email: nooryati@ump.edu.my

Junaida binti Sulaiman

***Study Leave**
 Pursuing PhD in Computer Science
 (Kyushu of Institut Technology,
 Japan)
 MSc Computer Science (UTM)
 Bach. of Management Info. System
 (UIA)
 Telephone No.: -
 Email: junaida@ump.edu.my

Roslina binti Mohd Sidek***Study Leave**

Pursuing PhD in Software Engineering (UPM)
 MSc Computer Science (UPM)
 BSc Computer Science (UTM)
 Telephone No.: -
 Email: roslinams@ump.edu.my

Awanis binti Romli***Study Leave**

Pursuing PhD in Manufacturing Engineering (Cardif University, UK) MSc Information Technology (Manufacturing) (UTM)
 BSc Computer Science (UTM)
 Telephone No.: -
 Email: awanis@ump.edu.my

Noorlin binti Mohd Ali***Study Leave**

Pursuing PhD in Computer Science (Kyushu of Institut Technology, Japan)
 MSc Artificial Intelligent (UUM)
 BIT (Hons) Information Management (UUM)
 Telephone No.: -
 Email: noorlin@ump.edu.my

Bariah binti Yusob***Study Leave**

Pursuing PhD in Computer Science (UTM)
 MSc. Computer Science (UTM, Skudai)
 BSc. Computer Science (UTM, Skudai)
 Telephone No.: -
 Email: bariah Yusob@ump.edu.my

Chu Kai Chuan***Study Leave**

Pursuing PhD in Computer Science (National Chio Tung University, Taiwan)
 M.Sc (Computer Science) (UTM)
 B.Sc (Computer Science) (UTM)
 Telephone No.: -
 Email: kaichuan@ump.edu.my

TUTORS**Zafril Rizal bin M Azmi**

MSc Computer Science (UTM)
 BSc Computer Science (UTM)
 Telephone No.: 09-549 2215
 Email: zafril@ump.edu.my

Mohd Izham bin Ibrahim

B.Sc Computer (Software Engineering) (UMP)
 Telephone No.: -
 Email: mohdizham@ump.edu.my

VOCATIONAL TRAINING OFFICER**Kirahman bin Ab. Razak**

Master of Science (Computer Science - Real Time Software Engineering) (UTM)
 BEng Computer Engineering (UTM)
 Oracle Database SQL Certified Expert
 Microsoft Certified Professional Developer
 IBM System zOS Programmer
 Telephone No.: 09- 5492679
 Email: kirahman@ump.edu.my

INFORMATION TECHNOLOGY OFFICER**Mohd Tarmizi bin Ab Rahman**

Master of Science (Computer Science - Real Time Software Engineering) (UTM)
 Bach. of Information Technology (UKM)
 CompTIA A+ Certified Professional
 Microsoft Certified Professional (MCP)
 Microsoft Certified Desktop Support Technician (MCDST)
 Telephone No.: 09- 5492116
 Email: tarmizi@ump.edu.my

Arifin bin Salleh

MSc in Comp Science (Network) in UiTM
 BSc Computer Science (UTM)
 MCP (Microsoft Certified Professional)
 Telephone No.: -
 Email: arifin@ump.edu.my

Mohd Fairuz bin Ramli

Master of Management (Information Technology) (UPM)
 Bach of Information Technology (Multimedia Studies) (UKM)
 MCP (Microsoft Certified Professional)
 Telephone No.: 09- 5492139
 Email: mfairuz@ump.edu.my

Rosmalissa binti Jusoh

B.Sc Data Communication & Networking (UiTM)
Telephone No.: 09- 5492153
Email: rosmalissa@ump.edu.my

Syahnizam bin Abdullah Sani

BSc Computer Science (UTM)
MCP (Microsoft Certified Professional)
Telephone No.: 09-549 2126
Email: syahnizam@ump.edu.my

ASSISTANT VOCATIONAL TRAINING OFFICERS**Mohd Faisal bin Mohd Saari**

Diploma Electric Engineering (Electronic) (UiTM)
Telephone No.: 09- 5492149
Email: faisal@ump.edu.my

Muhammad Rizal bin Ramedan

Diploma Electric Engineering (Electronic) (UTM)
Telephone No.: 09- 5492132
Email: rizalr@ump.edu.my

ASSISTANT INFORMATION TECHNOLOGY OFFICER**Amirul Husni bin Abdul Ghaffar**

Diploma Computer Science (UTM)
Telephone No.: 09- 5492135
Email: amirul@ump.edu.my

Roslina binti Ngah

Diploma Computer Science (UiTM)
Telephone No.: 09- 5492148
Email: roslinangah@ump.edu.my

Ruzainah binti Abdullah

BSc. Data Communication & Networking (UiTM)
Diploma Computer Science (UiTM)
Telephone No.: 09- 5492114
Email: ruzainah@ump.edu.my

TECHNICIANS**Muhammad Taufik bin Mohamad Reffin**

Certificate in Data Processing (Sultan Haji Ahmad Shah Polytechnic)
Telephone No.: 09- 5491139
Email: mtaufik@ump.edu.my

Khairun Nissak binti Abdullah

Certificate in Information Technology (Politeknik Seberang Perai)
Telephone No.: 09- 5491364
Email: nissak@ump.edu.my

Muhamad Akmal bin Najmudin

Certificate in Information Technology (Politeknik Tuanku Syed Sirajuddin)
Telephone No.: 09- 5491241
Email: akmalnajmudin@ump.edu.my

Abdul Rahman bin Abdul Karim

Certificate in Computer Systems (PSDC)
Telephone No.: 09- 5491139
Email: abdrahman@ump.edu.my

Mohammad Daud Bin Abu Samah

Certificate in Computer Systems
Telephone No.: 09- 549 1365
Email: mdaud@ump.edu.my

Wan Md Naharruddin Bin Wan Zulkiffi

Diploma Computer Systems (PSDC)
Telephone No.: 095491249
Email: wmnahar@ump.edu.my

Ahmad Fadhlán Bin Ahmad Shafiq

Diploma Electronic Computer (PSMZA)
Sijil Pelajaran Malaysia
Telephone No : -
Email: afadhlán@ump.edu.my

Ahmad Zaki Bin Shaikh Nasir

Diploma Kemahiran Malaysia (Teknologi Maklumat) (PSDC)
Kursus Penyelenggaraan & Baik Pulih Komputer (CRAM) (KKYPJ)
Sijil Pelajaran Malaysia
Telephone No: 09-5491263
Email: azaki@ump.edu.my

Mohd Faizul Bin Ghafar

Diploma Kemahiran Komputer (PSDC)
Sijil Pelajaran Malaysia
Telephone No :09-5492148
Email : faizul@ump.edu.my

ASSISTANT REGISTRAR

Azrizulazmi bin Bustan

BSc (Hons) Computer Science
(UM)

Diploma Business Studies (UiTM)

Telephone No.: 09- 5492143

Email: azrizul@ump.edu.my

ADMINISTRATIVE ASSISTANT OFFICER

Norhafizah binti Muda

BSc (Hons)

Business Administration (UUM)

Diploma Business Study
(POLITEKNIK KB)

Telephone No.: 09- 5492147

Email: fizah@ump.edu.my

SECRETARY

Darwina binti Rastam Tan

Diploma Secretarial Science
(POLISAS)

Telephone No.: 09- 5492136

Email: darwina@ump.edu.my

ADMINISTRATIVE ASSISTANT (FINANCE)

Rohhaya binti Adam

Diploma Accountancy (POLISAS)

Telephone No.: 09- 5491195

Email: rohaya@ump.edu.my

ADMINISTRATIVE ASSISTANT (OPERATION)

Ismalina binti Mohd Isah

Certificate of Data Processing
(POLISAS)

Telephone No.: 09- 5491196

Email: ismalina@ump.edu.my

Fauziah binti Sabli

Sijil Pelajaran Malaysia

Telephone No.: 09- 5491163

Email: gee@ump.edu.my

Noor Aftalina binti Omar

Diploma in Accountancy (UiTM)

Sijil Pelajaran Malaysia

Telephone No.: 09- 5492133

Email: aftalina@ump.edu.my

Surendran a/l Moorty

Sijil Pelajaran Malaysia

Telephone No.: 09- 5491379

Email: surendran@ump.edu.my

GENERAL OFFICE ASSISTANT

Mahmud bin Abdul Samad

Sijil Pelajaran Malaysia

Telephone No.: 09- 5491146

Email: mahmud@ump.edu.my

CURRICULUM STRUCTURE

DIPLOMA IN COMPUTER SCIENCE

YEAR	SEMESTER	SHORT SEM	FIRST		SECOND		THIRD			
			FIRST	SECOND	FIRST	SECOND	FIRST	SECOND		
COURSES		UQB1**1 Co-Curriculum I	DUM1113 Basic Mathematics	DCN2013 Graphical User Interface	DCS2103 Data Structure & Algorithm	DCS2143 Web Programming	DCC3068 Industrial Training			
			UHL1312 English for General Communication	DCC1022 ICT Competency Workshop	DUM1213 Fundamental Discrete Structure	DC***3 Elective I	DUM2413 Statistics & Probability		DCC3084 Industrial Training Report	
		UHS1011 Soft Skills 1	DCS1072 Problem Solving	DCN1053 Data Communication & Networking	DCJ2033 Database System	DCS2133 Object Oriented Programming				
			DCI1012 Introduction to IT	DCS1053 Programming Techniques	DUM1123 Calculus	DC***3 Elective II				
		DCC1032 Application Development Workshop	DCN2063 Operating Systems	DCN2072 Local Area Network Workshop	DCC3016 Final Year Project					
			DCN1013 Computer Architecture & Organization	UGE1002 Asas Pembudayaan Keusahawanan	DCS1093 Systems Analysis & Design					UHS2011 Soft Skills 2
		UHR1012 Islamic & Asian Civilizations I	UHM2022 Hubungan Etnik	UHL1332 English for Workplace Communication						
		UHL1322 English for Technical Communication								
		TOTAL CREDIT	4	18	19	19	19	12		
		91	OVERALL TOTAL CREDIT FOR GRADUATION							

BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING) WITH HONOURS

YEAR	FIRST		SECOND		THIRD		FOURTH	
	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND
CORE COURSES	UQB1*** Co-Curriculum I	UHM2022 Hubungan Etnik	UQ2*** Co-Curriculum II	UHF11* Foreign Language Level I	UHL2332 Academic Report Writing	UHS2011 Soft Skills 2	BCC3026 Undergraduate Project II	BCC4018 Industrial Training Report
	UHL2312 Technical English	UHL2322 Technical Writing	BCS1133 Systems Analysis & Design	BUM2223 Discrete Structure & Applications	UGE2002 Technopreneurship	UHF21*1 Foreign Language Level II	BCS3263 Software Quality Assurance	BCC4024 Industrial Training Report
	UHR1012 TITAS	BCN1043 Computer Architecture & Organization	BCS2143 Object Oriented Programming	BCN2053 Operating Systems	BUM2413 Applied Statistic	BCC3013 Undergraduate Project I	BC***3 Elective III	
	UHS1011 Soft Skills 1	BCS1093 Data Structure & Algorithms	BCI2023 Database Systems	BCS2173 Human Computer Interaction	BCS3313 Artificial Intelligence Techniques	BCS3323 Software Testing and Maintenance	BC***3 Elective IV	
	BCS1023 Programming Techniques	BCN1053 Data Communication & Networking	BCS2303 Web Scripting	BCS2203 Web Application Development	BCS3283 Software Configuration Management	BCS2213 Formal Method		
	BUM1213 Fundamental Discrete Structure	BCS2283 Introduction to Software Engineering	BCS2333 Software Planning & Requirement Workshop	BCS2343 Software Design Workshop	BC***3 Elective I	BC***3 Elective II		
	BCC1032 Application Development Workshop					Elective University		
	BCC1012 ICT Competency Workshop							
	16	16	16	16	16	16	15	12
	TOTAL CREDIT PER SEMESTER	OVERALL TOTAL CREDIT FOR GRADUATION						
123								

BACHELOR OF COMPUTER SCIENCE (COMPUTER SYSTEMS & NETWORKING) WITH HONOURS

YEAR	FIRST			SECOND			THIRD			FOURTH		
	SEMESTER	FIRST	SECOND	FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	FIRST	SECOND	
CORE COURSES		UOB1**1 Co-Curriculum I	UHM2022 Hubungan Etnik	UQ2**1 Co-Curriculum II	UHL2332 Academic Report Writing	UHF11**1 Foreign Language Level I	UHF21**1 Foreign Language Level II	BCC3026 Undergraduate Project II	BCC4018 Industrial Training			
		UHL2312 Technical English	UHL2322 Technical Writing	BCI2023 Database Systems	BUJM2413 Applied Statistics	UGE2002 Technopreneurship	BCC3013 Undergraduate Project I	BCN3023 Network Management	BCC4024 Industrial Training Report			
		UHR1012 TITAS	BCN1053 Data Communication & Networking	BCS2143 Object Oriented Programming	BCN2193 Network Technologies	UHS2011 Soft Skills 2	BCN3203 WAN Technology	BCN3133 Computer Ethic & Policies				
		UHS1011 Soft Skills 1	BCS1093 Data Structure & Algorithms	BCN2063 Operating Systems	BCS2303 Web Scripting	BCN2083 Computer Networks	BCN3123 Distributed Systems	BC***3 Elective IV				
		BCS1023 Programming Techniques	BCN1043 Computer Architecture & Organization	BUM2223 Discrete Structure & Applications	BCN3**3 Elective I	BCN2093 Network Analysis & Design	BCN3183 Internet Technology					
		BUM1213 Fundamental Discrete Structure	BCN1052 LAN Workshop	BCS1133 Systems Analysis & Design	Elective University	BCN2023 Data & Network Security	BC***3 Elective III					
		BCC1032 Application Development Workshop				BC***3 Elective II						
		BCC1012 ICT Competency Workshop										
		16	15	16	16	16	16	16	15	12		
	TOTAL CREDIT PER SEMESTER											
	122	OVERALL TOTAL CREDIT FOR GRADUATION										

BACHELOR OF COMPUTER SCIENCE (GRAPHIC & MULTIMEDIA TECHNOLOGY) WITH HONOURS

YEAR	FIRST			SECOND			THIRD			FOURTH			
	SEMESTER	FIRST	SECOND	FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	FIRST	SECOND	THIRD	
COURSES		UQB1**1 Co-Curriculum I	UHM2022 Hubungan Etnik	UQ**1 Co-Curriculum II	UHL2332 Academic Report Writing	UHF11*1 Foreign Language Level I	UHF21*1 Foreign Language Level II	BCC3026 Undergraduate Project II	BCC4018 Industrial Training Report				
		UHL2312 Technical English	UHL2322 Technical Writing	BCI2023 Database Systems	BCN2053 Operating Systems	UGE2002 Technopreneurship	BCC3013 Undergraduate Project I	BC***3 Elective III	BCC4024 Industrial Training Report				
		UHR1012 TITAS	BCN1053 Data Communication & Networking	BCS2143 Object Oriented Programming	BUM2223 Discrete Structure & Applications	BCM3113 3D Modelling	BCM3183 Multimedia Interactive Development						
		UHS1011 Soft Skills 1	BCS1093 Data Structure & Algorithms	BCS1133 Systems Analysis & Design	BUM2413 Applied Statistics	BCM2073 Modelling & Simulation	BC***3 Elective IV						
		BCS1023 Programming Techniques	BCN1043 Computer Architecture & Organization	BCS2173 Human Computer Interaction	BCS2303 Web Scripting	BCS2313 Artificial Intelligence Techniques	UHS2011 Soft Skills 2						
		BUM1213 Fundamental Discrete Structure	BCM2043 Multimedia Technology & Applications	BCM2053 Computer Graphics	BCM2063 Image Processing	BC***3 Elective I							
		BCC1032 Application Development Workshop											
		BCC1012 ICT Competency Workshop											
		16	16	16	16	16	16	15	16	15	16	12	
	TOTAL CREDIT PER SEMESTER												
	123	OVERALL TOTAL CREDIT FOR GRADUATION											

**BUM2133
ORDINARY DIFFERENTIAL EQUATIONS**

Credit : 3 credit

Pre-requisite : None

Synopsis

This course introduces to the Ordinary differential equations, Laplace transform and Fourier series and their applications in solving engineering problems.

Course outcomes

- CO 1 Use the basic principles and methodologies of differential equations ,Laplace transform and Fourier series to solve various problems in differential equations,Laplace transform and Fourier Series.
- CO 2 Use appropriate tool to solve the computational problems in ordinary differential equation.
- CO 3 Apply concepts and methods learned to solve any related problem of differential equations ,Laplace Transform and Fourier Series in various fields.

**COURSE SYNOPSIS – DIPLOMA IN
COMPUTER SCIENCE**

**FACULTY CORE SUBJECT
BASIC MATHEMATICS
DUM1113**

Course Outcomes

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

- CO1 Define and use the concepts and properties of basic mathematics.
- CO2 Apply concepts and methods learned to solve any related problem of

basic mathematics in various fields.

CO3

Relate and apply the concepts and methods studied into other courses.

Synopsis

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

**FUNDAMENTAL DISCRETE STRUCTURE
DUM1213**

Course Outcomes

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

- CO1 Use the basic principles and methodologies of discrete structure to solve various problems in discrete structure.
- CO2 Apply concepts and methods learned to solve any related problem of discrete structure in various fields.
- CO3 Relate and apply the concepts and methods studied into other courses.

Synopsis

This subject introduces and discusses the fundamental of the discrete as apply to computer science, focusing on providing a basic theoretical foundation for futher work. Students are exposed to logic, set theory, elementary number of theory, functions, relations, fundamentals of counting, Boolean algebra and simple proof technique. This course integrates symbolic tools, graphical concepts, and numerical calculations.

COMPUTER ARCHITECTURE & ORGANIZATION DCN1013

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Identify and classify computer structure and its functions |
| CO2 | Identify the importance of computer system design, in order to achieve high performance |
| CO3 | Explain the internal components and their functionality of a computer, i.e. control unit, ALU, register, memory and CPU addressing modes |
| CO4 | Demonstrate team working by solving problems in groups. |

Synopsis

This course discusses the structure and function of a computer. It expose student with the architecture and organization of a computer. This subject covers on the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal

architecture of Central Processing Unit, Logic Gates and Boolean Algebra.

PROGRAMMING TECHNIQUES DCS1053

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate various techniques in solving a problem. |
| CO2 | Construct and run programs. |
| CO3 | Present various programming techniques in computer. |

Synopsis

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

DATA STRUCTURE & ALGORITHM DCS2103

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Use various types of data structures and algorithms techniques in a related problem. |
| CO2 | Construct a programme by applying the data structure and algorithms techniques for a related problem. |
| CO3 | Join online collaboration tool and able to discuss |

new idea for learning autonomy.

Synopsis

This course is designed to expose the students to the data structures and algorithm. It provide theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

DATABASE SYSTEMS DCI2033

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate the concepts and principles of database systems. |
| CO2 | Manipulate queries using the syntax of Structure Query Language (SQL) and Query By Example. |
| CO3 | Construct innovative solution through the representation of data model, relationship ER and EER Diagrams and database normalization in database application system using appropriate DBMS |
| CO4 | Organize the group work to complete the given assessments in specified time frame. |

Synopsis

The course emphasizes on the importance of data to an organization and how the data should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be

covered in details. This includes database development life cycle, database architecture, data models, and normalization process. Several query languages such as Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture.

CALCULUS DUM1123

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Apply and solve for elementary function and any related problem using the basic techniques and methodologies of calculus. |
| CO2 | Think critically a wide range of problem and solve it using ideas and methods in calculus |
| CO3 | Relate and apply the concepts and methods studied into other courses. |

Synopsis

This subject discusses single-variable calculus as they apply to computer science and focusing on providing a basic theoretical foundation for further work. Students are exposes to limits and continuity, derivatives, application of the derivatives, integrals, and application of the integrals. This course integrates symbolic tools, graphical concepts and numerical calculations.

DATA COMMUNICATION & NETWORKING DCN1053

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate knowledge and understanding of basics computer networking |
| CO2 | Construct a simple LAN topologies by applying basic principles of cabling using network simulation |
| CO3 | Build basic configuration of network design using realnetwork devices such as switches and routers |
| CO4 | Perform standard configuration and troubleshooting network using professional technique |

Synopsis

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum.

OBJECT ORIENTED PROGRAMMING DCS2133

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate the concept of object-oriented in programming. |
| CO2 | Manipulate object-oriented programming in given problems |
| CO3 | Propose the solution of given problems using object-oriented programming technique. |

Synopsis

This course provides an introduction to the concepts of object orientation and object-oriented programming (OOP) techniques using Java programming language. It will provide students with a through look at the basic constructs of the Java programming language such as its basic data types and operations. It will also emphasize on the use of OOP characteristic that expose students to Unified Modeling Language (UML) design, class and object, inheritance, polymorphism, exception handling and Graphical User Interface (GUI) & event driven programming.

OPERATING SYSTEMS DCN2063

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Describe the theory of operating systems, distinguish the relationship between OS and hardware (system calls, I/O, files and symbolic links, directories and file systems, process management, forks, threads, inter-process communication, shells, signal handling, pipes, sockets, CPU scheduling and memory management). |
|-----|---|

- | | |
|-----|--|
| CO2 | Follow instructions on Operating Systems installation |
| CO3 | Identify the current issues in operating system the viewpoint of a system designer |

Synopsis

This subject introduces the various data and control structures necessary for the design and implementation of modern computer operating systems. Process creation and control, communication synchronization and concurrency, memory management and file systems concept are explored in the context of the WINDOWS/LINUX operating system.

STATISTICS & PROBABILITY DUM2413

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Describe and data analyze using statistical theory and methodology |
| CO2 | Apply statistical concepts and methods learned to solve any related problems in various scientific disciplines |
| CO3 | Relate and apply the techniques and methods studied into other courses. |

Synopsis

In this course, students are exposed to basic statistics and analyze statistically. The topics

covered are introduction to statistics, descriptive statistics, probability, discrete probability distributions, continuous probability distributions, sampling distribution and simple linear regression and correlation.

INDUSTRIAL TRAINING DCC3068

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Adapt working culture in ICT related industry. |
| CO2 | Construct solution by applying the theory learned to solve real problem in organization. |
| CO3 | Work effectively with others in organization to perform task given. |
| CO4 | Practise interpersonal skills and professional ethics in organization. |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Student also supervised by industrial and university supervisor to guide and ensure that they can do their work as good as possible and achieved the objective for this course.

INDUSTRIAL TRAINING REPORT DCC3074

Course Outcomes

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

CO1 Organize the industrial training knowledge, experience and skills in appropriate written report.

CO2 Organize technical writing skill in preparing the project report.

CO3 Report understanding of the leadership hierarchy in the organization.

CO4 Build communication skills on oral presentation.

Synopsis

During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Students also need to do final presentation for assessment..

ICT COMPETENCY WORKSHOP DCC1022

Course Outcomes

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

CO1 Demonstrate the knowledge for installation, maintenance and troubleshooting of Personal Computer and related Peripherall Devices base on Standard procedure.

CO2 Follow the installation, maintenance and troubleshooting Steps for Personal Computer and related Peripherall based on Standard procedure.

CO3 Perform professionalism behavior and good communication skills

Synopsis

This course is designated to expose the student an IT Technician and Desktop Support Technician such as be able to troubleshoot and manage all the computer hardware and software. The work is carried out independently and in a team. Student must be able to carry out assigned tasks.

PROBLEM SOLVING DCS1072

Course Outcomes

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

CO1 Demonstrate the methods and approaches for solving the computing problem.

CO2 Display logical thinking skills in solving problem

CO3 Demonstrate team working and communication skills through group assignment.

Synopsis

This course expose to the students with the appropriate computing methods in solving problem through programming approach, which consists of programming design, algorithm, pseudo code, flow chart and logic structure.

APPLICATION WORKSHOP DCC1032

DEVELOPMENT

CO2

Select appropriate approaches to update with current IT.

Course Outcomes

CO3

React, communicate and work in group work in order to complete the given assessment in specific time frame..

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

- CO1 Discover problems statements from given scenarios and translate them into programming codes
- CO2 Construct an executable application by going through all the processes of application development
- CO3 Work effectively in team in order to complete the given assessment in specific time

Synopsis

This course enables students to learn how to develop an executable application starting with the design of interface, writing of the codes using programming tool and lastly integrating the application with database.

INTRODUCTION TO IT DCI1012

Course Outcomes

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

- CO1 Demonstrate knowledge and understanding of the benefits of IT, the use of computers, the use of computer's components and function, current applications and latest knowledge on computer technology.

Synopsis

This is an introductory computer course that covers the fundamental of computer and information technology. The internet and World-wide web, application and system software, computer hardware, communication and networks, Information Technology (IT) trends and its challenges, and information systems and its development will also be discussed..

GRAPHICAL USER INTERFACE DCM2013

Course Outcomes

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

- CO1 Classify the Graphical User Interface (GUI) in various types of softwares.
- CO2 Construct a GUI prototype according to the user interface guidelines.
- CO3 Work and communicate effectively in group to complete the given assessment in specific time given.

Synopsis

This course introduces the standard Graphical User Interface (GUI) using usability-engineering life cycle for any software system and application. Student will expose to the concept of graphical user interface for computer application and how to

design good user interface based on the usability heuristic concept

CO2

Construct the plan, implement, test and troubleshoot structured cabling for LAN based on rules and standards.

WEB PROGRAMMING DCS2143

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate understanding in fundamental of dynamic web-based applications. |
| CO2 | Design and construct a Web-based application prototype using HTML, web server, database and scripting language. |
| CO3 | Show effective communication in written and oral form through group discussion, meeting and presentation. |

CO3

Explain the problem, discuss and make suggestion on the structured cabling network based on the real issue.

Synopsis

This course introduces structured cabling for Local Area Network (LAN). Students are exposed to the fundamental of computer network, network topology, network devices and cabling tools, Copper cabling, Fiber Optic cabling, Simple LAN Device Installation, Wide Area Network Connection and network troubleshooting and documentation.

Synopsis

This course introduces the essential topics of Internet programming & development of web-based applications. Students are required to develop a web/Internet application which connected to the database.

LOCAL AREA NETWORK WORKSHOP DCN2072

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Investigate the Local Area Network Elements such as basic of networking, safety environment, Network hardware and related LAN with Wide Area Network (WAN). |
|-----|---|

SYSTEMS ANALYSIS & DESIGN DCS1093

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Classify the stages of Systems Development Life Cycle. |
| CO2 | Reproduce the design of a new system from scratch that comply with the stages of systems development life cycle. |
| CO3 | Discuss effectively in a team and propose the team decision/solution for a given problem. |
| CO4 | Demonstrate leadership's skills through group assignment. |

Synopsis

This course describes the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and tools. The course focuses on the issues and management technique involved in analysis, design and implementation of information system.

FINAL YEAR PROJECT DCC3016

Course Outcomes

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

CO1	Build solution based on problem statement which comply with the principles of computer science
CO2	Explain the appropriate tools organization to realize the solution and join online community to search and manage relevance information from various sources.
CO3	Explain the solution through oral and written form in order to defend their proposal
CO4	Comply commercialization element in project solution.

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the

problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective..

ELECTIVE SUBJECT

MULTIMEDIA TECHNOLOGY AND APPLICATIONS DCM2033

Course Outcomes

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

CO1	Categorize characteristics and functions of each multimedia element.
CO2	Manipulate multimedia elements (text, graphic, audio, video & animation) using software tools.
CO3	Identify business opportunity in multimedia technology and application.
CO4	Justify contribution of multimedia technology and application towards economy development, environment and culture preservation.
CO5	Join collaborative learning platform for searching and managing relevance information from various sources.

Synopsis

This course will expose students to the theoretical and fundamental concepts of multimedia, its applications and the techniques involved. Topics to be covered include text and audio, image and video, the art of multimedia, and multimedia over the network.

DATA & NETWORK SECURITY DCN2033**Course Outcomes**

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

- CO1 Inquire and analyze theory and principles of security, cryptographic tools, user authentication and access control, security in networks, intrusion detection systems, firewalls and intrusion prevention systems and wireless security.
- CO2 Construct and organize attack and defense methods into computer and network environments.
- CO3 Identify and investigate security issues and keep abreast with current trends. CO4 - Demonstrate and explain security issues and propose possible solutions.

Synopsis

The course introduces fundamental of security. Every chapter will explain security concepts, fundamentals, purpose, implementation and discussion in their respective areas related to data and network security. Topics include: Introduction to security, cryptographic tools, user authentication and access control, security in networks, intrusion detection systems, firewalls and intrusion prevention systems and wireless security.

COURSE SYNOPSIS – BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING)**PROGRAMMING TECHNIQUES BCS1023****Course Outcomes**

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

- CO1 Demonstrate various techniques in solving a problem.
- CO2 Construct and run programs
- CO3 Differentiate various techniques in solving a problem

Synopsis

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

ICT COMPETENCY WORKSHOP BCC1012**Course Outcomes**

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

- CO1 Demonstrate the knowledge for installation, and troubleshooting of Personal Computer and related Peripheral Devices base on Standard procedure.
- CO2 Organize the installation, maintenance and troubleshooting Steps for

Personal Computer and related Peripheral based on Standard procedure

- CO3 Demonstrate professionalism behavior and good communication skills

Synopsis

This course is designated to expose the student an IT Technician and Desktop Support Technician such as be able to troubleshoot and manage all the computer hardware and software. The work is carried out independently and in a team. Student must be able to carry out assigned tasks.

APPLICATION WORKSHOP BCC1032 DEVELOPMENT

Course Outcomes

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

- CO1 Analyze problems statements from given scenarios and translate them into programming codes.
- CO2 Construct an executable application by going through all the processes of application development.
- CO3 Work effectively in team in order to complete the given assessment in specific time.
- CO4 Communicate effectively in team in order to complete the given assessment in specific time.

Synopsis

This course enables students to learn how to develop an executable application starting with the design of interface, writing of the codes using programming tool and lastly integrating the application with database.

FUNDAMENTAL DISCRETE STRUCTURE BUM1213

Course Outcomes

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

- CO1 Use the basic principles and methodologies of discrete structure to solve various problems in discrete structure.
- CO2 Apply concepts and methods learned to solve any related problem of discrete structure in various fields.
- CO3 Relate and apply the concepts and methods studied into other courses

Synopsis

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

- CO1 Use the basic principles and methodologies of discrete structure to solve various problems in discrete structure.
- CO2 Apply concepts and methods learned to solve any related problem of discrete structure in various fields.
- CO3 Relate and apply the concepts and methods studied into other courses.

DATA STRUCTURE & ALGORITHMS BCS1093

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyse various types of data structures and algorithms techniques in a related problem. |
| CO2 | Construct a programme by applying the data structure and algorithms techniques for a related problem. |
| CO3 | Join online collaboration tool and able to discuss new idea for learning autonomy. |

Synopsis

This course is designed to expose the students to the data structures and algorithm. It provide theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

DATA COMMUNICATION & NETWORKING BCN1053

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate knowledge and understanding of basics computer networking |
| CO2 | Construct a simple LAN topologies by applying basic principles of cabling using network simulation |

CO3

Build basic configuration of network design using real network devices such as switches and routers

CO4

Perform standard configuration and troubleshooting network using professional technique

Synopsis

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum.

COMPUTER ARCHITECTURE & ORGANIZATION BCN1043

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Identify and classify computer structure and its functions |
| CO2 | Identify the importance of computer system design, in order to achieve high performance |
| CO3 | Explain the internal components and their functionality of a computer, i.e. control unit, ALU, register, memory and CPU addressing modes |

- CO4 Demonstrate team working by solving problems in groups.

Synopsis

This course discusses the structure and function of a computer. It expose student with the architecture and organization of a computer. This subject covers on the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal architecture of Central Processing Unit, Logic Gates and Boolean Algebra.

SYSTEMS ANALYSIS & DESIGN BCS1133

Course Outcomes

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

- CO1 Differentiate the stages of Systems Development Life Cycle.
- CO2 reproduce a system from the given case study that comply with the stages of systems development life cycle
- CO3 Work effectively in a team and propose the team decision/solution for a given problem.
- CO4 Demonstrate team working by solving problems in groups.
- CO5 Communicate effectively in a team for a given problem.

Synopsis

This course describes the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and tools. The course focuses on the issues and management technique

involved in analysis, design and implementation of information system.

OBJECT ORIENTED PROGRAMMING BCS2143

Course Outcomes

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

- CO1 Demonstrate the concept of object-oriented in programming
- CO2 Manipulate object-oriented programming in given problems
- CO3 Formulate the solution of given problems using object-oriented programming technique

Synopsis

This course provides an introduction to the concepts of object orientation and object-oriented programming (OOP) techniques using Java programming language. It will provide students with a through look at the basic constructs of the Java programming language such as its basic data types and operations. It will also emphasize on the use of OOP characteristic that expose students to Unified Modelling Language (UML) design, class and object, inheritance, polymorphism, exception handling and Graphical User Interface (GUI) and event driven programming

DATABASE SYSTEMS BCI2023

Course Outcomes

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

- CO1 Demonstrate the concepts and principles of database systems.

- CO2 Manipulate queries using the syntax of Structure Query Language (SQL), Relational Algebra and Query By Example
- CO3 Construct innovative solution through the representation of data model using ER and EER Diagrams and normalize database to be implemented in database application system using appropriate DBMS
- CO4 Work in group in order to complete the given assessments in specific time frame
- CO5 Communicate effectively in group in order to complete the given assessments in specific time frame

Synopsis

The course emphasizes on the importance of data to an organization and how the data should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be covered in details. This includes database development life cycle, database architecture, data models, and normalization process. Several query languages such as relational algebra, Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture..

WEB SCRIPTING BCS2303

Course Outcomes

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

- CO1 Demonstrate the understanding of dynamic web-based applications
- CO2 Construct a Web-based application prototype using HTML, web server, database and scripting language.
- CO3 Demonstrate leadership skill through group project
- CO4 Demonstrate teamworking skill through group project
- CO5 Show ability to identify business opportunities

Synopsis

This course introduces the essential topics of Internet programming & development of web-based applications. Students are required to develop a web/Internet application which connected to the database..

DISCRETE STRUCTURE AND APPLICATIONS BUM2223

Course Outcomes

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

- CO1 Use the basic principles and methodologies of advanced discrete structure to solve various problems in discrete structure.

CO2	Write programs to describe and solve discrete structure problems using any programming language.	operating System (Case Study).
CO3	Apply concepts and methods learned to solve any related problem of discrete structure in various fields.	CO3 Organize the related problems using theoretical concepts of operating system.
CO4	Relate and apply the concepts and methods into other courses.	

Synopsis

This subject discusses an in depth of the discrete structures as they apply to computer science, focusing on providing a basic theoretical foundation for further work. Topics include review on algorithm, integers and matrices, advanced counting technique, graphs, trees, and modeling computation. This course integrates symbolic tools, graphical concepts, and numerical calculations.

OPERATING SYSTEMS BCN2053

Course Outcomes

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

CO1	Distinguish the relationship between OS and hardware (system calls, I/O, files and symbolic links, directories and file systems, process management, forks, threads, inter-process communication, shells, signal handling, pipes, sockets, CPU scheduling and memory management).
CO2	Construct the program for given problem on an

Synopsis

This subject introduces the various data and control structures necessary for the design and implementation of modern computer operating systems. Process creation and control, communication synchronization and concurrency, memory management and file systems concept are explored in the context of the WINDOWS/LINUX operating system.

APPLIED STATISTICS BUM2413

Course Outcomes

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

CO1	Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data.
CO2	Perform statistical data analysis by using appropriate software tools.
CO3	Apply statistical concepts and methods learned to solve any related problems in various scientific disciplines.
CO4	Relate and apply the techniques and methods studied into other courses

Synopsis

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice

UNDERGRADUATE PROJECT I BCC3013

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Design the proposed solutions for a specific problem that comply with principles of computer science. |
| CO2 | Organize the concept and usage of appropriate tools to be used in the development of the solution |
| CO3 | Organize the solution based on specific problem with minimum supervision and self independent |
| CO4 | Explain the solution through oral and written form following the provided standard |
| CO5 | Demonstrate understanding the effect of professional practices in the development of the solution |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective.

UNDERGRADUATE PROJECT II BCC3024

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Develop the solution based on the approved proposal (PSM1) which comply with the principles of computer science |
| CO2 | Organize the appropriate tools to realize the solution |
| CO3 | Construct the solution with the best alternative |
| CO4 | Explain the solution through oral and written form following the provided standard |
| CO5 | Show the commercialize potential on a solution project |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general

solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective..

SOFTWARE QUALITY ASSURANCE BCS3263

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Inquire a knowledge of main software quality activities, their tasks, work products and their models |
| CO2 | Organize software product quality related activities by applying ISO and IEEE standards |
| CO3 | Work in a team and present the team decision/solution for a given tasks. |

Synopsis

This course introduces students to the concept of Software Quality Assurance (SQA) including principles, component, process, models, standards and certification of SQA. Students are required to understand the relationship between software quality assurance and software engineering.

INDUSTRIAL TRAINING BCC4018

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Adapt working culture in ICT related industry. |
| CO2 | Construct solution by applying the theory learned to solve real problem in organization. |
| CO3 | Work effectively with others in organization to perform task given. |
| CO4 | Practise interpersonal skills and professional ethics in organization. |
| CO5 | Practice the related theory in the community and prepare for better career opportunity in computing area. |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Student also supervised by industrial and university supervisor to guide and ensure that they can do their work as good as possible and achieved the objective for this course.

INDUSTRIAL TRAINING REPORT BCC4024

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Organize the industrial training knowledge, experience and skills in appropriate written report.. |
|-----|---|

CO2	Organize technical writing skill in preparing the project report.
CO3	Report understanding of the leadership hierarchy in the organization.
CO4	Build communication skills on oral presentation.

Synopsis

During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Students also need to do final presentation for assessment.

CORE SUBJECT

INTRODUCTION TO SOFTWARE ENGINEERING BCS2283

Course Outcomes

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

CO1	Distinguish the important terminology and activities involves (theoretically and practically) related to foundation concepts of software engineering and software development process.
CO2	Show technical solutions to a range of audience.
CO3	Demonstrate leadership's skills through group Assignment

Synopsis

This course presents an introduction to software engineering concepts including: software engineering paradigms, requirements specification, functional design, object-oriented design, software verification, and maintenance.

SOFTWARE PLANNING & REQUIREMENT WORKSHOP BCS2333

Course Outcomes

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

CO1	Classify and choose the software project planning requirement by using appropriate software development process and tools to be used.
CO2	Construct a comprehensive Software Development Plan (SDP) document and Software Requirement Specification (SRS) document by using UML tools.
CO3	Fix problems and construct innovative solutions that comply with principles of software engineering (problem solving skills)
CO4	Work effectively in group and promote leadership's skills through effective communication ether in written, oral form, presentation and group discussion

Synopsis

This course exposes the student to software project planning and software requirement stages. It will concentrate on analysis of options and risks, configuration management

plan and project planning, discovering and eliciting requirements techniques, languages and models for representing requirements, requirement documentation standard, handling requirement changes and writing Software Development Plan (SDP) document and Software Requirement Specifications (SRS) customize from DOD and IEEE standard

SOFTWARE DESIGN WORKSHOP BCS2343

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate the Software Design Description (SDD) document based on IEEE or DOD Software development standard. |
| CO2 | Construct a comprehensive Software Design Description (SDD) and system prototype that comply with the software development document. |
| CO3 | Work effectively in group and promote leadership's skills through effective communication either in written, oral form, presentation and group discussion. |

Synopsis

This course introduces the students how to develop software development documents – Software Design Description (SDD) and their system development process. Continue from previous project/problems (from course BCS2293 Software Planning & Requirement Workshop), students must produce Software Design Description (SDD) document by following standard format which being customized from DOD and IEEE standard.

HUMAN COMPUTER INTERACTION BCS2173

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyze Human Computer Interface (HCI) principles and related approaches. |
| CO2 | Construct an application based on HCI principles approaches. |
| CO3 | Work and communicate effectively in a team for a project on developing and evaluating the prototype based on HCI rules. |

Synopsis

This course provides an introduction to Human-Computer Interaction (HCI). HCI is concerned with understanding, designing, implementing and evaluating user-interfaces so that the students have better support users in carrying out their tasks. On completing this course, the students will have knowledge of the theoretical foundations of designing for interaction between humans and computers. They will also have practical experience in implementing and evaluating graphical user interfaces.

WEB APPLICATION DEVELOPMENT BCS2203

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

- | | |
|-----|--|
| CO1 | Analyze the understanding of framework technology |
| CO2 | Manipulate web service components, configuration, securing |

and deployment in web application.

- CO3 Identify appropriate solution using web technology to the specified problem

Synopsis

This course provides students with the knowledge and skills that are needed to develop web application. Students learn data access from database to web application, create and utilize web services, create component and deploy application. The students will implement what they have learned in a mini project.

ARTIFICIAL INTELLIGENCE TECHNIQUES BCS2313

Course Outcomes

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

- CO1 Point out the artificial intelligence concept in computer science.
- CO2 Construct an intelligence system prototype/module
- CO3 Work effectively in a team to solve a given problem.

Synopsis

This course introduces student to the theory and practice of the Artificial Intelligence (AI). Student are expose to the main artificial intelligence concept currently most applied in application such as Artificial Neural Networks(ANN), Fuzzy Logics(FL), Genetic Algorithms(GA) and Expert Systems(ES). Practical examples of how artificial intelligence is applied to commercial, scientific and consumer applications will be covered.

SOFTWARE CONFIGURATION AND MANAGEMENT BCS3283

Course Outcomes

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

- CO1 Illustrate all the SCM method and task into the software engineering field
- CO2 Explain the SCM procedure in the software engineering task
- CO3 Work effectively in written and oral form through group discussion and presentation session

Synopsis

This course comprises factors such as configuration identification, configuration control, status accounting, review, build management, process management, and teamwork . SCM practices taken as a whole define how an organization builds and releases products and identifies and tracks changes. It also concerns with the aspects of SCM that have a direct impact on the day-to-day work of the people writing code and implementing features and changes to that code.

SOFTWARE TESTING AND MAINTENANCE BCS3323

Course Outcomes

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

- CO1 Analyze different types and levels of methods which used in software testing and maintenance
- CO2 Construct test sets using testing techniques and available tools

- CO3 Work effectively in a team to find a number of case studies and to identify the basic test cases and documentation
- CO4 Demonstrate the leadership skills in the selected case study

Synopsis

This course introduces students to software testing and maintenance, where the student learn and apply basic skills needed to create and automate the test plan for a software development environment. Students also expose to maintenance process including maintenance method and techniques.

FORMAL METHODS BCS2213

Course Outcomes

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

- CO1 Demonstrate the understanding of theory and principles of Formal Methods in developing software.
- CO2 Construct the software specification using appropriate techniques, skills and tools in Z notation.
- CO3 Work and communicate effectively in group to complete the software development based on software specification.

Synopsis

This course is introducing Formal Methods, which can be used in developing software specification. Formal Methods is the software

specification language that is used to ensure the software or system to be developed is being validated before it is actually developed. Therefore any bugs can be detected at early stage in order to reduce the cost of the development. Formal Methods language to be introduced is Z notation or any language related to Formal Methods.

ARTIFICIAL INTELLIGENCE TECHNIQUES BCS2313

Course Outcomes

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

- CO1 Point out the artificial intelligence concept in computer science.
- CO2 Construct an intelligence system prototype/module
- CO3 Work effectively in a team to solve a given problem.

Synopsis

This course introduces student to the theory and practice of the Artificial Intelligence (AI). Student are expose to the main artificial intelligence concept currently most applied in application such as Artificial Neural Networks(ANN), Fuzzy Logics(FL), Genetic Algorithms(GA) and Expert Systems(ES). Practical examples of how artificial intelligence is applied to commercial, scientific and consumer applications will be covered.

ELECTIVE SUBJECT

ARCHITECTURE OF SOFTWARE SYSTEM BCS3343

Course Outcomes

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

- CO1 Discover some major architectural structures (styles, patterns, tactics, etc.) and their impact on overall system properties
- CO2 Apply the technical, organizational and business role of software architecture CO3 - Reproduce a medium-sized software system that satisfies an architectural specification
- CO4 Demonstrate the ability of communication skills and team working elements in group work

Synopsis

This course introduces architectural design concepts critical to designing complex software-intensive systems. It considers commonly used software system structures, techniques for designing and implementing these structures, models and notations for characterizing and reasoning about architectures, tools for generating specific instances of an architecture, and case studies of actual system architectures. The course teaches the skills needed to evaluate the architectures of existing systems and to design new systems using well-founded architectural paradigms.

**CURRENT ISSUES IN ICT
BCI3023**

Course Outcomes

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

- CO1 Analyze the current issue of several areas in ICT.
- CO2 Organize a different approaches to gather the information to update with current issues in

ICT, especially in Malaysia.

- CO3 Demonstrate communication skills in group discussion and presentation

Synopsis

This course addresses several current issues in ICT locally and globally. The issues are raised from several areas in ICT: software or application technology, internet technology, computer hardware and networking, security, current trends in Malaysia ICT environment etc.

**MULTIMEDIA TECHNOLOGY AND APPLICATIONS
BCM2043**

Course Outcomes

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

- CO1 Categorize characteristics and functions of each multimedia element.
- CO2 Manipulate multimedia elements (text, graphic, audio, video & animation) using software tools.
- CO3 Identify business opportunity in multimedia technology and application.
- CO4 Justify contribution of multimedia technology and application towards economy development, environment and culture preservation.
- CO5 Join collaborative learning platform for searching and managing relevance information from various sources.

Synopsis

This course will expose students to the theoretical and fundamental concepts of multimedia, its applications and the techniques involved. Topics to be covered include text and audio, image and video, the art of multimedia, and multimedia over the network

COMPUTER GRAPHICS BCM2053

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate the basic concept of computer graphics and ability to use the computer graphics technology. |
| CO2 | Construct 2D graphics by implementing concepts of computer graphics and computer graphics programming. |
| CO3 | Respond to instruction by listening actively and give feedback using online application. (e.g LMS) |
| CO4 | Work together effectively to achieve the same goal by building a good relationship and interaction among team members. |

Synopsis

This course is designed to expose the student to the basic concept of digital graphic technology. This includes understanding and designing aspects by using a computer graphics application. The student will be exposed to the skill of using a computer graphics application. Through this course, the students will expose to explore on the latest graphics design context which will focus on the 'graphic thinking' and 'creative design process'.

IMAGE PROCESSING BCM2063

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Analyze and investigate different types of image formats and techniques in Image Processing. |
| CO2 | Construct a computerized solution using image processing techniques |
| CO3 | Identify and organize relevance information by searching from various sources. |

Synopsis

This course discusses about the processing of digital images. The techniques covers are reading image enhance the image quality and manipulate the image. Several image processing methods will be touch in this course. Programming skill and creativity is a required whereby students' are compulsory to do one related project in order to complete this course.

DATA & NETWORK SECURITY BCN2023

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Inquire and analyze theory and principles of information security, types of attacks, cryptography, firewalls, wireless and intrusion detection system. |
| CO2 | Construct attack and defence methods into computer and network environments. |

- CO3 Demonstrate usage of data and network security methods and tools and organize public awareness for newest attack and defence solution.

Synopsis

The course introduces fundamental of security. Every chapter will explain security concepts, fundamentals, purpose, implementation and discussion in their respective areas related to data and network security. Topics include: Introduction to security, cryptographic tools, user authentication and access control, security in networks, intrusion detection systems, firewalls and intrusion prevention systems and wireless security.

z/OS FOUNDATION BCN3083

Course Outcomes

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

- CO1 Distinguish ways in which the mainframe of today challenges the traditional thinking about centralized computing versus distributed computing.
- CO2 Explain both theoretical and practical foundation concepts in mainframe environment.
- CO3 Construct configuration for a specific mainframe environment.
- CO4 Demonstrate team working and communication skills through group assignment

Synopsis

This course provides students of information systems technology with the background knowledge and skills necessary to begin using the basic facilities of a mainframe computer. Explore the reasons why public and private enterprises throughout the world rely on the mainframe as the foundation of large-scale computing and discuss the types of workloads that are commonly associated with the mainframe, such as batch jobs and online or interactive transactions, and the unique manner in which this work is processed by a widely used mainframe operating system—z/OS.

COMPUTER ETHICS AND POLICIES BCN3133

Course Outcomes

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

- CO1 Identify and apply the basic concepts of a ethics and policies and the related area
- CO2 Construct the components of a structured plan for solving computing ethical problems
- CO3 Study and demonstrate several examples of professional codes of ethics related to computing, discuss their commonalities, differences, and implications.

Synopsis

This course introduces the overview of how computers have affected society and how they could further affect it in the future. Student will learn how to examine various ethical issues surrounding computers. These will include piracy, hacking, viruses, responsibility and liability for the use of

software, cyberporn, computerized invasion of privacy, computers in the workplace, and the use of artificial intelligence and expert systems. This course will also consider many of the moral and professional issues that those who work with computers might expect to face.

SPECIAL TOPIC IN Software Engineering BCS3063

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate understanding on best approaches updates for current issues or topics in software Engineering |
| CO2 | Reproduce a solution to a given problem based on current topics or issues in software engineering |
| CO3 | Discuss and present in group or individual to elaborate the given task |

Synopsis

Advanced topics in specifying, designing, modeling, developing, deploying, testing, and maintaining software. May include such topics as software engineering economics, data security and privacy, ethics of computing, programming languages, visual languages, expert systems, machine vision, web applications and web services. May be repeated with change in topic. May include several topics through-out the semester.

COURSE SYNOPSIS – BACHELOR OF COMPUTER SCIENCE (COMPUTER SYSTEMS & NETWORKING)

FACULTY CORE SUBJECT

PROGRAMMING TECHNIQUES BCS1023

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate various techniques in solving a problem. |
| CO2 | Construct and run programs |
| CO3 | Differentiate various techniques in solving a problem |

Synopsis

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

ICT COMPETENCY WORKSHOP BCC1012

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate the knowledge for installation, maintenance and troubleshooting of Personal Computer and related Peripherall Devices base on Standard procedure. |
| CO2 | Organize the installation, maintenance and troubleshooting Steps for |

Personal Computer and related Peripheral based on Standard procedure

- CO3 Demonstrate professionalism behavior and good communication skills

Synopsis

This course is designated to expose the student an IT Technician and Desktop Support Technician such as be able to troubleshoot and manage all the computer hardware and software. The work is carried out independently and in a team. Student must be able to carry out assigned tasks

APPLICATION WORKSHOP BCC1032

DEVELOPMENT

Course Outcomes

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

- CO1 Analyze problems statements from given scenarios and translate them into programming codes.
- CO2 Construct an executable application by going through all the processes of application development.
- CO3 Work effectively in team in order to complete the given assessment in specific time.
- CO4 Communicate effectively in team in order to complete the given assessment in specific time.

Synopsis

This course enables students to learn how to develop an executable application starting with the design of interface, writing of the codes using programming tool and lastly integrating the application with database.

SYLLABUS FOR BCN

FUNDAMENTAL DISCRETE STRUCTURE BUM1213

Course Outcomes

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

- CO1 Use the basic principles and methodologies of structure to solve various problems in discrete structure.
- CO2 Apply concepts and methods learned to solve any related problem of discrete structure in various fields.
- CO3 Relate and apply the concepts and methods studied into other courses

Synopsis

This subject introduces and discusses the fundamental of the discrete as apply to computer science, focusing on providing a basic theoretical foundation for further work. Students are exposed to logic, set theory, elementary number of theory, functions, relations, fundamentals of counting, Boolean algebra and simple proof technique. This course integrates symbolic tools, graphical concepts, and numerical calculations.

DATA STRUCTURE & ALGORITHMS**BCS1093**

CO3

Build basic configuration of network design using real network devices such as switches and routers

Course Outcomes

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

CO1 Analyse various types of data structures and algorithms techniques in a related problem

CO2 Construct a programme by applying the data structure and algorithms techniques for a related problem.
CO3 - Join online collaboration tool and able to discuss new idea for learning autonomy.

CO4

Perform standard configuration and troubleshooting network using professional technique

Synopsis

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum.

Synopsis

This course is designed to expose the students to the data structures and algorithm. It provide theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

**COMPUTER ARCHITECTURE & ORGANIZATION
BCN1043****Course Outcomes**

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

CO1

Identify and classify computer structure and its functions

CO2

Identify the importance of computer system design, in order to achieve high performance

CO3

Explain the internal components and their functionality of a computer, i.e. control unit, ALU, register,

DATA COMMUNICATION & NETWORKING**BCN1053****Course Outcomes**

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

CO1 Demonstrate knowledge and understanding of basics computer networking

CO2 Construct a simple LAN topologies by applying basic principles of cabling using network simulation

- CO4 memory and CPU addressing modes
 Demonstrate team working by solving problems in groups.

Synopsis

This course discusses the structure and function of a computer. It expose student with the architecture and organization of a computer. This subject covers on the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal architecture of Central Processing Unit, Logic Gates and Boolean Algebra.

OBJECT ORIENTED PROGRAMMING BCS2143

Course Outcomes

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

- CO1 Demonstrate the concept of object-oriented in programming
- CO2 Manipulate object-oriented programming in given problems
- CO3 Formulate the solution of given problems using object-oriented programming technique

Synopsis

This course provides an introduction to the concepts of object orientation and object-oriented programming (OOP) techniques using Java programming language. It will provide students with a through look at the basic constructs of the Java programming language such as its basic data types and operations. It will also emphasize on the use of OOP characteristic that expose students to Unified Modelling Language (UML) design,

class and object, inheritance, polymorphism, exception handling and Graphical User Interface (GUI) and event driven programming.

DATABASE SYSTEMS BCI2023

Course Outcomes

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

- CO1 Demonstrate the concepts and principles of database systems.
- CO2 Manipulate queries using the syntax of Structure Query Language (SQL), Relational Algebra and Query By Example
- CO3 Construct innovative solution through the representation of data model using ER and EER Diagrams and normalize database to be implemented in database application system using appropriate DBMS
- CO4 Work in group in order to complete the given assessments in specific time frame
- CO5 Communicate effectively in group in order to complete the given assessments in specific time frame

Synopsis

The course emphasizes on the importance of data to an organization and how the data

should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be covered in details. This includes database development life cycle, database architecture, data models, and normalization process. Several query languages such as relational algebra, Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture.

DISCRETE STRUCTURE AND APPLICATIONS BUM2223

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Use the basic principles and methodologies of advanced discrete structure to solve various problems in discrete structure. |
| CO2 | Write programs to describe and solve discrete structure problems using any programming language. |
| CO3 | Apply concepts and methods learned to solve any related problem of discrete structure in various fields. |
| CO4 | Relate and apply the concepts and methods studied into other courses. |

Synopsis

This subject discusses an in depth of the discrete structures as they apply to computer science, focusing on providing a basic theoretical foundation for further work. Topics include review on algorithm, integers and matrices, advanced counting technique, graphs, trees, and modeling computation. This course integrates symbolic tools, graphical concepts, and numerical calculations

OPERATING SYSTEMS BCN2053

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Distinguish the relationship between OS and hardware (system calls, I/O, files and symbolic links, directories and file systems, process management, forks, threads, inter-process communication, shells, signal handling, pipes, sockets, CPU scheduling and memory management). |
| CO2 | Construct the program for given problem on an operating System (Case Study). |
| CO3 | Organize the related problems using theoretical concepts of operating system |

Synopsis

This subject introduces the various data and control structures necessary for the design and implementation of modern computer operating systems. Process creation and control, communication synchronization and concurrency, memory management and file systems concept are explored in the context of the WINDOWS/LINUX operating system.

APPLIED STATISTICS BUM2413

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data. |
| CO2 | Perform statistical data analysis by using appropriate software tools. |
| CO3 | Apply statistical concepts and methods learned to solve any related problems in various scientific disciplines. |
| CO4 | Relate and apply the techniques and methods studied into other courses |

Synopsis

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance

(ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

INDUSTRIAL TRAINING BCC4018

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Adapt working culture in ICT related industry. |
| CO2 | Construct solution by applying the theory learned to solve real problem in organization. |
| CO3 | Work effectively with others in organization to perform task given. |
| CO4 | Practise interpersonal skills and professional ethics in organization. |
| CO5 | Practice the related theory in the community and prepare for better career opportunity in computing area |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Student also supervised by industrial and university supervisor to guide and ensure that they can do their work as good as possible and achieved the objective for this course.

INDUSTRIAL TRAINING REPORT BCC4024**Course Outcomes**

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

- | | |
|-----|---|
| CO1 | Organize the industrial training knowledge, experience and skills in appropriate written report.. |
| CO2 | Organize technical writing skill in preparing the project report. |
| CO3 | Report understanding of the leadership hierarchy in the organization. |
| CO4 | Build communication skills on oral presentation. |

Synopsis

During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Students also need to do final presentation for assessment.

**SYSTEMS ANALYSIS & DESIGN
BCS1133****Course Outcomes**

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

- | | |
|-----|---|
| CO1 | Differentiate the stages of Systems Development Life Cycle. |
|-----|---|

CO2	Construct a new system from scratch that comply with the stages of systems development life cycle
-----	---

CO3	Work effectively in a team and propose the team decision/solution for a given problem.
-----	--

CO4	Demonstrate team working by solving problems in groups.
-----	---

CO5	Communicate effectively in a team for a given problem.
-----	--

Synopsis

This course describes the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and tools. The course focuses on the issues and management technique involved in analysis, design and implementation of information system

**WEB SCRIPTING
BCS2303****Course Outcomes**

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

CO1	Demonstrate the understanding of dynamic web-based applications
-----	---

CO2	Construct a Web-based application prototype using HTML, web server, database and scripting language.
-----	--

CO3 Demonstrate leadership skill through group project

troubleshoot common errors that occur in small routed networks

CO4 Demonstrate teamworking skill through group project

CO5 Show ability to identify business opportunities

Synopsis

This course introduces the essential topics of Internet programming & development of web-based applications. Students are required to develop a web/Internet application which connected to the database.

NETWORK TECHNOLOGIES BCN2193

Course Outcomes

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

CO1 Discover the critical role routers play in enabling communications across multiple networks

CO2 Configure and verify basic operations for a newly-installed router with primary routing protocols

CO3 Explain the role of dynamic routing protocols and select these protocols in the context of modern network design

CO4 Identify router show and debug commands to

Synopsis

This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyze, 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.

LOCAL AREA NETWORK WORKSHOP BCN1052

Course Outcomes

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

CO1 Investigate the Local Area Network elements such as basic of networking, safety environment, network hardware and related LAN

CO2 Design, install, implement, configure, test and troubleshoot structured cabling and LAN device based on LAN rules and standard.

CO3 Identify problem, discuss and make suggestion on the structured cabling network.

Synopsis

This course introduces structured cabling for Local Area Network (LAN). Students are

exposed to the fundamental of computer network, network topology, network devices and cabling tools, Copper cabling, Fiber Optic cabling, Simple LAN Device Installation, Wide Area Network Connection and network troubleshooting and documentation

DATA & NETWORK SECURITY BCN2023

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Inquire and analyze theory and principles of information security, types of attacks, cryptography, firewalls, wireless and intrusion detection system. |
| CO2 | Construct attack and defence methods into computer and network environments. |
| CO3 | Demonstrate usage of data and network security methods and tools and organize public awareness for newest attack and defence solution. |

Synopsis

The course introduces fundamental of security. Every chapter will explain security concepts, fundamentals, purpose, implementation and discussion in their respective areas related to data and network security. Topics include: Introduction to security, cryptographic tools, user authentication and access control, security in networks, intrusion detection systems, firewalls and intrusion prevention systems and wireless security.

NETWORK ANALYSIS & DESIGN BCN2093

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Analyze various computer networks, formulate problems and provide technical solutions to improve quality of service (QoS) |
| CO2 | Build a logical and/or physical network following all the steps and documentation phases for a specific requirement |
| CO3 | Demonstrate ability to function effectively as an individual and in a group to produce RFP and finalize a specific project |

Synopsis

This course focuses on analysis and design of enterprise networks that are reliable, secure and manageable. It includes top-down network design methodology to design networks that meet customer's business and technical goals, analyzation of business and technical requirements, examine traffic flow and Quality of Service (QoS) requirements, and production of RFP documentation with relevant procedure steps for case study/project to fulfil this subject requirement.

COMPUTER NETWORKS BCN2083

Course Outcomes

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

CO1	Experiment knowledge and understanding of how a switch communicates with other switches and routers in a small or medium-sized business network to implement VLAN.
CO2	Identify and correct common network problems at layers 1, 2, 3, and 7 using a layered model approach.
CO3	Organize the configuration, verification, and troubleshooting VLANs, trunking on Cisco switches, interVLAN routing, VTP, RSTP and wireless network.

Synopsis

The primary focus of this course is on LAN switching and wireless LANs. This course focuses on Layer 2 switching protocols and concepts used to improve redundancy, propagate VLAN information, and secure the portion of the network where most users access network services. Switching technologies are relatively straightforward to implement; however, as with routing, the underlying protocols and algorithms are often quite complicated. This course will go to great lengths to explain the underlying processes of the common Layer 2 switching technologies. Each switching concept will be introduced within the context of a single topology for each chapter.

UNDERGRADUATE PROJECT I BCC3013

Course Outcomes

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

CO1	Design the proposed solutions for a specific problem that comply with principles of computer science.
CO2	Organize the concept and usage of appropriate to be used in the development of the solution
CO3	Organize the solution based on specific problem with minimum supervision and self independent
CO4	Explain the solution through oral and written form following the provided standard
CO5	Demonstrate understanding the effect of professional practices in the development of the solution

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student

will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective

UNDERGRADUATE PROJECT II BCC3026

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Develop the solution based on the approved proposal (PSM1) which comply with the principles of computer science |
| CO2 | Organize the appropriate tools to realize the solution |
| CO3 | Construct the solution with the best alternative |
| CO4 | Explain the solution through oral and written form following the provided standard |
| CO5 | Show the commercialize potential on a solution project |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project

progress and to ensure that they can achieve the course objective.

WAN TECHNOLOGY BCN3203

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Analyze and classify the components required for network and Internet communications, operation and benefits of DHCP and DNS, purpose and types of access control lists (ACLs), the basic operation of Network Address Translation (NAT) and components of VPN technology. |
| CO2 | Assemble, build, construct and organize WAN serial connection, a Point-to-Point Protocol (PPP) connection between Cisco routers, Frame Relay on Cisco routers, DHCP, DNS, NAT and ACLs operations on a router. |
| CO3 | Formulate common network problems at layers 1, 2, 3 and 7 using a layered model approach, NAT issues and WAN implementation issues. |

Synopsis

This course discusses the WAN technologies and network services required by converged applications in enterprise networks. The

course uses the Cisco Network Architecture to introduce integrated network services and explains how to select the appropriate devices and technologies to meet network requirements. Students learn how to implement and configure common data link protocols and how to apply WAN security concepts, principles of traffic, access control and addressing services. Finally, students learn how to detect, troubleshoot and correct common enterprise network implementation issues.

DISTRIBUTED SYSTEM BCN3123

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate the principles and fundamentals of distributed systems, the technical challenges and current issues in distributed systems design and apply the knowledge of Java, Shell programming and Linux environment |
| CO2 | Construct network application with adequate knowledge in distributed systems such Interprocess communication, distributed transaction and replication |
| CO3 | Explain common and current issues and challenges in distributed computing |

Synopsis

Owing to new technologies like the Internet and cluster computing, distributed systems

have become reality and are widely applied in practice. Well known are the Web and distributed component infrastructures like CORBA or J2EE compliant application servers. Moving from a centralized to a distributed environment introduces new complexity: communication, synchronous and asynchronous behaviour of the different components in the system, architectural considerations, failures and more. Distributed systems handle these issues by providing tools and protocols for efficient and powerful coordination among the cooperating components. The objectives of this new subject is to learn the state-of-the-art of practical distributed systems, to understand the typical problems and challenges encountered in distributed environments, and to discuss both sound and practical solutions for them.

INTERNET TECHNOLOGY BCN3183

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Classify the services supported by the Internet Technology. |
| CO2 | Fix the problems to install and configure servers and clients applications individually |
| CO3 | Synthesize and implement all the services and protocols supported by the Internet Technology. |

Synopsis

This course is designated to expose the student about Active Directory Technology Specialist s how to implement and configure secure network access and implement fault tolerant storage technologies, understand the network technologies most commonly used

and IP-enabled network, and how to secure servers and maintain update compliance.

NETWORK MANAGEMENT BCN3023

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Identify and explain the five areas of network management and related tools in a group. |
| CO2 | Organize Network Management Protocols such as Simple Network Management Protocol (SNMP) that is the most widely deployed network management protocols on networking devices. |
| CO3 | Analyze all of the possible pieces of information on a network device including Management Information Bases (MIBs) and also about Remote Network Monitoring Devices (RMON) MIB. |

Synopsis

This course introduces the overview of network management to familiarize student with network management systems and the five areas of network management. Student will learn a practical means of designing or evaluating a network management system for particular networking environment. Student also equipped with the example of simple, complex and advanced tools for each category of network management so that they could determine that a particular functionality

would be useful and might want to pursue its development.

COMPUTER ETHICS AND POLICIES BCN3133

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Identify and apply the basic concepts of a computer ethics and policies and the related area |
| CO2 | Construct the components of a structured plan for solving computing ethical problems |
| CO3 | Study and demonstrate several examples of professional codes of ethics related to computing, discuss their commonalities, differences, and implications. |

Synopsis

This course introduces the overview of how computers have affected society and how they could further affect it in the future. Student will learn how to examine various ethical issues surrounding computers. These will include piracy, hacking, viruses, responsibility and liability for the use of software, cyberporn, computerized invasion of privacy, computers in the workplace, and the use of artificial intelligence and expert systems. This course will also consider many of the moral and professional issues that those who work with computers might expect to face.

CURRENT ISSUES IN ICT BCI3023

Course Outcomes

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

- CO1 Analyze the current issue of several areas in ICT.
- CO2 Organize a different approaches to gather the information to update with current issues in ICT, especially in Malaysia.
- CO3 Demonstrate communication skills in group discussion and presentation

Synopsis

This course addresses several current issues in ICT locally and globally. The issues are raised from several areas in ICT: software or application technology, internet technology, computer hardware and networking, security, current trends in Malaysia ICT environment etc.

IMAGE PROCESSING BCM2063

Course Outcomes

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

- CO1 Analyze and investigate different types of image formats and techniques in Image Processing.
- CO2 Construct a computerized solution using image processing techniques

CO3

Identify and organize relevance information by searching from various sources

Synopsis

This course discusses about the processing of digital images. The techniques covers are reading image enhance the image quality and manipulate the image. Several image processing methods will be touch in this course. Programming skill and creativity is a required whereby students' are compulsory to do one related project in order to complete this course.

z/OS FOUNDATION BCN3083

Course Outcomes

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

- CO1 Distinguish ways in which the mainframe of today challenges the traditional thinking about centralized computing versus distributed computing.
- CO2 Explain both theoretical and practical foundation concepts in mainframe environment.
- CO3 Construct configuration for a specific mainframe environment.
- CO4 Demonstrate team working and communication skills through group assignment

Synopsis

This course provides students of information systems technology with the background knowledge and skills necessary to begin using the basic facilities of a mainframe computer. Explore the reasons why public and private enterprises throughout the world rely on the mainframe as the foundation of large-scale computing and discuss the types of workloads that are commonly associated with the mainframe, such as batch jobs and online or interactive transactions, and the unique manner in which this work is processed by a widely used mainframe operating system—z/OS.

**SPECIAL TOPICS IN COMPUTER NETWORKS
BCN2103**
Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate knowledge and understanding of how an IP Addressing in computer network is defined to manage all the network communication. |
| CO2 | Organize the ways of actual IP Addressing performed, for instance IPv6 according to a systematic IP addressing network-wide standard. |
| CO3 | Demonstrate on how network can be managed and associated with Network Address Translation (NAT). |

Synopsis

This course develops a possible network-wide system for IP Addressing. The fundamental problem of IP Addressing and Network Address Translation is mainly

highlighted in this course to be the problem of networking communication.

The hypothetical application of the system to an existing network is also discussed

**CREATIVE WRITING
UHE3082**
Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate creative writing through a variety of activities |
| CO2 | Write at least one fiction and/or non fiction piece the elements of creative writing |
| CO3 | Work in group to produce a short video and improve editing skills |

Synopsis

This course provides students of information systems technology with the background knowledge and skills necessary to begin using the basic facilities of a mainframe computer. Explore the reasons why public and private enterprises throughout the world rely on the mainframe as the foundation of large-scale computing and discuss the types of workloads that are commonly associated with the mainframe, such as batch jobs and online or interactive transactions, and the unique manner in which this work is processed by a widely used mainframe operating system—z/OS.

SYLLABUS FOR BCG
**PROGRAMMING TECHNIQUES
BCS1023**
Course Outcomes

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

CO1	Demonstrate various techniques in solving a problem.
CO2	Construct and run programs
CO3	Differentiate various techniques in solving a problem

Synopsis

This course discusses on understanding problems and translating them into computer solution techniques using programming language. This course enables students to apply programming techniques, write programming codes from given problems and execute programming codes successfully.

COMPETENCY WORKSHOP BCC1012

Course Outcomes

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

CO1	Demonstrate the knowledge for installation, and troubleshooting of Personal Computer and related Peripheral Devices base on Standard procedure.
CO2	Organize the installation, maintenance and troubleshooting Steps for Personal Computer and related Peripheral based on Standard procedure
CO3	Demonstrate professionalism behavior and good communication skills

Synopsis

This course is designated to expose the student an IT Technician and Desktop Support Technician such as be able to troubleshoot and manage all the computer hardware and software. The work is carried out independently and in a team. Student must be able to carry out assigned tasks.

APPLICATION WORKSHOP BCC1032

DEVELOPMENT

Course Outcomes

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

CO1	Analyze problems statements from given scenarios and translate them into programming codes.
CO2	Construct an executable application by going through all the processes of application development.
CO3	Work effectively in team in order to complete the given assessment in specific time.
CO4	Communicate effectively in team in order to complete the given assessment in specific time.

Synopsis

This course enables students to learn how to develop an executable application starting with the design of interface, writing of the codes using programming tool and lastly integrating the application with database.

FUNDAMENTAL DISCRETE STRUCTURE BUM1213

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Use the basic principles and methodologies of discrete structure to solve various problems in discrete structure. |
| CO2 | Apply concepts and methods learned to solve any related problem of discrete structure in various fields. |
| CO3 | Relate and apply the concepts and methods studied into other courses. |

Synopsis

This subject introduces and discusses the fundamental of the discrete as apply to computer science, focusing on providing a basic theoretical foundation for further work. Students are exposed to logic, set theory, elementary number of theory, functions, relations, fundamentals of counting, Boolean algebra and simple proof technique. This course integrates symbolic tools, graphical concepts, and numerical calculations.

DATA STRUCTURE & ALGORITHMS BCS1093

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyse various types of data structures and techniques in a related problem. |
|-----|---|

CO2	Construct a programme by applying the data structure and algorithms techniques for a related problem.
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CO3	Join online collaboration tool and able to discuss new idea for learning autonomy.
-----	--

Synopsis

This course is designed to expose the students to the data structures and algorithm. It provide theoretical basis in data structures and the application of data structures is based on standard algorithms. Students must also be able to transform the data structure and algorithms problems into the computer programs.

DATA COMMUNICATION & NETWORKING BCN1053

Course Outcomes

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

CO1	Demonstrate knowledge and understanding of basics computer networking
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CO2	Construct a simple LAN topologies by applying basic principles of cabling using network simulation
-----	--

CO3	Build basic configuration of network design using real network devices such as switches and routers
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CO4	Perform standard configuration and
-----	------------------------------------

troubleshooting network
using professional
technique

Synopsis

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum.

COMPUTER ARCHITECTURE & ORGANIZATION BCN1043

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Identify and classify computer structure and its functions |
| CO2 | Identify the importance of computer system design, in order to achieve high performance |
| CO3 | Explain the internal components and their functionality of a computer, i.e. control unit, ALU, register, memory and CPU addressing modes |
| CO4 | Demonstrate team working by solving problems in groups |

Synopsis

This course discusses the structure and function of a computer. It expose student with the architecture and organization of a computer. This subject covers on the numbering system and the representation of data, the internal and external computer communication through system buses and Input and Output, computer storage, internal architecture of Central Processing Unit, Logic Gates and Boolean Algebra.

OBJECT ORIENTED PROGRAMMING BCS2143

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Demonstrate the concept of object-oriented in programming |
| CO2 | Manipulate object-oriented programming in given problems |
| CO3 | Formulate the solution of given problems using object-oriented programming technique |

Synopsis

This course provides an introduction to the concepts of object orientation and object-oriented programming (OOP) techniques using Java programming language. It will provide students with a through look at the basic constructs of the Java programming language such as its basic data types and operations. It will also emphasize on the use of OOP characteristic that expose students to Unified Modelling Language (UML) design, class and object, inheritance, polymorphism, exception handling and Graphical User Interface (GUI) and event driven programming.

DATABASE SYSTEMS**BCI2023****Course Outcomes**

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

- | | |
|-----|---|
| CO1 | Demonstrate the concepts and principles of database systems. |
| CO2 | Manipulate queries using the syntax of Structure Query Language (SQL), Relational Algebra and Query By Example |
| CO3 | Construct innovative solution through the representation of data model using ER and EER Diagrams and normalize database to be implemented in database application system using appropriate DBMS |
| CO4 | Work in group in order to complete the given assessments in specific time frame |
| CO5 | Communicate effectively in group in order to complete the given assessments in specific time frame |

Synopsis

The course emphasizes on the importance of data to an organization and how the data should be managed. Database management system (DBMS) will be viewed as a solution to the problems of file processing system. Aspects of relational database design will be covered in details. This includes database development life cycle, database architecture, data models, and normalization process.

Several query languages such as relational algebra, Structured Query Language (SQL) and Query by Example (QBE) will be discussed but the emphasis is on SQL. Students will be given a real life problem to design and develop a database application system. In the later part of the course students will be exposed to the latest developments in database architecture.

**DISCRETE STRUCTURE AND APPLICATIONS
BUM2223****Course Outcomes**

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

- | | |
|-----|--|
| CO1 | Use the basic principles and methodologies of advanced discrete structure to solve various problems in discrete structure. |
| CO2 | Write programs to describe and solve discrete structure problems using any programming language. |
| CO3 | Apply concepts and methods learned to solve any related problem of discrete structure in various fields. |
| CO4 | Relate and apply the concepts and methods studied into other courses. |

Synopsis

This subject discusses an in depth of the discrete structures as they apply to computer science, focusing on providing a basic theoretical foundation for further work. Topics include review on algorithm, integers and matrices, advanced counting technique,

graphs, trees, and modeling computation. This course integrates symbolic tools, graphical concepts, and numerical calculations.

OPERATING SYSTEMS BCN2053

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Distinguish the relationship between OS and hardware (system calls, I/O, files and symbolic links, directories and file systems, process management, forks, threads, inter-process communication, shells, signal handling, pipes, sockets, CPU scheduling and memory management). |
| CO2 | Construct the program for given problem on an operating System (Case Study). |
| CO3 | Organize the related problems using theoretical concepts of operating system |

Synopsis

This subject introduces the various data and control structures necessary for the design and implementation of modern computer operating systems. Process creation and control, communication synchronization and concurrency, memory management and file systems concept are explored in the context of the WINDOWS/LINUX operating system.

APPLIED STATISTICS BUM2413

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data. |
| CO2 | Perform statistical data analysis by using appropriate software tools. |
| CO3 | Apply statistical concepts and methods learned to solve any related problems in various scientific disciplines. |
| CO4 | Relate and apply the techniques and methods studied into other courses |

Synopsis

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

UNDERGRADUATE PROJECT I BCC3013

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Design the proposed solutions for a specific problem that comply with principles of computer science. |
| CO2 | Organize the concept and usage of appropriate tools to be used in the development of the solution |
| CO3 | Organize the solution based on specific problem with minimum supervision and self independent |
| CO4 | Explain the solution through oral and written form following the provided standard |
| CO5 | Demonstrate understanding the effect of professional practices in the development of the solution |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project

progress and to ensure that they can achieve the course objective.

UNDERGRADUATE PROJECT II BCC3024

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Develop the solution based on the approved proposal (PSM1) which comply with the principles of computer science |
| CO2 | Organize the appropriate tools to realize the solution |
| CO3 | Construct the solution with the best alternative |
| CO4 | Explain the solution through oral and written form following the provided standard |
| CO5 | Show the commercialize potential on a solution project |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study in the university. Student will learn to identify problem, analyze the problem, give general solution, collect the required data regarding specific solution and do research on the solution. Finally student will be able to produce report proposal and solve the problem identified. During the course, student will be supervised by their supervisor in order to guide and monitor the students' project progress and to ensure that they can achieve the course objective.

SYSTEMS ANALYSIS & DESIGN BCS1133

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Differentiate the stages of Systems Development Life Cycle. |
| CO2 | Construct a new system from scratch that comply with the stages of systems development life cycle |
| CO3 | Work effectively in a team and propose the team decision/solution for a given problem. |
| CO4 | Demonstrate leadership's skills through group assignment |
| CO5 | Communicate effectively in a team for a given problem. |

Synopsis

This course describes the concepts and methods of information system analysis and design, with an emphasis on system analysis methods and tools. The course focuses on the issues and management technique involved in analysis, design and implementation of information system

INDUSTRIAL TRAINING BCC4018

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Adapt working culture in ICT related industry. |
| CO2 | Construct solution by applying the theory learned to solve real problem in organization. |
| CO3 | Work effectively with others in organization to perform task given. |
| CO4 | Practise interpersonal skills and professional ethics in organization. |
| CO5 | Practice the related theory in the community and prepare for better career opportunity in computing area |

Synopsis

This course aim to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Student also supervised by industrial and university supervisor to guide and ensure that they can do their work as good as possible and achieved the objective for this course.

INDUSTRIAL TRAINING REPORT BCC4024

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Organize the industrial training knowledge, experience and skills in appropriate written report.. |
|-----|---|

CO2	Organize technical writing skill in preparing the project report.
CO3	Report understanding of the leadership hierarchy in the organization.
CO4	Build communication skills on oral presentation.

Synopsis

During the placement, we expect students to keep a log book, in which they make regular entries describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Students also need to do final presentation for assessment.

IMAGE PROCESSING BCM2063

Course Outcomes

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

CO1	Analyze and investigate different types of image formats and techniques in Image Processing.
CO2	Construct a computerized solution using image processing techniques
CO3	Identify and organize relevance information by searching from various sources

Synopsis

This course discusses about the processing of digital images. The techniques covers are

reading image enhance the image quality and manipulate the image. Several image processing methods will be touch in this course. Programming skill and creativity is a required whereby students' are compulsory to do one related project in order to complete this course.

MULTIMEDIA TECHNOLOGY AND APPLICATIONS BCM2043

Course Outcomes

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

CO1	Categorize characteristics and functions of each multimedia element.
CO2	Manipulate multimedia elements (text, graphic, audio, video & animation) using software tools.
CO3	Identify business opportunity in multimedia technology and application.
CO4	Justify contribution of multimedia technology and application towards economy development, environment and culture preservation.
CO5	Join collaborative learning platform for searching and managing relevance information from various sources.

Synopsis

This course will expose students to the theoretical and fundamental concepts of multimedia, its applications and the

techniques involved. Topics to be covered include text and audio, image and video, the art of multimedia, and multimedia over the network.

HUMAN COMPUTER INTERACTION BCS2173

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyze Human Computer Interface (HCI) principles and related approaches. |
| CO2 | Construct an application based on HCI principles and approaches. |
| CO3 | Work and communicate effectively in a team for a on developing and evaluating the prototype based on HCI rules. |

Synopsis

This course provides an introduction to Human-Computer Interaction (HCI). HCI is concerned with understanding, designing, implementing and evaluating user-interfaces so that the students have better support users in carrying out their tasks. On completing this course, the students will have knowledge of the theoretical foundations of designing for interaction between humans and computers. They will also have practical experience in implementing and evaluating graphical user interfaces.

ARTIFICIAL INTELLIGENCE TECHNIQUES BCS2313

Course Outcomes

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

- | | |
|-----|--|
| CO1 | Point out the artificial intelligence concept in computer science. |
| CO2 | Construct an intelligence system prototype/module |
| CO3 | Work effectively in a team to solve a given problem. |

Synopsis

This course introduces student to the theory and practice of the Artificial Intelligence (AI). Student are expose to the main artificial intelligence concept currently most applied in application such as Artificial Neural Networks(ANN), Fuzzy Logics(FL), Genetic Algorithms(GA) and Expert Systems(ES). Practical examples of how artificial intelligence is applied to commercial, scientific and consumer applications will be covered.

COMPUTER GRAPHICS BCM2053

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate the basic concept of computer graphics and ability to use the computer graphics technology. |
| CO2 | Construct 2D graphics by implementing concepts of computer graphics and computer graphics programming. |
| CO3 | Respond to instruction by listening actively and give feedback using online application. (e.g LMS) |

- CO4 Work together effectively to achieve the same goal by building a good relationship and interaction among team members.

Synopsis

This course is designed to expose the student to the basic concept of digital graphic technology. This includes understanding and designing aspects by using a computer graphics application. The student will be exposed to the skill of using a computer graphics application. Through this course, the students will expose to explore on the latest graphics design context which will focus on the 'graphic thinking' and 'creative design process'.

MODELING & SIMULATION BCM2073

Course Outcomes

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

- CO1 Apply certain statistic techniques in analyzing the simulation output and approve the simulation model and also to differentiate between model and proposed model.
- CO2 Construct discrete simulation model to assist in decision making based on given problem.
- CO3 Propose new idea and capable to model and simulate it.

Synopsis

This course will discuss on general knowledge and a few techniques of the

simulation. Topics to be covered are introduction to simulation, a few examples of simulation system, general principles in simulation, techniques to develop simulation system, how to analyze input and output, how to verify and validate the models and comparison and validation of alternatives system design. Students are expected to equip themselves with adequate skill of modeling and simulation.

VIRTUAL REALITY BCM3103

Course Outcomes

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

- CO1 Demonstrate conceptual understanding of virtual reality, regardless of the programming language used.
- CO2 Construct virtual reality application by implementing concepts of virtual reality.
- CO3 Work in team and undertake the role of a leader and a group member interchangeably.

Synopsis

This module introduces the concepts of virtual reality, using Virtual Reality Modelling Language (VRML) and enables the students to gain hands-on experience by developing their own applications.

3D MODELLING BCM3113

Course Outcomes

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

CO1	Experiment with the geometrical 2D and 3D shapes.	include data acquisition, data fill
CO2	Construct 3D models by implementing concepts of 3D modelling.	CO3 Display an idea clearly, effectively and confidently in written and oral form through group discussion, meeting and presentation.
CO3	Work effectively to achieve the project goals by building a good relationship and interaction among team members.	CO4 Propose and lead data visualization group project.
CO4	Display an idea clearly, effectively and confidently in written and oral form among team members.	

Synopsis

The focus of the course is on 3D design and modeling. Students are introduced to 3D design and modeling methods such as modeling with NURBS, polygons, and subdivision surfaces. Texture mapping, lighting, and rendering are also discussed. Production pipeline issues such as geometry deformation and level of detail are emphasized.

**DATA VISUALIZATION
BCM3123**

Course Outcomes

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

CO1	Analyze the concept of the data visualization in various visualization applications.
CO2	Construct visualization application by implementing the data processing stages which

Synopsis

Topics include the introduction to data visualization. It focuses on the visualization techniques and method that have a broad applicability in visualization applications. This course also covers the dataset concept by describing the most frequently used types of datasets in visualization. Students will be exposed to the various data processing stages that form the visualization process: data acquisition, data filtering, data mapping and rendering.

**MULTIMEDIA INTERACTIVE
DEVELOPMENT
BCM3183**

Course Outcomes

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

CO1	Apply basic theories of interactivity to the development of multimedia application.
CO2	Construct multimedia interactive application using various multimedia scripting and tools.
CO3	Report on impact of ethical issues in multimedia interactive application.

This course is designed to expose the student to the multimedia interactive project including basic theories of multimedia learning. This course also teach student to apply various multimedia scripting and tools in order to develop a prototype of multimedia interactive application.

CREATIVE WRITING UHE3082

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Demonstrate creative writing through a variety of activities |
| CO2 | Write at least one fiction and/or non fiction piece applying the elements of creative writing |
| CO3 | Work in group to produce a short video and improve editing skills |

Synopsis

This Creative Writing course generally aims to foster and bring out the potential and creativity in students by developing descriptive writing using the five senses. This course models a writer's workshop structure which consists of Mini Lessons, Independent Writing, Conferring and Sharing. This course also generates critical thinking skills in students as well as exposes students to the beauty of the written language by having a reader's log. Students will be introduced to the elements of creative fiction and non-fiction writing as well as certain elements of grammar, which will be emphasized in the writing process through language software or online resources. Collaborative editing skills will also be introduced before students publish their writing to the public, online or otherwise.

COMPUTER ANIMATION BCM3093

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Apply computer animation principle and computer animation process. |
| CO2 | Construct an animation project using animation tools within a group. |
| CO3 | Work effectively to achieve the project goals by building a good relationship and interaction among team members. |

Synopsis

This course is designed to provide a platform where comprehensive computer animation skills and technique are introduced. The topic includes an overview of story-boarding, type of animations, animation techniques and animation tools. Through this course, student will explore current research topics in computer animation and work in group to develop a short story using computer animation.

MULTIMEDIA DATA PROCESSING BCM3153

Course Outcomes

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

- | | |
|-----|---|
| CO1 | Analyze the basic theory of data sampling, algorithm for data storage, and presentation of multimedia data. |
|-----|---|

CO2 Construct multimedia data processing application using current software/applications development tools.

CO3 Work in a team by identify and respect attitude, behaviour and trust among team members.

Synopsis

This course concentrates on using current existing software/applications for processing the multimedia data as well as theory and techniques used within the software. For this purpose student are exposed with the theory of data sampling, basic algorithm for data storage and data presentation. Students are exposed to data processing by programming. Students are required to produce their own software/application for editing, storage, and presentation of multimedia data by using the library/frame-work. At this stage students are also exposed with the techniques on how to handling multimedia data presentation in network environment.

GEOGRAPHICAL INFORMATION SYSTEM BCM3173

Course Outcomes

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

CO1 Analyze the concept of the GIS and Information Visualization Concept.

CO2 Manipulate data management module to Construct Geographical Information System application in any related area.

CO3 Share ideas, accept new ideas and take charge of their own learning (autonomy).

Synopsis

Topics include introduction to Geographical Information Systems (GIS) application, principle of information visualization, spatial and attribute data management, analysis and manipulation of the data and information to create useful information. This course also covers the development of the Geographical Information Systems which is generally used in many applications. The development interactive information visualization by using computer graphics and multimedia technology will be discussed. Two type of applications are used ; vector data and raster data.

MOBILE APPLICATION DEVELOPMENT BCS3283

Course Outcomes

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

CO1 Analyze the limitations and challenges in mobile applications.

CO2 Build a mobile application using selected software development environment.

CO3 Demonstrate ability to recognize and respect group member's attitude, act and belief.

Synopsis

This course is concerned with the development of applications on mobile and wireless computing platforms. It explores mobile