Vision and mission of FCSIT
VISION

A global university impacting the world.

MISSION

Pushing the boundaries of knowledge and nurturing aspiring leaders.

QUALITY POLICY

Universiti Malaya is committed to conduct teaching and learning, carry out research and provide quality services on a global level, generate and enhance knowledge through continuous improvement efforts for the benefit of all stakeholders, especially Universiti Malaya's students.

History
Universiti Malaya, or UM, Malaysia's oldest university, is situated on a 922 acre (373.12 hectare) campus in the southwest of Kuala Lumpur, the capital of Malaysia.

It was founded on 28 September 1905 in Singapore as the King Edward VII College of Medicine and on 8th October 1949, it became the Universiti Malaya with the merger of the King Edward VII College of Medicine and Raffles College (founded in 1928).

The Universiti Malaya derives its name from the term 'Malaya' as the country was then known. The Carr-Saunders Commission on University Education in Malaya, which recommended the setting up of the university, noted in its Report in 1948: "The Universiti Malaya would provide for the first time a common centre where varieties of race, religion and economic interest could mingle in joint endeavour ... For a Universiti Malaya must inevitably realise that it is a university for Malaya."

The growth of the University was very rapid during the first decade of its establishment and this resulted in the setting up of two autonomous Divisions on 15 January 1959, one located in Singapore and the other in Kuala Lumpur. In 1960, the government of the two territories indicated their desire to change the status of the Divisions into that of a national university. Legislation was passed in 1961 and the Universiti Malaya was established on 1st January 1962.

On June 16th 1962, Universiti Malaya celebrated the installation of its first Chancellor, Tunku Abdul Rahman Putra Al-Haj, who was also the country's first prime minister. The first Vice-Chancellor was Professor Oppenheim, a world-renowned Mathematician.

Currently, His Royal Highness The Sultan of Perak Darul Ridzuan, Sultan Nazrin Muizzuddin Shah is the Chancellor of UM.

Type of Courses for FCSIT (Faculty of Computer Science and Information Technology)

1. University Courses (Courses from others faculties)
    a. **GIG1003 Basic Entrepreneurship Culture** (Type of Course: University Course, Credit: 2, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the basic concepts of entrepreneurship. 2. Producing creative and innovative entrepreneurial ideas. 3. Develop a business plan framework. Synopsis of Course Content The course will attempt to inculcate the basic elements of entrepreneurship in the students. Initiatives are taken to open their minds and motivate the entrepreneurial spirit in this potential target group. The course encompasses theory and development of entrepreneurship, factors affecting entrepreneurship, entrepreneurship development in Malaysia, ethics of entrepreneurship, creativity and innovation in entrepreneurship and developing business plans. This course also incorporates a direct exposure to entrepreneurial mindset, skills and competencies. Assessment Methods Continuous Assessment: 100)

b. **GIG1012 Philosophy and Current Issues** (Type of Course: University Course, Credit: 2, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain current issues based on philosophy, the Philosophy of National Education and the Rukun Negara. 2. Explain current issues based on the main of thoughts from the various streams of philosophy. 3. Explain current issues through a comparative perspective of philosophy as a basis for establishing inter-cultural dialogue. Synopsis of Course Content This course covers philosophical relations with the Philosophy of National Education and Rukun Negara. The use of philosophy as a tool to purify the culture of thought in life through the arts and methods of thinking and human concepts. The main topics in philosophy are epistemology, metaphysics and ethics discussed in the context of current issues. Emphasis is given to philosophy as a basis for fostering inter-cultural dialogue and fostering one's values. At the end of this course students will be able to see the disciplines of science as one comprehensive body of knowledge and related to each other. Assessment Methods Continuous Assessment: 70% Final Examination: 30%)

c. **GIG1013 Appreciation of Ethics and Civilizations** (Type of Course: University Course, Credit: 2, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the ethical concepts of different civilizations. 2. Compare systems, levels of development, social progress and culture across nationalities. 3. Discuss contemporary issues related to economics, politics, the social, the environment and culture from the perspective of ethics and civilization. Synopsis of Course Content: This course discusses ethical concepts from different civilization perspectives. It aims to identify the systems, developmental stages, progress and culture of a nation in strengthening social cohesion. In addition, discussions on contemporary issues in the economic, political, social, cultural and environmental aspects from an ethical and civil perspective can produce students who are morally and professionally sound. The application of appropriate High Impact Education Practices (HIEPs) is used in the delivery of this course. At the end of this course students will be able to relate ethics and civic-minded citizenship. Assessment Methods: Continuous Assessment: 70% Final Examination: 30%)

d. **GIG1017 Basic Malay Language** (Type of Course: University Course, Credit: 2, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Read syllables, words, phrases or expressions in

Malay correctly. 2. Demonstrate spoken and written skills using simple Malay. 3. Write short paragraphs on selected topics using simple language styles. Synopsis of Course Content: This course emphasises mastering basic skills in Malay for international students enrolled in the undergraduate study programmes. The course includes four skills, which are pronunciation and speaking; listening, reading and writing in Malay for basic communication. Emphasis is given to oral and written exercises. Assessment Methods: Continuous Assessment: 60% Final Examination: 40%)

2. Faculty Core Courses
    a. **WIX1001 Computing Mathematics I** (Type of Course: Faculty Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Identify fundamental concepts and terminology in computing mathematics. 2. Solve mathematical proofs using the fundamental mathematics concepts. 3. Apply various computing mathematics techniques to solve problems. Synopsis of Course Content This course covers mathematics and its applications in computer science. Topics include number theory, sets, relations and functions, logic, graphs and trees, matrices, vector and combinatorics. It also covers mathematical applications in computer science (such as applications of sets and functions in program semantics, logic in program specification, equivalence and order relations in program complexity, graphs and trees in game theory, matrices in graphics, number theory in secure communication). Assessment Methods Continuous Assessment: 50% Final Examination: 50%)
    b. **WIX 1003 Computer systems and organization** (Type of Course: Faculty Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe the basic computer organization and logic design. 2. Explain the basic computer systems design, combinational circuit and sequential logic. 3. Interpret the basic concepts of computer systems operation. Synopsis of Course Content This course covers the introduction to computer systems and organization which includes number system, Boolean Algebra, basic logic gates, function simplification, combinational circuit, latches and flip-flop, sequential circuit and addressing mode. This course also gives an introduction to processor system. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

c. **WIX 1002 Fundamentals of programming** (Type of Course: Faculty Core Courses, Credit: 5, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Define the steps of problem solving in programming. 2. Rewrite programs that contain errors 3. Develop programs based on principles of objectoriented. Synopsis of Course Content This course covers problem solving and the fundamental of programming. These include problem solving techniques, the basic structure of computer program, the fundamental concepts of object-oriented programming, data types and operations, selection control structures i.e. if and switch, repetition control structures i.e. for, while, dowhile, function, array, string, text file, and programming practice. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

d. **WIX 2001 Thinking and communication skills** (Type of Course: Faculty Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Apply communication and thinking skills in various environments. 2. Plan and implement an entrepreneur activity. 3. Demonstrate an active, committed and ethical role in course and group activities. Synopsis of Course Content This course will cover topics to develop effective communication and critical thinking. Topics for communication skill include verbal and non-verbal communication skills, listening skills, presentation skills and barriers to communication. Topics taught for the latter include techniques to clarify, analyze and evaluate arguments, logical fallacies, problem solving and decision making. Additionally, methods to find, evaluate and use information sources correctly will be explained. The teaching and learning methods for the course able develop individual, leadership and teamwork skills. Assessment Methods Continuous Assessment: 70% Final Examination: 30%)

e. **WIX2002 Project Management** (Type of Course: Faculty Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Elaborate the purpose and importance of project management from the perspectives of planning, tracking and completion of project. 2. Identify appropriate techniques to estimate project time and costs. 3. Perform a project to track project schedule, expenses, and resources with the use of suitable project management tools. Synopsis of Course Content This course introduces the fundamental of management

concepts, explains topics on organizational structures, project planning, techniques for project time and costs estimation, risk management, the various issues involved in the management of project personnel, measurement and evaluation of project progress and performance, and project control. This course also covers project audit and closure. Assessment Methods Continuous Assessment: 70% Final Examination: 30%)

3. Programme Core Courses
    a. **WIA1001 Information Systems** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain basic information systems concepts and principles. 2. Describe the ecosystem in which information systems are employed. 3. Determine societal and ethical impacts of information systems. Synopsis of Course Content This course covers the following topics: Overview of Information System (IS) (Introduction to IS, IS in organisation); Information Technology Concepts in IS; Managing Data and Information; Type of Business Information Systems; Knowledge Management and Specialized Information Systems; IS Stakeholders; Planning, Developing, Managing and Evaluating IS; Securing Information Systems; IS in Society, Business and Industry (Security Issue and Privacy, Ethics and IS); and Case study on IS in organization. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

    b. **WIA1003 Computer System Architecture** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): WIX1003, Medium of Instruction: English Learning Outcomes 1. Identify the concept of top-down approach to show the computer system architecture. 2. Use basic operation and instruction set architecture. 3. Explain the difference between computer organization and computer architecture. Synopsis of Course Content This course covers the introduction to computer architecture which includes global system structure, instruction sets, addressing modes, fundamental processor execution technique, pipelining, RISC and CISC design, memory hierarchy, cache memory, bus interconnection, I/O system, multiprocessing system and current topics in computer architecture. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

    c. **WIA1002 Data Structure** (Type of Course: Programme Core Courses, Credit: 5, Course Pre-requisite(s): WIX1002, Medium of Instruction:

English Learning Outcomes 1. Define the data structure ADT operations. 2. Implement the data structure internal operations. 3. Develop general-purpose, reusable data structures that implement one or more abstractions. Synopsis of Course Content For any type of query possible on digital data, there is a corresponding data structure supporting it. A data structure can be linear such as array, stack, queue, linked list etc., and non-linear such as graph, trees etc. A central goal in this course is to emphasize object-oriented view of data structures including encapsulation and abstract data types (ADTs), and to learn how these data structures work internally by manipulating arrays, lists, and pointers to perform searching, insertion, deletion, traversing and other operations. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

d. **WIA1005 Network Technology Foundation** (Type of Course: Programme Core Courses, Credit: 4, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe the protocols, architecture, components, addressing and operations in a network. 2. Explain basic routing and switching concepts. 3. Solve switching and routing problems in a network. Synopsis of Course Content This course is designed to provide students with the fundamental concepts of computer networking which include TCP/IP model, IPv4 and IPv6 addressing, routing and switching. This course will examine several aspects of networking such as VLAN, ACL, DHCP and NAT. This course also emphasis on practical exercises in routing and switching. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

e. **WIA1006 Machine Learning** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe the fundamental issues and challenges of machine learning. 2. Understand the underlying mathematical relationships within and across machine learning algorithms and the paradigms of supervised and unsupervised learning. 3. Design various machine learning algorithms in a range of real-world applications. Synopsis of Course Content This course will introduce the field of Machine Learning, focusing on the core concepts of supervised and unsupervised learning. In supervised learning we will discuss algorithms which are trained on input data labeled with a desired output, for instance, an image of a face and the name of the person whose face it is and learn

a function mapping from the input to the output. Unsupervised learning aims to discover latent structure in an input signal where no output labels are available, an example of which is grouping webpages based on the topics they discuss. Students will learn the algorithms which underpin many popular Machine Learning techniques, as well as developing an understanding of the theoretical relationships between these algorithms. The practical will concern the application of machine learning to a range of real-world problems. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

f. **WIA1007 Introduction to Data Science** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the key concepts relevant to data science, including all processes in the data science life cycle and data science applications in the real-world. 2. Determine suitable tools, technologies and the core algorithms underlying an end-to-end data science workflow, including the experimental design, data collection, mining, analysis, and presentation of information derived from datasets. 3. Interpret the ethical implications on the use of data and technologies in data science process. Synopsis of Course Content The course is designed to help the student learn fundamental concepts of data science. It covers what, when, who, where why and how (5W 1H) of data science in the era of big data. Also encompasses the life cycle of data science from data preparation, data processing, data cleansing and integration, to data analysis and visualization of data in data-driven decision making. The role of data scientist, the knowledge and skills required are also presented. Machine learning algorithms and statistical models are included. Diverse technologies, programming languages as well as tools in data science are discussed. Assessment Methods Continuous Assessment: 60% Final Examination: 40%)

g. **WIA1008 Fundamental of Multimedia** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe the principles of each element of a multimedia system. 2. Evaluate the design of a multimedia application and provide recommendations for improvement. 3. Develop a multimedia application development through multiple elements creation and manipulation using appropriate multimedia editing and authoring tools. Synopsis of Course Content During the course, students will be introduced to the main elements of the multimedia system including texts,

images and graphics, audio, video and animation. Students will be taught the process of editing multimedia elements using editing tools such as Adobe Photoshop, Illustrator, Animate, Rush, and Audacity. Students will also be exposed to issues related to data compression, security, and current multimedia technology. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

h. **WIA2001 Database** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe the basic concepts in database. 2. Design a database system for an application or small business. 3. Implement the database design using a Database Management System (DBMS). Synopsis of Course Content This course introduces the concepts of file-based systems vs DBMS. It provides students with the knowledge of database architecture, models, and processes necessary for using, designing, and implementing database systems and applications. Students will have hands-on sessions to use DBMS and write SQL commands. Database applications will be developed based on case studies. Transaction management topics and other issues related to database management system are also discussed. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

i. **WIA2002 Software Modelling** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the concepts of software modelling. 2. Construct software model using the UML notation. 3. Use a UML CASE tool to produce and manage software models. Synopsis of Course Content This course covers object-oriented modelling concepts in system design using Unified Modelling Language (UML). Topics include basic concepts of modelling in system design, key differences between the structured and object-oriented paradigm, design of a software system using structural and behavioral diagrams, use of an object-oriented case tool to construct various UML diagrams and generate source codes, consistency checking of UML model. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

j. **WIA2003 Probability and Statistics** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain probabilistic and statistical concepts. 2. Use basic probabilistic and statistical concepts. 3. Employ

the appropriate statistical tests to analyze data. Synopsis of Course Content This course provides an introduction to probability and statistics concepts which includes Introductory Notions, Conditional Probability, Bayes Theorem, Binomial and Poisson Distributions, among others. As for statistics, the course aims to develop students' ability to describe, explore and analyze data (both descriptive and inferential statistics) using a statistical package (e.g., SAS/SPSS). Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

k. **WIA2004 Operating Systems** (Type of Course: Programme Core Courses, Credit: 4, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. List the basic concept of operating systems. 2. Elaborate the criteria on memory, device and file management for early systems and current systems. 3. Explain the criteria on processor and process management and know how to handle it. Synopsis of Course Content This course covers basic concepts of operating systems which includes memory management in early and recent systems, processor and process management, concurrent process, deadlock, and starvation. This course also provides insights into device, file and system management, as well as examples of operating systems. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

l. **WIA2005 Algorithm Design and Analysis** (Type of Course: Programme Core Courses, Credit: 4, Course Pre-requisite(s): WIA1002 – Data Structure, Medium of Instruction: English Learning Outcomes 1. Describes major algorithms related to advanced data structures and time complexity. 2. Implement important algorithm design paradigms. 3. Assess the performance of algorithms. Synopsis of Course Content This course introduces students to the analysis and design of computer algorithms. Students will learn basics design techniques, important classical algorithms and advanced data structures, and their implementation in the modern programming environment. Students are exposed to a few algorithms design paradigms. Assessment Method Continuous Assessment: 70% Final Examination: 30%)

m. **WIA2006 System Analysis and Design** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Identify various concepts,

principles, and stages of computer-based information systems analysis, modelling, and design. 2. Review of the groups of people involved in systems development and the different methods, tools, and techniques used in systems analysis, modelling and design. 3. Apply concepts and skills to develop an information system. Synopsis of Course Content This course deals with process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components and planning the development of information systems through understanding and specifying in detail what a system should do and how the components of the system should be implemented and work together. In addition, this course also deals with the concepts, skills, methodologies, techniques, tools, and perspectives essential for systems analysts. System analysts solve business problems through analyzing the requirements of information systems and designing such systems by applying analysis, modelling, and design techniques. The practical component of this course is object-oriented design and use-case driven, requiring students to go through the steps of system analysis, modelling, and design to solve a real-life business problem. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

n. **WIA2007 Mobile Application Development** (Type of Course: Programme Core Courses, Credit: 4, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain various categories of mobile applications, its framework, lifecycle and its relevant user interface components, services, and libraries. 2. Analyze the appropriate functionalities and sketches for mobile application based on its intended purposes and users. 3. Develop the mobile applications using suitable components, services, or libraries, with database utilization. Synopsis of Course Content This course provides an understanding on the categories, development framework and lifecycle of typical mobile applications. Besides, relevant GUI components and its event handling, services and libraries are introduced, including location-aware service, audio, etc. This course also gives practical hands-on on mobile application development with database connectivity by considering users, hardware and software requirements as a whole. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

o. **WIA2008 Advanced Network Technology** (Type of Course: Programme Core Courses, Credit: 4, Course Pre-requisite(s): WIA1005, Medium of Instruction: English Learning Outcomes 1. Identify the

architecture, components, and operations of routers and switches in complex networks. 2. Explain the issues, philosophies and protocols involved in managing a local and wide area network infrastructure. 3. Solve the common problems of routers and switches in IPv4 and IPv6 networks. Synopsis of Course Content This course is designed to provide students with the overall concept and needs of network technologies in advance level. This course will examine several aspects of networking such as OSPF, EIGRP, STP, PPP and VPN in IPv4 and IPv6 networks. This course also emphasis on practical exercises by introducing a range of network technologies and protocols used in a network. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

p. **WIA2009 Digital Design and Hardware Description Language** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): WIA1003 & WIX1003, Medium of Instruction: English Learning Outcomes 1. Explain the basic components of computer digital development and how those components functioning. 2. Discuss digital design issues. 3. Develop digital circuit using systematic design methods using HDL or any Electronic Design Automation (EDA) and Electronic Computer-Aided Design (ECAD) equipment. Synopsis of Course Content This course consists of basic introduction to digital design, combinational logic design principle and practice, sequential logic design principle and practice, memory, CPLD and FPGA, design method using HDL and case studies. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

q. **WIA2010 Human Computer Interaction** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the ways human factors and cognitive models influence aspects of interface design. 2. Apply design principles, guidelines, patterns and visual design elements to the interface design and selected interface construction tools for the implementation of interactive systems. 3. Evaluate interactive systems (websites, travel, or game apps, with a strong adoption of user-centric design. Synopsis of Course Content This course covers both human factors and the technical methods for the design and evaluation of interactive systems, where it is structured within four main topics: overview of HCI, essential interaction design principles, user interface development process and interface design and programming. Overview of HCI introduces human, computer and interactions; user interfaces;

usability, user experience (UX) and design thinking. Interface development process includes topics on iterative design, user-centered design, design discovery, design exploration and evaluation of user interfaces. Interface design and programming include topics on visual information design, forms design, interface design patterns, prototyping and construction tools, and responsiveness issue. Three types of applications are covered: Graphical User Interfaces, Web and Mobile Devices. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

r. **WIA3001 Industrial Training** (Type of Course: Programme Core Courses, Credit: 12, Course Pre-requisite(s): Taken all Faculty and Programme Core Courses (except Academic Project I and Academic Project II), Medium of Instruction: English Learning Outcomes 1. Apply operation, management, and development processes at workplace. 2. Identify the problems faced and lessons learnt at the workplace. 3. Use appropriate systems and technologies in the tasks at workplace. 4. Demonstrate professional ethics at workplace according to knowledge and skills acquired at workplace. Synopsis of Course Content This course requires a student to undergo industrial training at an organization offering internship related to the student's field of study. The student records his/her daily activities at the workplace in a logbook. The student also prepares a final report about his/her industrial training. Assessment Methods Continuous Assessment: 100%)

s. **WIA3002 Academic Project I** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): Pass all Faculty and Programme Core courses except for Industrial Training, Medium of Instruction: English Learning Outcomes 1. Identify solution approach that is suitable for the stated problem. 2. Conduct suitable requirement gathering, system analysis and design techniques. 3. Present project proposal paper. Synopsis of Course Content This course covers the activities including problem identification, literature review, data collection, writing and presenting project proposals. Assessment Methods Continuous Assessment: 100%)

t. **WIA3003 Academic Project II** (Type of Course: Programme Core Courses, Credit: 5, Course Pre-requisite(s): Pass all Faculty and Programme Core courses except for Industrial Training, Medium of

Instruction: English Learning Outcomes 1. Develop a system based on the solution approach and method identified. 2. Present the implemented project. 3. Implement the system with ethics and professionalism. Synopsis of Course Content This course covers research activities including system analysis and design, system implementation, testing and evaluating the developed system, project presentation and writing an academic report. Assessment Methods Continuous Assessment: 100%)

u. **WIE2003 Introduction to Data Science** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the key concepts relevant to data science, including all processes in the data science life cycle and data science applications in real-world. 2. Determine suitable tools, technologies and the core algorithms underlying an end-to-end data science workflow, including the experimental design, data collection, mining, analysis, and presentation of information derived from datasets. 3. Interpret the ethical implications on the use of data and technologies in data science process. Synopsis of Course Content The course is designed to help the student learn fundamental concepts of data science. It covers what, when, who, where why and how (5W 1H) of data science in the era of big data. Also encompasses the life cycle of data science from data preparation, data processing, data cleansing and integration, to data analysis and visualization of data in data-driven decision making. The role of data scientist, the knowledge and skills required are also presented. Machine learning algorithms and statistical models are included. Diverse technologies, programming languages as well as tools in data science are discussed. Assessment Methods Continuous Assessment: 60% Final Examination: 40%)

v. **WID3006 Machine Learning** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the concepts and techniques for supervised learning, semi-supervised and unsupervised learning. 2. Use the appropriate machine learning techniques for given sample datasets. 3. Apply practical solutions to solve common problems in machine learning. Synopsis of Course Content This course covers a broad understanding of the field of machine learning and statistical pattern recognition. Topics include classification and linear regression, Bayesian network, decision trees, SVMs, statistical learning method, unsupervised learning and

reinforcement learning. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

w. **WIH3001 Data Science Project** (Type of Course: Programme Core Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Define the problem background. 2. Determine the objectives of project. 3. Identify suitable solution approach for the stated problem. 4. Review literature relevant to the stated problem. 5. Conduct data gathering using suitable techniques. 6. Develop a prototype of the proposed solution. 7. Write a project report. Synopsis of Course Content This course covers the following research activities including problem and objectives identification; literature review; data collection, prototype development, report writing and project presentation. Assessment Methods Continuous Assessment: 100%)

x. **WIH3002 Data Science Industrial Training** (Type of Course: Programme Core Courses, Credit: 14, Course Pre-requisite(s): Taken all Faculty and Programme Core Courses, Medium of Instruction: English Learning Outcomes 1. Understanding real-world case studies/problem that require data science solutions in industry. 2. Use appropriate data science technologies in tasks at workplace. 3. Apply data science industrial experience in one or more industry-based projects. Synopsis of Course Content This course requires a student to acquire data science industrial experience at an organisation offering internship related to data science field of study. The student records his/her daily experiences at the workplace in a logbook. The student also prepares a final report about his/her data science industrial experiences. Assessment Methods Continuous Assessment: 100%)

4. Specialization Elective Courses
    a. WIC2008 INTERNET OF THINGS (Type of Course: Specialization Elective Courses, Credit: 3 Course Pre-requisite(s): WIA1005 Medium of Instruction: English Learning Outcomes 1. Describe the basic concept of Internet-ofThings. 2. Design IoT application using existing technology. 3. Apply IoT knowledge of practical problem solving. Synopsis of Course Content The course provides an overview of Internet of Things technology

concept and practical. It develops foundational skills using hands-on lab activities that stimulate the students in applying creative problem solving and rapid prototyping in the interdisciplinary domain of electronics, networking, security, data analytics, and business. The student-centric approach translates into the student being able to produce ideas, design, prototype and present an IoT solution for an identified business or society need. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

b. WID2001 KNOWLEDGE REPRESENTATION AND REASONING (Type of Course: Specialization Elective Courses, Credit: 3 Course Pre-requisite(s): None Medium of Instruction: English Learning Outcomes 1. Describe types of knowledge and their engineering processes. 2. Differentiate the various knowledge representation and knowledge reasoning methods. 3. Use the various knowledge representation and knowledge reasoning methods to solve problems. Synopsis of Course Content This course describes types of knowledge and their engineering processes as used in expert system development. It differentiates the various knowledge representations methods such as logic, rule-based, frame-based, semantic network, script, conceptual dependency, and ontology. It also explains the various knowledge reasoning methods such as the deductive, inductive, monotonic, and non-monotonic reasoning. Students will use the various knowledge representation and knowledge reasoning methods to solve problems. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

c. WID2002 COMPUTING MATHEMATICS II (Type of Course: Specialization Elective Courses, Credit: 3 Course Pre-requisite(s): None Medium of Instruction: English Learning Outcomes 1. Apply various formulae for operations on differentiation and integration as well as mathematical transformation (Calculus). 2. Apply the principles of algebraic matrix in problem solving (Linear Algebra). 3. Apply statistical methods in problem solving (Statistics). Synopsis of Course Content This course covers important mathematics topics which can be applied to the artificial intelligence field. The topics include calculus (differentiation and integration), functions and graphs, matrix algebra (Eigen value, Eigen vector, dependency, singularity), statistical methods (sampling, principal component analysis) and transformations (Fourier, Laplace etc.). Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

d. WID2003 COGNITIVE SCIENCE (Type of Course: Specialization Elective Courses, Credit: 3 Course Pre-requisite(s): None Medium of Instruction: English Learning Outcomes 1. Identify various cognitive concepts and processes. 2. Describe memory functions related to learning activities. 3. Apply cognitive theories in everyday problem solving. Synopsis of Course Content This course covers the fundamentals on cognitive science. It covers topics on mind and machine, perception (object recognition), attention & consciousness, memory (short term memory, working memory and long term memory), forgetting, mental representation and visual perception, category, language, intelligence and creativity, emotion and expression, problem solving, reasoning and decision making. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

e. WID3001 FUNCTIONAL AND LOGIC PROGRAMMING (Type of Course: Specialization Elective Courses, Credit: 3 Course Pre-requisite(s): None Medium of Instruction: English Learning Outcomes 1. Describe basic principles and features of functional and logic programming. 2. Explain concepts and methods of functional and logic programming. 3. Apply functional and logic programming knowledge. Synopsis of Course Content This course introduces Artificial Intelligence (AI) programming languages, which covers functional and logic styles of programming. It describes the functional programming that uses functions as its basis and includes topics such as types and classes, lists, recursions, and higher-order functions. The logic programming is based on formal logic and includes topics such as clauses and predicates, unification, operators and arithmetic, cuts and negation. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

f. WID3002 NATURAL LANGUAGE PROCESSING (Type of Course: Specialization Elective Courses, Credit: 3 Course Pre-requisite(s): None Medium of Instruction: English Learning Outcomes 1. Identify the various levels of natural language processing. 2. Explain the approaches and applications of natural language processing. 3. Apply natural language processing techniques to solve problems. Synopsis of Course Content The course introduces the theory and methods of Natural Language Processing (NLP). It covers a broad range of topics in NLP including basic text processing, minimum edit distance, syntactic analysis, and semantic analysis. In addition, it also discusses some NLP applications such as machine translation and sentiment analysis. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

g. WID3007 FUZZY LOGIC (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): WIX1001, Medium of Instruction: English Learning Outcomes 1. Understand the concept and techniques of fuzzy set theory and fuzzy logic. 2. Distinguish fuzzy rules and fuzzy relations from their crisp counterparts. 3. Implement fuzzy inference systems and fuzzy clustering techniques in problem solving. Synopsis of Course Content This course begins with the definition, concept, and examples of fuzzy logic. It covers fuzzy sets, rules, operations, relations, and membership functions. It also discusses fuzzy logics, fuzzification, defuzzification, fuzzy systems, and future applications. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

h. WID3010 AUTONOMOUS ROBOTS (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe various robot components such as sensors, actuators, and computational nodes. 2. Discuss conceptual and technical challenges in autonomous robots. 3. Apply methods for decision making in autonomous robots. Synopsis of Course Content This course introduces the basic concept of autonomous systems by making robots that can observe, reason, and act. The syllabus includes learning how robots interpret noisy sensor inputs, control their actions, recover from failures, react versus reason about a situation, solve sub-problems, solve long-term goals, and coexist in the world. In this course, students will study methodologies to achieve autonomous robot systems through a practical and ground-up approach of programming their own. Assessment Methods Continuous Assessment: 70% Final Examination: 30%)

i. WID3011 DEEP LEARNING (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Describe components of the architecture of artificial neural networks and convolutional neural networks. 2. Compare categories of supervised and unsupervised deep networks. 3. Apply suitable learning rules for a problem. Synopsis of Course Content The purpose of this course is to give students a clear introduction, an intuitive understanding, and a smooth Python implementation of the most successful deep learning techniques. The teaching approach provides a good balance of theory and practice. The theory of deep neural networks relies on simple linear operations and basic gradient descent optimization.

Practical exercises of deep learning applications will focus on PyTorch. Each lecture presents the fundamental concepts and translates them into PyTorch implementations. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

j. WID3012 EVOLUTIONARY COMPUTATION (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain evolutionary computation techniques and methodologies set in the context of modern heuristic methods. 2. Apply various evolutionary computation methods and algorithms to particular classes of problems. 3. Develop evolutionary algorithms for real-world applications. Synopsis of Course Content The course aims to introduce students to a wide range of Evolutionary Computation terminology, techniques, and processes. The concepts taught in these lectures will be practiced and reinforced by participation in projects. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

k. WID3013 COMPUTER VISION AND PATTERN RECOGNITION (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain basic concepts, terminology, theories, models, and methods in the field of computer vision and pattern recognition. 2. Describe known principles of the human visual system. 3. Suggest a design of a computer vision or pattern recognition system for a specific problem. Synopsis of Course Content Ever wonder how robots can navigate space and perform duties, how search engines can index billions of images and videos, how algorithms can diagnose medical images for diseases, how self-driving cars can see and drive safely, or how Instagram creates filters or Snapchat creates masks? In this course, we will explore all of these technologies and learn to prototype them. Lying in the heart of these modern AI applications are computer vision and pattern recognition technologies that can perceive, understand, and reconstruct the complex visual world. Computer Vision and Pattern Recognition is one of the fastest-growing and most exciting AI disciplines in today’s academia and industry. This course is designed to open the doors for students who are interested in learning about the fundamental principles and important applications of computer vision and pattern recognition. We will expose students to a number of real-world applications that are important to our daily lives. More importantly, we will guide students through a series of

well-designed projects such that they will get to implement a few interesting and cutting-edge computer vision and pattern recognition algorithms. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

l. WID3014 PRACTICAL ARTIFICIAL INTELLIGENCE (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Identify solution approaches suitable for the stated problem. 2. Conduct suitable requirement gathering, system analysis, and design techniques. 3. Present the project solution. Synopsis of Course Content This course covers practical activities including system analysis and design, system implementation, testing and evaluating the developed system, and project presentation. Assessment Methods Continuous Assessment: 100%)

m. WID3015 NUMERICAL ANALYSIS (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Solve equations using numerical methods. 2. Apply numerical methods to solve differentiation/integration problems. Synopsis of Course Content This course covers numerical analysis and the computer implementation of numerical problems. Topics include interpolation and function approximation, solving systems of linear equations, solving algebraic equations, numerical differentiation and integration, and numerical solution of ordinary differential equations. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

n. WIG3004 VIRTUAL REALITY (Type of Course: Specialization Elective Courses, Credit: 3, Course Pre-requisite(s): None, Medium of Instruction: English Learning Outcomes 1. Explain the technology that supports virtual reality applications and human perceptions involved in designing virtual reality environments. 2. Discuss other technologies including visualization and augmented reality. 3. Develop a virtual reality environment using suitable tools and programming languages. Synopsis of Course Content This course begins with an introduction to virtual reality technology and its applications, followed by a detailed explanation of input and output devices used in virtual reality applications. Students will learn about human sensory systems (visual, audio, and tactile) and their relations to the development of virtual reality devices, as well as the possible effects these devices have on human health. Then students will be taught how to

model a virtual reality world and manipulate its objects using virtual reality development tools and programming languages. The course ends by providing students with fundamental knowledge regarding data visualization and augmented reality, a research area closely related to virtual reality. Assessment Methods Continuous Assessment: 50% Final Examination: 50%)

Each course can only be included in one of the four types.

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PROGRAMME GOALS

To produce excellent graduates who are able to apply the knowledge and skills gained in the field of Computer Science and apply specific Artificial Intelligence techniques to solve computer-based problems, as well as having entrepreneurship mindset.

Programme Educational Objective:

(1) Graduates will demonstrate their ability to advance their careers in the computing profession, and will be engaged in learning, understanding, and applying new ideas and technologies as the Artificial Intelligence field evolves. (Professionalism).
(2) Graduates will have continuously advanced their knowledge, and improved competency in computer science and Artificial Intelligence to meet current and future needs (Continuous Personal Development).
(3) Graduates will contribute to sustainable development and the well-being of society through computer science and Artificial Intelligence (Societal Engagement).
PROGRAMME LEARNING OUTCOMES

At the end of the Bachelor of Computer Science (Artificial Intelligence) programme, graduates can:

PO1 Acquire a wider breadth of knowledge in computer science areas and a deeper understanding of Artificial Intelligence techniques.

PO2 Apply an understanding of Artificial Intelligence domain to solve problems by exploring innovative practices for acquiring and analyzing information.
PO3 Engage in practical solutions, which involves requirements gathering, designing, and developing algorithms and intelligence-based systems.
PO4 Apply basic Mathematics and computer science theories specifically Artificial Intelligence techniques in modelling and designing computer-based systems.
PO5 Communicate effectively and engage in teamwork to solve issues related to intelligence-based computer science.
PO6 Works effectively as individuals, and as a member of various technical teams.
PO7 Initiate technical and/or societal innovation through technologies or entrepreneurship.
PO8 Practice professionalism and ethics in executing tasks related to computing

Academic Calendar 2023/2024

SEMESTER I

Orientation (Week of Welcome - WOW)
Duration: 1 week
Dates: 01.10.2023 - 08.10.2023
Lectures
Duration: 7 weeks
Dates: 09.10.2023 - 26.11.2023
Mid Semester I Break
Duration: 1 week
Dates: 27.11.2023 - 03.12.2023
Lectures
Duration: 7 weeks
Dates: 04.12.2023 - 21.01.2024
Revision Week
Duration: 1 week
Dates: 22.01.2024 - 28.01.2024
Semester I Final Examination
Duration: 2 weeks
Dates: 29.01.2024 - 11.02.2024
Semester Break
Duration: 3 weeks
Dates: 12.02.2024 - 03.03.2024

Total Duration of Semester I: 22 weeks

SEMESTER II

Lectures
Duration: 5 weeks
Dates: 04.03.2024 - 07.04.2024
Mid Semester II Break
Duration: 1 week
Dates: 08.04.2024 - 14.04.2024
Lectures

Duration: 9 weeks
Dates: 15.04.2024 - 16.06.2024

Revision Week
Duration: 1 week
Dates: 17.06.2024 - 23.06.2024

Semester II Final Examination
Duration: 2 weeks
Dates: 24.06.2024 - 07.07.2024

Total Duration of Semester II: 18 weeks

SEMESTER BREAK

Duration: 9 weeks
Dates: 08.07.2024 - 08.09.2024

SPECIAL SEMESTER

Lectures
Duration: 7 weeks
Dates: 08.07.2024 - 25.08.2024

Special Semester Final Examination
Duration: 1 week
Dates: 26.08.2024 - 01.09.2024

Break
Duration: 1 week
Dates: 02.09.2024 - 08.09.2024

Total Duration of Special Semester: 9 weeks

Note:

The academic calendar includes several public and festive holidays and is subject to change. Some of the key holidays are:

Maulidur Rasul: 28 September 2023
Deepavali: 12 November 2023
Christmas Day: 25 December 2023
New Year: 01 January 2024
Thaipusam: 25 January 2024
Federal Territory Day: 01 February 2024
Chinese New Year: 10 & 11 February 2024
Nuzul Al-Quran: 28 March 2024
Eidul Fitri: 10 & 11 April 2024
Labour Day: 01 May 2024
Wesak Day: 22 May 2024
His Majesty the King's Birthday: 03 June 2024
Eidul Adha: 17 June 2024
Awal Muharam: 07 July 2024
National Day: 31 August 2024
Malaysia Day: 16 September 2024

In the Faculty of Computer Science and Information Technology, the Department of Artificial Intelligence is led by Dr. Erma Rahayu Mohd Faizal Abdullah, the Head of Department. Professors in the department include Prof. Ir. Dr. Chan Chee Seng and Prof. Dr. Loo Chu Kiong. The department also has Associate Professors such as Associate Prof. Ts. Dr. Aznul Qalid Md Sabri and Associate Prof. Dr. Norisma Idris. Senior Lecturers in the department are Dr. Lim Chee Kau, Dr. Liew Wei Shiung, Dr. Muhammad Shahreeza Safiruz Kassim, Dr. Nurul Japar, Dr. Rohana Mahmud, Dr. Saw Shier Nee, Dr. Siti Soraya Abdul Rahman, Dr. Unaizah Hanum Obaidellah, Dr. Woo Chaw Seng, and Dr. Zati Hakim Azizul Hasan.

Department of Artificial Intelligence

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Curriculum Structure for the Bachelor of Computer Science in Artificial Intelligence

The curriculum structure for the Bachelor of Computer Science in Artificial Intelligence for the academic session 2023/2024

University Courses
GIG1012 Philosophy and Current Issues (for local students only), 2 credits, Semester 1
GLT1017 Basic Malay Language (for international students), Semester 1
GIG1013 Appreciation of Ethics and Civilizations, 2 credits, Semester 2
GIG1003 Basic Entrepreneurship Culture, 2 credits, Semester 1
GLTXXXX English for Communication (1), 2 credits, Semester 1
GLTXXXX English for Communication (2), 2 credits, Semester 2
Co-Curriculum (1), 2 credits, Semester 2
Co-Curriculum (2), 2 credits, Semester 1

Total credits for University Courses: 14 credits.

Faculty Core Courses
WIX1001 Computing Mathematics I, 3 credits, Semester 1

WIX1002 Fundamentals of Programming, 5 credits, Semester 1
WIX1003 Computer Systems and Organization, 3 credits, Semester 1
WIX2001 Thinking and Communication Skills, 3 credits, Semester 1
WIX2002 Project Management, 3 credits, Semester 1

Total credits for Faculty Core Courses: 17 credits.

External University Elective Courses (Student Holistic Empowerment - SHE)
University Elective (Cluster 1): Thinking Matters: Mind & Intellect, 2 credits, Semester 2
University Elective (Cluster 2): Technology/Artificial Intelligence and Data Analytics: i-Techie, 2 credits, Semester 2
University Elective (Cluster 3): Global Issues and Community Sustainability: Making the World a Better Place, 2 credits, Semester 1
KIAR: Integrity and Anti-Corruption, 2 credits, Semester 2

Total credits for External University Elective Courses: 8 credits.

Programme Core Courses
WIA1002 Data Structure (pre-requisite WIX1002), 5 credits, Semester 2
WIA1003 Computer System Architecture (pre-requisite WIX1003), 3 credits, Semester 2
WIA1005 Network Technology Foundation, 4 credits, Semester 2
WIA1006 Machine Learning, 3 credits, Semester 2
WIA1007 Introduction to Data Science, 3 credits, Semester 1
WIA2001 Database, 3 credits, Semester 1
WIA2003 Probability and Statistics, 3 credits, Semester 1
WIA2004 Operating Systems, 4 credits, Semester 2
WIA2005 Algorithm Design and Analysis (pre-requisite WIA1002), 4 credits, Semester 2
WIA2006 System Analysis and Design, 3 credits, Semester 1
WIA2007 Mobile Application Development, 4 credits, Semester 1
WIA3001 Industrial Training (taken all Faculty and Programme Core Courses except Academic Project I and Academic Project II), 12 credits, Semester 1
WIA3002 Academic Project I (pass all Faculty and Programme Core Courses except for Industrial Training and Academic Project II), 3 credits, Semester 2
WIA3003 Academic Project II (pre-requisite WIA3002), 5 credits, Semester 1

Total credits for Programme Core Courses: 59 credits.

Specialization Elective Courses (Choose only 10 courses)
WIC2008 Internet of Things (pre-requisite WIA1005), 3 credits, Semester 2
WID2001 Knowledge Representation and Reasoning, 3 credits, Semester 2
WID2002 Computing Mathematics II, 3 credits, Semester 2

WID2003 Cognitive Science, 3 credits, Semester 2
WID3001 Functional and Logic Programming, 3 credits, Semester 2
WID3002 Natural Language Processing, 3 credits, Semester 2
WID3007 Fuzzy Logic (pre-requisite WIX1001), 3 credits, Semester 1
WID3010 Autonomous Robots, 3 credits, Semester 2
WID3011 Deep Learning, 3 credits, Semester 1
WID3012 Evolutionary Computation, 3 credits, Semester 1
WID3013 Computer Vision and Pattern Recognition, 3 credits, Semester 1
WID3014 Practical Artificial Intelligence, 3 credits, Semester 1
WID3015 Numerical Analysis, 3 credits, Semester 1
WIG3004 Virtual Reality, 3 credits, Semester 2

Total credits for Specialization Elective Courses: 30 credits.

Total Credits for Graduation
The total number of credits required for graduation is 128 credits.

Course Planning for Bachelor of Computer Science (Artificial Intelligence)

Academic Session 2023/2024

Year 1
Semester 1
GIG1012/GLT1017 Philosophy and Current Issues (for local students only) / Basic Malay Language (for international students), 2 credits
GLTXXXX English for Communication (1), 2 credits
WIX1001 Computing Mathematics I, 3 credits
WIX1002 Fundamentals of Programming, 5 credits
WIX1003 Computer Systems and Organization, 3 credits
WIA1007 Introduction to Data Science, 3 credits

Total credits for Semester 1: 18 credits

Semester 2
GIG1013 Appreciation of Ethics and Civilizations, 2 credits
GLTXXXX English for Communication (2), 2 credits
WIA1002 Data Structure (pre-requisite WIX1002), 5 credits
WIA1003 Computer System Architecture (pre-requisite WIX1003), 3 credits
WIA1005 Network Technology Foundation, 4 credits
WIA1006 Machine Learning, 3 credits

Total credits for Semester 2: 19 credits

Year 2
Semester 1
GIG1003 Basic Entrepreneurship Culture, 2 credits
WIX2001 Thinking and Communication Skills, 3 credits
WIX2002 Project Management, 3 credits
WIA2001 Database, 3 credits
WIA2003 Probability and Statistics, 3 credits
WIA2006 System Analysis and Design, 3 credits
WIA2007 Mobile Application Development, 4 credits

Total credits for Semester 1: 21 credits

Semester 2
Co-Curriculum (1), 2 credits
WIA2004 Operating Systems, 4 credits
WIA2005 Algorithm Design and Analysis (pre-requisite WIA1002), 4 credits
Specialization Elective (1), 3 credits

Specialization Elective (2), 3 credits
Specialization Elective (3), 3 credits
KIAR: Integrity and Anti-Corruption, 2 credits

Total credits for Semester 2: 21 credits

Year 3
Semester 1
WIA3001 Industrial Training (taken all Faculty and Programme Core Courses except Academic Project I and Academic Project II), 12 credits

Total credits for Semester 1: 12 credits

Semester 2
WIA3002 Academic Project I (pass all Faculty and Programme Core Courses except for Industrial Training and Academic Project II), 3 credits
Specialization Elective (4), 3 credits
Specialization Elective (5), 3 credits
Specialization Elective (6), 3 credits
Specialization Elective (7), 3 credits
University Elective (Cluster 1), 2 credits
University Elective (Cluster 2), 2 credits

Total credits for Semester 2: 19 credits

Year 4
Semester 1
Co-Curriculum (2), 2 credits
WIA3003 Academic Project II (pre-requisite WIA3002), 5 credits
Specialization Elective (8), 3 credits
Specialization Elective (9), 3 credits
Specialization Elective (10), 3 credits
University Elective (Cluster 3), 2 credits

Total credits for Semester 1: 18 credits

Credit Distribution
University Courses: 14 credits
Faculty Core Courses: 17 credits
University Elective Courses: 8 credits
Programme Core Courses: 59 credits

Specialization Elective Courses: 30 credits

Total credits for graduation: 128 credits.

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