ALBUKHARY INTERNATIONAL UNIVERSITY

ACADEMIC HANDBOOK

BACHELOR OF COMPUTER SCIENCE (HONOURS)

(BCS)

EDITION 2021

"inspiring minds"

AQIDAH   AKHLAQ   ADAB   AMANAH   AMALAN

BACHELOR OF COMPUTER SCIENCE (HONOURS)

Academic Handbook

Albukhary International University (AIU)

Jalan Tun Abdul Razak, 05200 Alor Setar,

Kedah Darul Aman, Malaysia

Email: sci@aiu.edu.my

Website: www.aiu.edu.my

TABLE OF CONTENTS

SCHOOL OF COMPUTING AND INFORMATICS (SCI)

Background

Albukhary International University (AIU) is a private non-profit education institution, a fully residential campus with state-of-the-art facilities. It provides a conducive living and learning environment for self-discovery, nurturing relationships and building understanding of global issues. At AIU, students are exposed to a holistic educational approach through a combined academic and social engagement programme, which is carried out throughout the study period.

Designed and constructed on a 45 acres (18 hectares) site, the AIU campus is located near the city of Alor Setar, the capital of the State of Kedah in the north of Malaysia. The inspiring architectural splendour of the University campus is one that mirrors the centres of learning of yesteryears. Although several are even reminiscent of classical Muslim architecture during the golden age of learning then, the beauty of AIU lies not just in its rich and beautiful architecture but also-and very importantly-in the diverse enrolment of students from over 40 nationalities.

Through its vision, mission and core values, AIU is committed to ensuring human dignity in line with the concept of '**Inspiring Minds'** as the core ethos and tagline of the University.

The School of Computing and Informatics (SCI) aims to produce graduates who are equipped with competitive knowledge, principles, and skills in technical and fundamental computer science theories towards serving the society through social business. SCI aspires to develop adaptable, balanced, well-rounded individuals who are willing and able to serve humanity, acting as change agents in respective communities through its 5A Core Values which are Adab, Akhlak, Amanah, Aqidah, Amalan.

Above all, the Bachelor of Computer Science (Honours) programme, plus its embedded core values in the curriculum, would produce an individual who is professional, compassionate, empathetic and holistic in all dimensions of life. The graduates of Bachelor of Computer Science (Honours) from Albukhary International University would stand out as outstanding and exceptional leaders with philanthropic attitudes and traits.

SCHOOL OF COMPUTING AND INFORMATICS

Programme Information

BACHELOR OF COMPUTER SCIENCE (HONOURS)
KPT NEC: N/481/6/0827   MQA CODE: MQA/PA13899

AIU Philosophy

AIU was founded with the intention of providing an opportunity where the pursuit of knowledge can flourish together with exploration and stretching its boundary towards a new horizon for future needs. AIU aspires to develop adaptable, balanced, well-rounded individuals who are willing and able to serve humanity, acting as change agents in respective communities.

AIU Vision

Innovating solutions that promote the convergence of ideas towards a sustainable world.

AIU Mission

Provides opportunity to serve humanity through social business in a redesigned learning environment.

BACHELOR OF COMPUTER SCIENCE (HONOURS) PROGRAMME ENTRY REQUIREMENTS

Bachelor of Computer Science (Honours)

i.   A pass in Matriculation/Foundation qualification with a minimum CGPA of 2.00 out of 4.00, or any equivalent qualification; and a Credit in the following subjects at SPM level or any equivalent qualification:
    A. Additional Mathematics; Or
    B. Mathematics, and one of the Science, Technology or Engineering subject;

ii. A Pass in STPM (Science Stream) or any equivalent qualifications with minimum Grade C (CGPA 2.00) in Mathematics and one of Science or ICT subjects.

iii. A Diploma in Computer Science or Software Engineering or Information Technology or Information Systems or its equivalent field (Level 4 MQF) with minimum CGPA 2.50 OR any Diploma in Science and Technology with minimum CGPA 2.50

Language Proficiency:

i.   For Local Students:
    A. Test of Malaysian University English Test (MUET) at a score of academic Band 2.00
ii. For International Students:
    B. Test of Malaysian University English Test (MUET) at a score of academic Band 3.00; OR
    C. International English Language Testing Services (IELTS), a minimum overall academic band score of 5.00 OR its equivalent.

Note:

➢ English Language: Students who do not meet the criteria will be issued with a "conditional" offer letter which enables them to receive a 12-month student pass, to undergo Pre- University English Programme (PREP). The PREP prepares students for English language proficiency tests such as IELTS / TOEFL / Cambridge English: Advanced (CAE) / Cambridge English: Proficiency (CPE) / Pearson Test of English (PTE) or MUET to ensure that they meet the eligibility requirements.

BACHELOR OF COMPUTER SCIENCE (HONOURS) CURRICULUM STRUCTURE

Programme	: Bachelor of Computer Science (Honours)
Total Credits To Graduate	: 120 Credit Hours
Duration Of Study	: 3 Years (9 Semesters)
Programme Educational Objectives (PEO)	1. Acquire fundamental knowledge, scientific principles and technical competency skills in the field of computer science in line with industry requirements locally and globally. 2. Communicate effectively, perform well as a team player and demonstrate good leadership qualities with AIU 5A core values. 3. Solve computing problems creatively, innovatively and ethically, using numerical and technical skills through sustainable approaches. 4. Demonstrate social entrepreneur skills, recognise the need for lifelong learning, as well as use digital solutions for the community at large.
Programme Learning Outcome (PLO)	1. Describe advanced and comprehensive theoretical concepts and technical knowledge in Computer Science. 2. Apply critical, analytical and evaluation skills to resolve complex real-world problems and unpredictable issues with innovative sustainable approaches. 3. Perform a range of essential techniques, methods and procedures in order to solve computing problems. 4. Work together with different people in diverse learning and working Communities. 5. Communicate ideas, information and solutions effectively with stakeholders and society at large. 6. Develop solutions for real computing problems using relevant digital technologies. 7. Demonstrate the ability to analyse numerical data for work or study. 8. Demonstrate leadership, teamwork, social skills within groups and Communities. 9. Effectivly integrate skills and principles of lifelong learning and professional pathways in career development. 10. Demonstrate entrepreneurial competency in social business project(s) including appreciation of broader socio-economic and cultural issues in local and global communities. 11. Exhibit professionalism and ethical behaviour with AIU core values.

1. Compulsory Common Curriculum Courses (18 credits)

COURSE CODE	COURSE	CH	PREREQUISITE
MPU3113*	Hubungan Etnik	3	NONE
MPU3153**	Malaysian Studies	3	
MPU3123*	Tamadun Islam dan Tamadun Asia (TITAS)	3	NONE
MPU3143**	Bahasa Melayu Komunikasi II	3	
MPU3213	Entrepreneurship and Innovation	3	NONE
MPU3313	Unity and Patriotism	3	NONE
BBN1022	Sustainability And Society	2	NONE
BBU1012	Social Business 1	2	**MPU3213**
LLN1012	Academic Writing	2	**NONE**

Notes:
* Local Student
** International Student

2. Programme Core Courses (42 credits)

COURSE CODE	COURSE	CH	PREREQUISITE	YEAR & SEMESTER
CCC1113	Mathematics for Computer Science	3	NONE	Y1, S1
CCC1123	Problem Solving and Programming Fundamental	3	NONE	Y1, S1
CCC1133	Computer Organization and Architecture	3	NONE	Y1, S1
CCC1213	Data Communication and Networking	3	CCC1133	Y1, S2
CCC1223	Object Oriented Programming	3	CCC1123	Y1, S2
CCC1233	Probability and Statistic	3	NONE	Y1, S2
CCC1243	Artificial Intelligence	3	NONE	Y1, S2
CCC1313	Cyber Ethics	3	NONE	Y1, S3
CCC1323	Discrete Mathematics	3	CCC1233	Y1, S3
CCC2113	Data Structures and Algorithm Analysis	3	CCC1223	Y2, S1
CCC2123	Operating Systems	3	CCC1133	Y2, S1
CCC2133	Database Management System	3	NONE	Y2, S1
CCC2143	Software Engineering	3	CCC1223	Y2, S1
CCC2213	Directed Study in Computer Science	3	CCC2113 OR CCC2123	Y2, S2

3. Specialisation Courses (21 Credits)

Choose ONE (1) of the following Specialisations (Data Science OR Cybersecurity)

DATA SCIENCE		CREDIT HOURS	YEAR/ SEMESTER
CCS2213	Machine Learning	3	Y2, S2
CCS2233	Statistical Programming	3	Y2, S2
CCS2253	Parallel and Distributed Databases	3	Y2, S2
CCS2313	Data Mining and Analytics	3	Y2, S3
CCS3113	Deep Learning	3	Y3, S1
CCS3133	Information Visualization	3	Y3, S1
CCS3153	Natural Language Processing	3	Y3, S1

OR

CYBERSECURITY		CREDIT HOURS	YEAR/ SEMESTER
CCS2223	Fundamental of Information Security	3	Y2, S2
CCS2243	Cryptography Essential	3	Y2, S2
CCS2263	Cybersecurity Systems	3	Y2, S2
CCS2323	Secured Software Development	3	Y2, S3
CCS3123	Digital Forensics	3	Y3, S1
CCS3143	Cybersecurity Risk Management	3	Y3, S1
CCS3163	Directed Studies in Cybersecurity	3	Y3, S1

4. Field Elective Courses (9 Credits)

Choose THREE (3) from the following courses

COURSE		CREDIT HOURS	YEAR/ SEMESTER
CCE2213	Routing and switching	3	YEAR 2 S2 & S3 YEAR 3 S1
CCE2313	Scaling and Connecting Networks	3	
CCE3113	Network Security Technology	3	
CCE2233	Requirements Engineering	3	
CCE2333	Software Testing	3	
CCE3133	Software Quality Management	3	
CCE2223	Information Security Management System	3	
CCE2323	Vulnerability Assessment and Penetration Test	3	
CCE3123	Incident Handling and Response	3	
CCE2243	Statistical Inference	3	
CCE2343	Regression Models	3	
CCE3143	Data Products Development	3	

5. Free Electives (9 Credits)

Choose 3 Free Elective courses from other programmes

COURSE	CREDIT HOURS	YEAR/SEMESTER
FREE ELECTIVE 1	3	Y1, S2
FREE ELECTIVE 2	3	Y2, S1
FREE ELECTIVE 3	3	Y2, S2

6. Project

COURSE		CREDIT HOURS	YEAR/SEMESTER
CCC3013	Project 1	3	Y2, S3
CCC3026	Project 2	6	Y3, S1

7. Industrial Training

COURSE		CREDIT HOURS	YEAR/SEMESTER
CCT3216	Industrial Training	12	Y3, S2 & S3

BACHELOR OF COMPUTER SCIENCE (HONOURS) STUDY PLAN

YEAR	SEM	COURSE CODE	COURSE	CH	TOTAL
1ST	1ST	MPU3123	Islamic And Asian Civilization (Titas)*	3	19
		MPU3153	Malaysian Studies**	3	
		MPU3313	Unity And Patriotism	3	
		BBN1022	Sustainability And Society	2	
		LLN1012	Academic Writing	2	
		CCC1113	Mathematics For Computer Science	3	
		CCC1123	Problem Solving And Programming Fundamental	3	
		CCC1133	Computer Systems Organization And Architecture	3	
	2ND	MPU3123	Ethnic Relationship	3	18
		MPU3143	Bahasa Melayu Komunikasi II	3	
		MPU3213	Entrepreneurship and Innovation	3	
		CCC 1213	Data Communication and Networking	3	
		CCC 1223	Object Oriented Programming	3	
		CCC 1233	Probability and Statistic	3	
		CCC 1243	Artificial Intelligence	3	
	3RD	BBU 1012	Social Business	2	8
		CCC 1313	Cyber Ethics	3	
		CCC 1323	Discrete Mathematics	3	

YEAR	SEM	COURSE CODE	COURSE	CH	TOTAL
2ND	1ST	CCC 2113	Data Structures and Algorithm Analysis	3	18
		CCC 2123	Operating Systems	3	
		CCC 2133	Database Management System	3	
		CCC 2143	Software Engineering	3	
		XXX XXX3	Free Elective 1	3	
		XXX XXX3	Free Elective 2	3	
	2ND	CCC 2213	Directed Study in Computer Science	3	18
		CCS 22X3	Specialisation 1: Machine Learning OR Fundamental of Information Security	3	
		CCS 22X3	Specialisation 2: Statistical Programming OR Cryptography Essential	3	
		CCS 22X3	Specialisation 3: Parallel Distributed Databases OR Cybersecurity Systems	3	
		CCE 2XX3	Field Elective 1	3	
		XXX XXX3	Free Elective 3	3	
	3RD	CCC 3013	Project 1	3	9
		CCS 23X3	Specialisation 4: Data Mining and Analytics OR Secured Software Development	3	
		CCE 2XX3	Field Elective 2	3	

YEAR	SEM	COURSE CODE	COURSE	CH	TOTAL
3RD	1ST	CCC 3026	Project 2	6	18
		CCS 31X3	Specialisation 5: Deep Learning OR Digital Forensics	3	
		CCS 31X3	Specialisation 6: Information Visualization OR Cybersecurity Risk Management	3	
		CCS 31X3	Specialisation 7: Natural Language Processing OR Directed Study in Cybersecurity	3	
		CCE 3XX3	Field Elective 3	3	
	2ND 3RD	CCT3216	Industrial Training	12	12

GRADING SYSTEM

The grade for each course shall be based on the overall assessment performance of the course. The overall assessment normally comprises Final Examination and Coursework. Some courses might only comprise Coursework as overall assessment.

Students of the Bachelor of Computer Science (Honours) programme must pass both components of Final Examination/Assessment and Coursework. The passing mark of the Final Examination/Assessment and Coursework is based on the Grading System below.

Student performance is indicated by the Performance Indicator shown in Table 1.1

Table 1.1 Grades, Score & Grade Point Relationship

LETTER	SCORE	GRADE POINT	QUALITATIVE ASSESSMENT
A+	90 - 100	4.00	High Distinction
A	80 - 89	3.75	Distinction
A-	75 - 79	3.67	High Credit
B+	70 - 74	3.33	Credit
B	65 - 69	3.00	Credit
B-	60 - 64	2.67	Pass
C+	55 - 59	2.33	Pass
C	50 - 54	2.00	Pass
C-	40 - 49	1.67	Failed (Re-sit the Course)
D+	35 - 39	1.33	Failed (Repeat the Course)
D	30 - 34	1.00	Failed (Repeat the Course)
F	0 - 29	0.00	Failed (Repeat the Course)

ACADEMIC SESSION

The University implements a 3-semester academic year in which Semester 1 and Semester 2 comprise 18 weeks. These 18 weeks include lectures, examinations, and preparations. Meanwhile, Semester 3 comprises 9 weeks. This semester is counted in the calculation of study.

SEMESTER 1	WEEK
Lectures	14 Weeks
Mid-Semester Break	1 Week
Revision Period	1 Week
Examination	2 Weeks
Total (A)	18 Weeks
End Of Semester Break (B)	2 Weeks
SEMESTER 2	WEEK
Lectures	14 Weeks
Mid-Semester Break	1 Week
Revision Period	1 Week
Examination	2 Weeks
Total (C)	18 Weeks
End Of Semester Break (D)	2 Weeks
SEMESTER 3	WEEK
Lectures	7 Weeks
Revision Period	1 Week
Examination	1 Week
Total (E)	9 Weeks
End Of Semester Break (F)	2 Weeks
TOTAL (A+B+C+D+E+F)	51 WEEKS

INDUSTRIAL TRAINING

1. Industrial Training refers to the placement of students in an organization to conduct supervised practical training in the industry sector within the stipulated time before they are awarded a bachelor's degree.

2. The students should note that Industrial Training is an essential component in the curriculum. It provides exposure to fundamental concepts at a practical level, helps developing professional skills required by an organization and offers opportunity to prospective employment. Many employers regard this period as a chance to assess potential employees for future employment.

3. For Industrial Training, ONE (1) credit value is equivalent to TWO (2) weeks of training. The total credit hours for Industrial Training is 12 credit hours.

4. The students will undergo Industrial Training for two (2) consecutive semesters (six (6) months).

5. Students must complete and pass their final project before undergoing Industrial Training.

6. Students who undergo Industrial Training are not eligible to be considered for the Dean's List.

7. The student will be graded based on the Grade Point Average (GPA) system. Incomplete ("I") status may be given to the students who do not complete their Industrial Training.

8. Refer to the Bachelor of Computer Science (BCS) Industrial Training handbook for more details.

GRADUATION

1. A student will only qualify for graduation once the following requirements are fulfilled:

   I. Obtained a CGPA of at least 2.00 or achieved Active Status ("AS")
   II. Pass all courses required for the programme within the stipulated period of study
   III. Complete a total of graduating credits set by the School and approved by the Senate
   IV. Meet all requirements for Undergraduate Studies' Academic Regulation
   V. Apply for graduation and obtain approval from the School
   VI. Verified to be awarded a degree by the School and approved by the Senate; and fulfil other requirements as required by the Senate.

2. The minimum amount of credits for graduation is ONE HUNDRED AND TWENTY (120) for Bachelor of Computer Science (Honours) programme.

PROGRAMME CORE COURSES

Course: CCC1113 Mathematics for Computer Science

Synopsis: This course covers practical mathematics concepts for computer science. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of functions; permutations and combinations and counting principles. Further selected topics may also be covered, such as recursive definition and structural induction; state machines and invariants; recurrences; generating functions. This course applied mathematical theories in the computer science field. The course will be conducted through lectures, tutorials, problem-based learning and exercises.

Course Learning Outcome (CLO):

- Describe the fundamentals of Mathematics for Computer Science (C2, PLO1).
- Formulate the techniques to solve appropriate problems (A4, PLO3).
- Use tools or software to implement techniques learned for problem solving (C3, PLO7).

Course: CCC1123 Problem Solving and Programming Fundamental

Synopsis: This course is designed to introduce problem solving methods and programming techniques to computing students using a specific programming language. Emphasis is placed on the fundamentals of computer programming such as data types, variables, selection structures (if/else), looping structures (while), code modularity (methods), arrays as well as the mechanics of program running, testing, and debugging. The knowledge of a computer language is gained by learning its syntax and standard coding conventions. The course also focused on the traditional structured (procedural) approach. The class uses regular practical laboratory exercises that emphasize the problem-solving techniques described during the lectures.

Course Learning Outcome (CLO):

- Describe the fundamentals of computer systems and problem solving in programming (C2, PLO1).
- Identify computer program codes by applying suitable programming tools, structures and techniques (C4, PLO2).
- Apply suitable programming structures and techniques in solving problems (P5, PL03).

Course: CCC1133 Computer Organization and Architecture

Synopsis: This course aims to enhance the knowledge and understanding of the characteristics and concepts in a computer system. This course will emphasize on the fundamental models of a general system model which is used to examine the language translation process by the compiler, assembler, linker, loader and the numbering system. This course will also concentrate on the commands and format architecture, and converge on the concepts of digital circuits, central processing unit components, control and implementation units, the fetch/execute cycle, instruction sets, I/O function and bus system. The course will be conducted through lectures, problem-based learning and exercises.

Course Learning Outcome (CLO):

- Describe digital computer architecture and organization; and describe how the different components in computer systems connect and function to produce results (C2, PLO1).
- Demonstrate the concept of data representation and digital circuit (C3, PLO2).
- Explain the connection between memory, IO and bus system (C5, PLO6)

Course: CCC1213 Data Communication and Networking

Synopsis: This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing, and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation of network security. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes. The student will also be able to utilize common network utilities to verify small network operations and analyze data traffic. The course will be conducted through lectures and laboratory exercises.

Course Learning Outcome (CLO):

- Explain network technologies and how devices access local & remote network resources (C2, PLO1)
- Identify an IP addressing scheme to provide network connectivity for a small to medium-sized business network (C4, PLO2).
- Build initial settings on a network device and monitoring tools available for small to medium-sized business networks (P4, PL03).

Course: CCC1223 Object Oriented Programming

Synopsis: This course focuses on the development of larger programs using object-oriented design principles and programming constructs. It introduces the student to the principles of object-oriented programming which includes topics such as object-oriented concept, predefined and user defined class, basic aspects of string processing, encapsulation, inheritance, polymorphism, abstract classes, interfaces, inner classes, array of object, Graphical User Interface, event handling and design pattern. Content covered includes approaches for designing an application, system by applying object-oriented programming, as well as using visual modeling throughout the development life cycles. The course will be conducted through lectures and laboratory exercises.

Course Learning Outcome (CLO):

- Describe basic object-oriented programming concepts (C2, PLO1).
- Explain an OOP language syntactic elements and constructs (C5, PLO2).
- Demonstrate the understanding of object-oriented features of an OOP language (P5, PLO3).

Course: CCC1233 Probability and Statistics

Synopsis: This course is designed to introduce students to fundamental techniques of probability and statistical analysis. Students will learn basic mathematical tools for effective experiment design, experimental result analysis, inference from sampling data, and probability determination. The course also touches on general methods of stochastic modelling, simulation, queuing, and statistical data analysis; make optimal decisions under uncertainty; model and evaluate computer systems; and prepare for advanced probability-based courses. Class discussion will emphasize how statistics and probability relates to contemporary topics of interest. The course will be conducted through lectures, tutorials, problem-based learning and exercises.

Course Learning Outcome (CLO):

- Describe probability and statistical techniques discussed in this course (C2, PLO1).
- Differentiate between inferential and descriptive statistics (C4, PLO2).
- Identify appropriate techniques to solve related problems (C4, PLO7).
- Formulate appropriate techniques to solve problems (C6, PLO6).

Course: CCC1243 Artificial Intelligence

Synopsis: This course provides a general introduction to Artificial Intelligence (AI) and its underlying techniques. The course also provides an understanding of the diverse branches of AI through a discussion of its theoretical foundations. Students are also exposed to AI programming languages in this course. The students should be able to develop intelligent systems by assembling solutions to concrete computational problems as well as understand and appreciate the role of knowledge representation, reasoning, problem solving, and learning in understanding human intelligence from a computational perspective. The course will be conducted through lectures, laboratory exercises and problem-based learning.

Course Learning Outcome (CLO):

- Explain the fundamental knowledge of concepts underlying Artificial Intelligence (C2, PLO1).
- Identify the need and opportunity for adopting Artificial Intelligence techniques into real world problems and applications (C4, PLO2).
- Demonstrate practical skills of building intelligent systems (A3, PLO6).

Course: CCC1313 Cyber Ethics

Synopsis: This course emphasizes on ethical problems that computer scientists face, the codes of ethics of computing professional societies, legal issues involved in technology, and the social implications of computers, computing, and other digital technologies. Students will be exposed to the common threats in the cyber world and how to apply the theories in facing the issues regarding the threats. The emerging and converging technologies will also be discussed in this course to realize the potential threats of the new technologies. The course will be conducted through lectures, problem-based learning and group discussion.

Course Learning Outcome (CLO):

- Explain ethical philosophies, frameworks, and methodologies (C2, PLO1).
- Discuss the ethical issues in cyber space including its impact to individual, community, organization and country (A2, PLO4).
- Identify the local and global impact of computing on individuals, organizations, and society (C4, PLO8).
- Apply the concepts and principles of moral thinking to problems relating to computing and digital technologies (C3, PLO11).

Course: CCC1323 Discrete Mathematics

Synopsis: This course prepares students to solve problems in computing with applications in business, engineering, mathematics, in the social, physical sciences and many other fields. Students will study discrete, finite and countably infinite structures such as logic and proofs, sets, naming systems, in particular, number systems, relations, functions, sequences, graphs, and combinatorics. These topics are commonly used when reasoning about real problems and developing correct algorithmic solutions for them. This course applied discrete mathematics theories in the computer science field. The course will be conducted through lectures, tutorials, problem-based learning and exercises.

Course Learning Outcome (CLO):

- Describe mathematically about basic data types and structures used in computer algorithms and systems (C2, PLO1).
- Analyse computational processes using analytic and combinatorial methods (C4, PLO7).
- Apply principles of discrete probability to calculate probabilities and expectations of simple random processes (C3, PLO2).

Course: CCC2113 Data Structures and Algorithm Analysis

Synopsis: This course is considered as one of the important courses for the preparation of graduates who are capable to write innovative program solutions using data structure concepts. The focus is to enable the students to choose and apply appropriate data structures and algorithms given a particular computing problem. The course introduces students to data structures such as lists, stacks, queues, graphs, recursion, trees, searching, sorting and hashing. Students will also be introduced to complexity analysis as a way to evaluate the efficiency of algorithms. Students will apply the data structure concept through laboratory assignments and projects.

Course Learning Outcome (CLO):

- Illustrate the algorithm design and performance for different abstract data type operations (C2, PLO1).
- Apply the suitable data structures for an application that requires data structures (C3, PLO2).
- Construct the data structures and algorithms in problem solving (P4, PLO3).

Course: CCC2123 Operating Systems

Synopsis: This course aims at giving the students the general understanding of the concepts of an operating system (OS). It covers the various parts of OS including the concepts and algorithms related to process management, memory management, input/output management and file management in an OS. This course discusses generally the function of operating system components, policy, strategy and approach being used in constructing an Operating System. This course also provides students with hands-on experience on the design and implementation of Computer Operating Systems. The course will be conducted through lectures, laboratory exercises and problem-based learning.

Course Learning Outcome (CLO):

- Explain the basic concepts, theory and technology used in operating systems (C2, PLO1).
- Demonstrate the major components and functionalities of an operating system and security (C3, PLO2).

Course: CCC2133 Database Management System

Synopsis: This course exposes the student to the knowledge and skill in the processes of design and implementation of databases using Database Management System (DBMS). This course emphasizes the concepts of database, database environment, and DBMS. This course also emphasizes conceptual, logical and physical design of relational databases. The Entity Relationship Diagram and Enhanced Entity Relationship Diagram are discussed extensively and discussion on normalization is done from unnormalized form to other normal forms. The topics will cover SQL, physical design, query processing and optimization, and security. The course will be conducted through lectures, laboratory exercises and problem-based learning.

Course Learning Outcome (CLO):

- Describe the concept of databases (C2, PLO1).
- Apply the knowledge and skills in query processing and optimization (C3, PLO2).
- Create database applications with selected DBMS (P7, PLO6).

Course: CCC2143 Software Engineering

Synopsis: In this course, students will gain an understanding of the methods, tools, and procedures of software engineering. The student would learn the different phases in software development such as identifying the main issues in managing a software project, design and development of software. Methods covered include a wide range of activities such as software process, project management, system and software requirements analysis, design, development, component engineering, configuration management, quality assurance, testing and maintenance of software. Industry standard system modelling, and specification notations will be discussed throughout the course. The course will be conducted through lectures, laboratory exercises and problem-based learning.

Course Learning Outcome (CLO):

- Describe the concepts and principles that guide software engineering practices (C2, PLO1).
- Demonstrate an understanding of implementing software engineering processes and techniques to develop a good software (P5, PLO5).
- Construct requirement models during analysis and design phases (C3, PLO2).
- Use software tools effectively in all phases of software development (A1, PLO6).

Course: CCC2213 Directed Study in Computer Science

Synopsis: This course requires students to pursue independent research under the guidance of a faculty member. Students may choose to undertake a Directed Study for the following reasons: 1) to pursue in depth a computer science area covered more generally in a course offered by the school, or 2) to explore a topic not normally covered in the curriculum, which normally is in the area of emerging technologies. In either case, it is the student's responsibility to identify the topic fully and to acquire enough information to ensure its worthiness for independent research.

Course Learning Outcome (CLO):

- Outline a directed study plan in the chosen area (C4, PLO1).
- Organise the learning process of the chosen area (A4, PLO3).
- Demonstrate the gained knowledge of the chosen area in an appropriate form of report (P5, PLO6).
- Report the knowledge gained in the training and share with colleagues. (A2, PLO9).

SPECIALISATION COURSES (DATA SCIENCE)

Course: CCS2213 Machine Learning

Synopsis: The course aims to expose students to one of advanced artificial intelligence techniques and it is a fundamental knowledge for the data science specialization. It covers theories, learning models and practical applications of machine learning algorithms. Topics include supervised, unsupervised, reinforcement learning, and classification with Artificial Neural Networks, Support Vector Machines, and evolutionary computation. Students will be exposed to the analysis and design of algorithms for solving classification and optimization tasks. Several software libraries and datasets publicly available will be used to illustrate the application of these algorithms. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Describe the roles of machine learning (C2, PLO1).
- Demonstrate machine learning techniques to resolve complex real-world problems (P5, PLO2).
- Analyse data using machine learning techniques (C4, PLO7).
- Develop machine learning models (C6, PLO6).

Course: CCS2233 Statistical Programming

Synopsis: The course aims to expose students to programming and computation techniques in supporting analysis of large datasets based on the industry needs or demands. It is a necessary knowledge and skill for data science specialization. The students will develop statistical programs using the R programming language. The topics covered in the course include introduction to statistical programming, the basic R programming structures, logic, flow control, functions and packages. The students will also perform programming statistical graphics, simulations, computational linear algebra, and optimizations. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Describe the role of statistical programming in large dataset analysis (C2, PLO1).
- Apply the suitable statistical packages for data analysis (C3, PLO2).
- Interpret data using statistical programming (A5, PLO7).
- Build a program to visual data exploration (P5, PLO6).

Course: CCS2253 Parallel and Distributed Databases

Synopsis: This course provides students with advanced knowledge in database management systems particularly managing large volumes of data through parallelization and querying data from distributed database systems. Students will be exposed to database design and computation techniques for parallel and distributed database technology for integrating the operational data of an enterprise and in providing centralized and controlled access to the data. The topics covered in the course include parallel architectures, strategies and algorithms for parallel database systems, distributed database design, distributed query processing, and multi-database systems. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of the concepts of distributed and parallel databases (P5, PLO1).
- Apply the appropriate technique to access and query distributed databases (C3, PLO2).
- Integrate distributed database system (A4, PLO6).

Course: CCS2313 Data Mining and Analytics

Synopsis: The course aims to expose the students to the basics of data science for handling massive data from databases. Students will be guided to analyze several data sets and recognize useful patterns using data mining techniques and appropriate tools. The topics covered include an Introduction to Data Mining and Data Warehousing, Data, Data Pre-processing, Data Exploration, Regression Analysis, Classification and Prediction, Association Analysis, Cluster Analysis, and Web Mining. In addition, the course also discusses the strengths and weaknesses of data mining techniques as well as identifying trends and its applications. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of the concepts of data mining (C2, PLO1).
- Perform the appropriate technique to find patterns on data (A2, PLO2).
- Analyze data using appropriate data mining techniques (C4, PLO7).
- Develop an analytical application using appropriate data mining algorithms (P7, PLO6).

Course: CCC3113 Deep Learning

Synopsis: This course aims to expose students to mathematical, statistical and computational challenges of building stable representations for high-dimensional data, such as images, text and data. It is an advanced knowledge of machine learning, mathematics and statistics which is necessary for data science specialization. This course will delve into selected topics of Deep Learning, discussing algorithms, structures, functions, and models from both supervised and unsupervised learning. Special emphasis will be on convolutional architectures, invariance learning, unsupervised learning and non-convex optimization. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Describe the basic concepts of deep learning (C2, PLO1).
- Perform a deep learning process on a large dataset (A5, PLO2).
- Differentiate between deep learning algorithms for solving real-word problems (P3, PLO7).
- Develop a practical deep learning application (C6, PLO6).

Course: CCC3133 Information Visualization

Synopsis: The course covers the concepts and models to visualize data in the data analytics area. It introduces students to design principles for creating meaningful displays of quantitative and qualitative data to facilitate managerial decision-making. The topics that will be covered by the course include, the approaches to data visualization, choosing the appropriate tools for visualizing the data, and managing data quality before and during the visualization process. Students will develop an advanced knowledge of the appropriate selection, modelling, and evaluation of data visualizations. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of data visualization concepts (C3, PLO1).
- Presenting data in appropriate visual representation (A2, PLO3).
- Organise a large dataset into a visual meaningful information (P5, PLO2).
- Develop appropriate information visualization applications (C6, PLO6).

Course: CCS3153 Natural Language Processing

Synopsis: The purpose of this course is to provide students with a comprehensive understanding and experience of design and development of natural language computing applications. The course is necessary for the data science specialization as it provides the ability to the computer to understand and derive meaning from human languages. The topics covered in the course include theories of natural language, principles and components in natural language computing, and natural language computing techniques. The focus will be given on syntax, semantic, pragmatic, stemming and tokenization of natural language processing. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Describe the needs for natural language processing (C2, PLO1).
- Demonstrate text classification task using appropriate approach (A3, PLO3).
- Analyse techniques in machine learning to specific problems in NLP (C4, PLO2).
- Build practical NLP applications (P7, PLO6).

SPECIALISATION COURSES (CYBER SECURITY)

Course: CCS2223 Fundamental of Information Security

Synopsis: The purpose of this course is to provide students with theories and fundamental knowledge of information security. It is a basic course for cybersecurity specialization. The topics covered include attacks, threats, risk, and security countermeasures, and requirements. Other topics include security models and management, common attacks such as viruses, worms, and trojan horse. Students will also be exposed to the current issues that focus on the importance of cyber security in an organization related to the cybersecurity environment. Besides, students will also gain hands-on experience using certain tools to solve common cyber security problems as laboratory exercises and projects.

Course Learning Outcome (CLO):

- Describe the information security requirements (C2, PLO1).
- Identify security attacks and suitable countermeasures (A4, PLO6).
- Identify the process in information security planning (C4, PLO2).

Course: CCS2243 Cryptography Essential

Synopsis: This course exposes students to the underlying concepts and techniques of cryptography for the cybersecurity environment. It provides an extensive coverage on the techniques for performing encryption and decryption processes of cryptography domain. Classical ciphers will be first introduced followed by modern techniques. The course also covers cryptanalysis and other attacks using cryptography to the cybersecurity environment. Key management, public and symmetric key encryptions are among the topics discussed in this course together with their current algorithms. The course also deals with message authentication and digital signatures for authentication. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Describe the key terminology used in cryptography (C2, PLO1).
- Explain the types of cryptographic techniques for securing data (P2, PLO3).
- Apply appropriate cryptographic techniques for securing data (A3, PLO7).
- Identify the elements and basic process of cryptographic techniques (C4, PLO2).

Course: CCS2263 Cybersecurity Systems

Synopsis: The aim of the course is to provide knowledge and practical skills to students on protecting systems that make use of cyberspace from internal and external attacks. It is a fundamental course for cybersecurity specialization. The course will focus on the topics of access control, monitoring systems, and intrusion detection systems. It will also expose the students to securing devices and hosts as a mechanism for cybersecurity. Remote and local access to the systems will also be discussed. The course will also introduce the students to penetration tests and computer forensic as a cybersecurity approach. The course will be conducted through lectures, laboratory exercises and projects using appropriate software tools.

Course Learning Outcome (CLO):

- Explain the fundamental concepts of cybersecurity (C2, PLO1).
- Apply the appropriate approach for securing devices and hosts (C3, PLO2).
- Analyse the appropriate approach for securing local networks (A3, PLO6).

Course: CCS2323 Secured Software Development

Synopsis: The course aims to introduce the students with the software security concept which is essential for developing secure software. It is a necessary course for the cybersecurity specialization. The course will cover the fundamental concept of security in software, issues, requirements, models, techniques and tools. Some prominent issues such as input handling, buffer overflow, web application security, software errors and exceptions will also be covered. The static analysis framework, to improve the quality of written programming codes, will also be introduced. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Analyse the basic concepts in software security (C4, PLO1).
- Demonstrate understanding of the process of developing secure systems (P5, PLO3).
- Practice secure software development process (A5, PLO11).
- Design a secure software (C5, PLO2).

Course: CCS3123 Digital Forensics

Synopsis: The course aims to provide students with the necessary knowledge and technical skills on handling cybersecurity incidents. It is a compulsory course for the cybersecurity specialization. In this course, the students will learn the fundamental principles of computer forensics. Topics covered include the classification of the digital evidence, the procedure of discovering and preserving evidence and types of computer and Internet crimes. Students will also learn to search and retrieve digital evidence using a number of known common tools. Related legal procedures, regulations, and laws are also briefly discussed. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Analyse the related concepts in computer forensics (C4, PLO1).
- Describe the process of conducting a digital forensic investigation (P2, PLO3).
- Demonstrate ethics and professionalism in digital forensic investigation (A3, PLO11).
- Organise digital forensics investigation (A4, PLO2).

Course: CCS3143 Cybersecurity Risk Management

Synopsis: The course aims to expose the students on the importance of security policies for an organization. Managing risks is an essential step in cybersecurity management; hence, it is a compulsory course for the cybersecurity specialization. The course will cover risk management practice such as risk identification, analysis, prioritization, planning, mitigation, monitoring, and communication. Conducting a risk analysis for cybersecurity can be a challenging task. This course will discuss risk analysis and risk management processes including "vulnerability," "threat," and "risk," and their relationship. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Analyse the needs for cybersecurity risk management (C4, PLO1).
- Prepare a cybersecurity risk management plan (A4, PLO6).
- Perform cybersecurity risk management process (C3, PLO2).

Course: CCS3163 Directed Studies in Cybersecurity

Synopsis: This course requires students to pursue independent study under the guidance of a faculty member in the topic related to cybersecurity. Students may choose to undertake a directed study for the following reasons: 1) to pursue in depth a computer science area covered more generally in a course offered by the school, or 2) to explore a topic not normally covered in the curriculum, which normally is in the area of emerging cybersecurity topics. In either case, it is the student's responsibility to identify the topic fully and to acquire enough information to ensure its worthiness for independent research.

Course Learning Outcome (CLO):

- Outline a directed study plan in the chosen area (C4, PLO1).
- Organise the learning process of the chosen area (P5, PLO3).
- Demonstrate the gained knowledge of the chosen area in an appropriate form of report (A3, PLO6).

FIELD ELECTIVE COURSES

Course: CCE2213 Routing and Switching

Synopsis: The course aims to provide students with technical knowledge and skills in computer networks. It is an elective course for the students enrolling in a computer science program. It will cover the architecture, components, and operations of routers and switches in a small network. Students will learn how to configure a router and a switch for basic functionality as well as configuring and troubleshooting routers and resolve common issues with RIPv1, RIPv2, single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Analyse the concepts of routing and switching in networks (C4, PLO1).
- Identify the suitable routing protocols and algorithms (A4, PLO7).
- Adapt appropriate techniques to solve routing problems (P6, PLO3).
- Revise the design and architecture of a network routing (A5, CLO6).

Course: CCE2313 Scaling and Connecting Networks

Synopsis: The course aims to expose the students with the technical knowledge and skills in designing and implementing a computer network in organizations. It is an elective course for the students enrolling in a computer science program. The students will learn the architecture, components, and operations of routers and switches in larger and more complex networks. Later, they will be able to configure connections, routers and switches for advanced functionalities to support the quality of service and security of the network. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of network design concepts (P5, PLO3).
- Practice network troubleshooting activities (C3, PLO3).
- Generalise data from troubleshooting activities (A4, PLO7).
- Practice network operation management (A5, PLO6).

Course: CCE3113 Network Security Technology

Synopsis: The course aims to expose the students with the technical knowledge and skills in securing computer networks in an organization. It covers an introduction to the core security concepts and skills needed for the installation, troubleshooting, and monitoring of network devices to maintain the integrity, confidentiality, and availability of data and devices. It emphasizes the practical application of skills needed to design, implement, and support network security. Students will develop an in-depth, theoretical understanding of network security principles as well as the tools and configurations available. The course will be conducted through lectures, laboratory exercises and projects

Course Learning Outcome (CLO):

- Apply the concepts of security in networks (C3, PLO1).
- Demonstrate the process of securing networks (P5, PLO3).
- Perform ethical and professional network management and monitoring process (A5, PLO11).
- Organise a network monitoring activity (A4, PLO6).

Course: CCE2233 Information Security Management System

Synopsis: The course aims to provide the students with an understanding of the principles of information security management that are commonly used in business. It will introduce the student to commonly used frameworks and methods and explore critically the suitability and appropriateness of these for addressing today's organizational security needs. The course comprises the following topics: governance and security policy, threat and vulnerability management, incident management, risk management, information leakage, crisis management and business continuity, legal and compliance, security awareness and security implementation considerations. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Apply the appropriate methods in information security management (C3, PLO1).
- Demonstrate understanding of the principles of information security management (P5, PLO3).
- Propose an appropriate business continuity plan (A5, PLO6).

Course: CCE2323 Vulnerability Assessments and Penetration Tests

Synopsis: The course aims to provide the students with technical knowledge and hands-on experience of analyzing and conducting vulnerability assessments and penetration tests. The tests attempt to exploit the vulnerabilities in a system to determine whether unauthorized access or other malicious activity is possible and identify which flaws pose a threat to the application. The students will be exposed to the process of securing the network by examining and assessing the network of an organization, detecting attacks and identifying mitigation steps to protect systems or applications against the exploits. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of the principles of penetration testing (P5, PLO3).
- Apply the appropriate approach of penetration testing for a given scenario (C3, PLO1).
- Organise a vulnerability assessment and penetration test based on a given problem (A4, PLO6).
- Perform a vulnerability assessment and penetration test ethically (A5, PLO11).

Course: CCE3123 Incident Handling and Response

Synopsis: This course aims to provide the students with the knowledge and skills in responding and handling a cybersecurity incident in organization. The course focuses on incident response preparation, handling it and gathering evidence when a security breach is detected. Also included is an analysis of the principles and practices of incident handling; network-based, host-based, and hybrid intrusion detection; identifying attack patterns; deployment of resources and responses to handle the incident, surveillance, damage assessment, risk assessment, data forensics, data mining, attack tracing, system recovery, and continuity of operation. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of the incident handling and response (P5, PLO3).
- Analyze the suitable techniques to respond to incidents (C4, PLO1).
- Organise an incident handling and response activity (A4, PLO11).
- Report the findings of an incident handling and response activity (A3, PLO6).

Course: CCE2233 Requirements Engineering

Synopsis: This course is intended to provide the students with the knowledge and skills in gathering and managing software requirements during the software development process. It is an elective course for the computer science programme which focuses on the software engineering domain. The topics of the course are methods, techniques, and process of performing requirements engineering, modelling, validation and negotiation, requirements management, and requirements engineering tools. The knowledge and skills that students obtained is expected to foster the software development process and maintain a good quality of it. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of software requirements engineering (P5, PLO3).
- Practice software requirement engineering process (A5, PLO6).
- Manage requirement artifacts (C6, PLO1).

Course: CCE2333 Software Testing

Synopsis: The course aims to provide students with the necessary knowledge and skills in evaluating a software product. It is considered as one of the important courses for the preparation of graduates who are capable to plan, manage, and perform the software testing in the Software Development Lifecycle. The course introduces students to the concept of software testing such as test cases, testing plan, testing template, managing and performing software testing, and documenting the results of the software testing. Students will apply the software testing concepts and techniques through assignments and projects. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Develop software testing plan (C6, PLO1).
- Perform software testing process (P4, PLO3).
- Interpret the needs for software testing (A5, PLO6).

Course: CCE3133 Software Quality Management

Synopsis: This course will provide the students with knowledge about software quality, quality models, software quality standards and methodologies in the software industry. The principles of software development and management are presented with special emphasis on the processes and activities of quality assurance. In addition, the role of standards, principles, and procedures are discussed, with examples drawn from ISO, CMMI, and other process models and standards. This course provides practical knowledge of software project management and a variety of quality assurance techniques, and an understanding of some of the trade-offs between techniques. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Organize the management of software quality assurance (P4, PLO3).
- Develop a software quality assurance plan (C6, PLO1).
- Perform software quality assurance process (A5, PLO6).

Course: CCE2243 Statistical Inference

Synopsis: This course aims to expose the students with statistical analysis techniques in the areas of point and interval estimation, as well as hypothesis testing. This is an elective course to computer science programme that focuses on advanced statistical techniques. Topics covered include inference for two means, inference for variances, multiple regression techniques, one-way analysis of variance and its extensions, analysis of covariance and its extensions, multivariate analysis of variance and covariance, discriminant analysis; inference for proportions and comparison of proportions, chi-square goodness of fit and tests of independence. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Analyse parametric model and point estimation of the parameters of those models (C4, PLO1).
- Formulate hypothesis tests in some common models correctly (A4, PLO7).
- Demonstrate computational skills to implement various statistical inferential approaches (P5, PLO3).
- Select the appropriate statistical techniques for solving problems (A2, PLO6).

Course: CCE2343 Regression Models

Synopsis: This course focuses on understanding and presentation of regression models and associated methods, data analysis, interpretation of results, statistical computation and model building. Students will understand the following key concepts and how to apply them in real-world problems: simple and multiple linear regression; correlation; the use of dummy variables; residuals and diagnostics; model building/variable selection, regression models and methods in matrix form; weighted least squares regression with correlated errors and nonlinear regression. A matrix formulation of the linear regression model is given partway through the course. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Analyze the concept of regression (C4, PLO1).
- Explain regression models (A3, PLO6).
- Interpret the regression models (A5, PLO7).
- Perform a regression analysis (P4, PLO3).

Course: CCE3143 Data Products Development

Synopsis: This course integrates the principles of product development with data analytics. It covers the new product idea generation using analysis of business data and information. The course will cover topics like case study of successful system implementation of data products, methodology and process of data product development. The process includes problem understanding and data preparation, dataset understanding, data modelling, model evaluation, tuning and implementation. Finally, it discusses the topic of managing data products. The course will be conducted through lectures, laboratory exercises and projects.

Course Learning Outcome (CLO):

- Demonstrate understanding of data product development (P5, PLO3).
- Apply the appropriate approach for data product development (C3, PLO2).
- Propose a data product design to solve socio-economic and cultural issues in local and global communities (A5, PLO10).
- Formulate a data product for social business (A4, PLO6).

UNIVERSITY COURSES

Course: BBU1012 Social Business 1

Synopsis: The course provides the opportunity for students to experience first-hand the social issues faced by specific communities and to instill in them the responsibility to address these issues in sustainable ways. Social business is presented as an alternative to mainstream business. The course will also enable the students to understand social business, the various models used, funding platform and its impact as an effective development intervention in improving socio- economic livelihoods of the bottom billion.

Course Learning Outcome (CLO):

- Identify social issues in the community that are amenable to social business solutions.
- Apply knowledge of social business, Yunus model, micro-financing, social business plan and development, planning, risks and challenges.
- Demonstrate collaborative behaviour and leadership in a social business team
- Demonstrate ethical decision making and integrity in proposing social business to solve community problems.

Course: MPU3313 Hubungan Etnik

Synopsis: Kursus ini membincangkan konsep asas, latar belakang dan realiti sosial masa kini hubungan etnik di Malaysia dari perspektif kesepaduan sosial. Tujuan kursus ini ialah memberikan kesedaran dan penghayatan dalam mengurus kepelbagaian ke arah pengukuhan negara bangsa. Pengajaran dan pembelajaran akan dilaksanakan dalam bentuk pembelajaran berasaskan pengalaman melalui aktiviti individu, berpasukan dan semangat kesukarelaan. Pada akhir kursus ini, pelajar diharapkan dapat mengamalkan nilai-nilai murni, mempunyai jati diri kebangsaan, dan menerima kepelbagaian sosio-budaya etnik di Malaysia.

Course Learning Outcome (CLO):

- Menghuraikan isu dan cabaran dalam konteks hubungan etnik di Malaysia.
- Menilai kepentingan jati diri kebangsaan dan kesukarelaan dalam pelbagai konteks ke arah mewujudkan warganegara yang bertanggungjawab
- Membina dan memupuk hubungan dan interaksi sosial pelbagai etnik

Course: MPU3123 Tamadun Islam dan Tamadun Asia / Islamic and Asian Civilisations (TITAS)

Synopsis: Kursus ini membincangkan ilmu ketamadunan yang meliputi pengenalan ilmu ketamadunan, perkembangan dan interaksi ketamadunan dalam Tamadun Islam, Melayu, Cina, India, serta isu ketamadunan kontemporari dalam Tamadun Islam dan Tamadun Asia. Kursus ini bertujuan memberi kefahaman mengenai setiap elemen tersebut dan implikasinya terhadap proses pembangunan negara. Selain itu, perbincangan dan perbahasan dalam kursus ini turut berperanan dalam usaha melahirkan pelajar yang mengetahui warisan sejarah negara, memupuk nilai murni, mempunyai jati diri kebangsaan dan menghargai kepelbagaian.

Course Learning Outcome (CLO):

- Menghuraikan peranan nilai ketamadunan dalam pembentukan sistem nilai masyarakat Malaysia.
- Mempamerkan kebolehan komunikasi sosial dalam kepelbagaian landskap budaya.
- Membahaskan elemen ketamadunan dengan isu kemasyarakatan semasa

Course: MPU3143 Bahasa Melayu Komunikasi 2

Synopsis: Kursus ini melatih pelajar antarabangsa untuk berkomunikasi dalam bahasa Melayu asas yang meliputi situasi kehidupan harian. Pelajar akan diperkenalkan dengan pertuturan dan penulisan bahasa Melayu mudah. Pengajaran dan pembelajaran akan dilaksanakan dalam bentuk kuliah, tutorial, tugasan dan pengalaman pembelajaran pelajar di dalam dan di luar kelas. Pada akhir kursus ini, pelajar diharapkan dapat berkomunikasi dan menulis menggunakan ayat mudah dengan berkesan.

Course Learning Outcome (CLO):

- Menerangkan kandungan teks penuh yang menggunakan ayat mudah dan ayat berlapis
- Bertutur dalam pelbagai situasi dengan menggunakan ayat mudah dan ayat berlapis
- Menyusun idea secara kreatif dan sistematik dalam penulisan karangan pendek

Course: MPU3153 Malaysian Studies

Synopsis: Kursus ini membincangkan Sejarah dan Politik, Perlembagaan Malaysia, Sistem dan Struktur Pentadbiran Negara, Kemasyarakatan dan Perpaduan, Pembangunan Negara dan Agama dan Kepercayaan. Kursus ini adalah bertujuan untuk melahirkan graduan yang memahami identiti Malaysia ke arah memupuk semangat kesejagatan. Pengajaran dan pembelajaran akan dilaksanakan dalam bentuk kuliah, tugasan, peperiksaan dan pengalaman pembelajaran.

Course Learning Outcome (CLO):

- Menghuraikan dan membahaskan kepelbagaian dalam masyarakat
- Mengulas kepentingan identiti Malaysia ke arah memupuk semangat kesejagatan
- Membina hubungan dan interaksi sosial dalam kalangan pelajar

Course: MPU3213 Entrepreneurship and Innovation

Synopsis: This course introduces the students with the tools they need to master the issues involved in starting and managing a successful new business venture. The main aims are to present the pathway of successful entrepreneurs from the factors that motivate them to start a small business and the skills required to run a business. Innovation and entrepreneurship theories and concepts will be discussed with real life experience through examples and cases.

Course Learning Outcome (CLO):

- Apply the basics knowledge of innovation and entrepreneurial strategies for successful launching new ventures.

- Identify new venture opportunities and evaluate the viability by considering the resources available and market potential

- Produce a recommendation on how the business should be developed, grow and be sustainable in a competitive environment.
- Use the knowledge gained to effectively contribute towards innovation and entrepreneurial activities in any business organizations into profitability.

Course: MPU3313 Unity and Patriotism

Synopsis: Unity within a society is an essential element to ensure that a society can thrive and prosper. Forging unity is a process that takes into account societal belief systems, historicity, and development goals. This course aims to discuss the process of creating unity within the context of nation building. The final goal of nation building is to have a group that is committed to ensure the wellbeing of the people. Some of the concepts associated with unity and nation building are modernization, democratization, social cohesion, nationalism and patriotism. However, there are many factors that can threaten unity. The course will focus on the opportunities and challenges presented in fostering unity. Students will have opportunities to share their experiences in shaping and maintaining unity within their own countries.

Course Learning Outcome (CLO):

- Instill the value of unity and nation building in students by learning from each other's background, challenges to fostering unity, and examples of regional case studies.
- Challenge students with higher order thinking skills during the lessons.
- Develop a student's mind in other nations' unity perspectives and to compare with their own.
- Appreciate the spirit of patriotism and nation building during the learning activities.

Course: BBN1022 Sustainability and Society

Synopsis: This course aims to inculcate understanding human beings in families, tribes, communities (rural and cities), nations and networks and how the individual's patterns of feelings, thoughts and actions are shaped as we try to live together and help each other. Real world current issues are used to reflect deeply on societal problems such as poverty, liberty, war, ageing, and disease, climate change, and globalization, food and water security. Students will volunteer to design and implement projects for specific groups, incorporating social business for sustainability.

Course Learning Outcome (CLO):

- Identify common problems in a society within 10 KM radius from AIU campus.
- Formulate problem statement.
- Write a project proposal to undertake a project involving a group of society.
- Conduct a preliminary project community project to explore the problems   .
- Conduct a community project incorporating social business for sustainability.

Course: LLN1012 Academic Writing

Synopsis: This course emphasizes the theory and practice of academic writing. Students will be introduced to the writing process and writing supporting details using facts, quotations and citations. They will also be exposed to summarizing, paraphrasing, synthesizing and analyzing texts. In addition, accurate use of grammar and mechanics of English will also be emphasized. The end product will be report writing and they will be introduced to types of reports commonly produced by students at tertiary level.

Course Learning Outcome (CLO):

- Identify the structure of an academic research paper.
- Use English accurately and effectively in producing written texts.
- Apply the process of writing when producing written text.
- Produce coherent and cohesive written texts.

INDUSTRIAL TRAINING

Course: CST3116 Industrial Training

Synopsis: This course aims to expose students to the real working environment, to enhance knowledge and provides opportunities to develop digital solutions to real world problems in a challenging working environment. Students will be placed at the selected organizations for six (6) months under close supervision of the organization's supervisor. Academic supervisor will also be assigned to assist students in their industrial training. Students are required to be involved in a minimum of one project at the organization. At the end of Practicum, students are required to present their workable project together with their industrial training report.

Course Learning Outcome (CLO):

- Demonstrate the ability to work independently with minimal supervision (A3, PLO11).
- Identify opportunities for conducting projects in computer science (A1, PLO5).
- Organise projects in computer science (P5, PLO3).
- Conduct computer science projects with diverse people in the community (A5, PLO4).
- Integrate lifelong learning in completing computer science projects (A4, PLO9).