

**Courses Offered – UKM Virtual Exchange Programme
Semester 1 2020/2021**

Faculty of Information Science and Technology, UKM

Course	Course Code	Credit	Course Synopsis	Preferred Teaching Platform
Software Requirements Engineering	TTTE2104	4	This course aims to introduce the fundamentals of software engineering and requirements engineering. The course emphasises on the important processes in requirements engineering, namely eliciting and analysing requirements, specifying and validating requirements specifications and managing the requirements throughout the software development cycle. Students will learn how to define the vision and scope of a software product and determine the stakeholders. They will learn utilising various techniques and methods involved in eliciting, analysing and validating requirements. Students are exposed to several types of documents for specifying requirements and practise creating a software requirements specification. Students will also learn to perform requirements traceability and manage requirements change.	- Microsoft Teams - UKMFolio
Software Testing	TTTE3503	3	Software testing is an important activity in every software development environment. Software must be tested in order to ensure its quality. This course is designed to enable clear understanding and knowledge of the foundations, methods, techniques and tools in the area of software testing and its application. The course will prepare students to be software testers who are capable of testing software based on the specified standards. The students will also have the opportunity to learn strengths and weaknesses of various software testing methods and techniques, as well as managing testing process.	- Microsoft Teams - UKMFolio
Multimedia System for Software Development	TTTH3404	4	This course introduces students to the concepts and implementation of multimedia systems development process. Besides the generic process models such as Waterfall and Instructional Design, the students are exposed to the current system development approaches, namely Agile Methods and Component -based Software Engineering. Students will learn the basic principles of Agile Methods and how projects that use such a method can be managed through Scrum approach. In addition to Agile Methods, students will also be taught on the main processes of component-based multimedia systems development. The students will then be given the opportunity to develop multimedia systems by using Agile Method.	- Microsoft Teams - UKMFolio

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Animation	TTTH2823	3	This course introduces the concepts and principles of animation, production techniques and 2D animation in a variety of multimedia application. This course covers the following topics: traditional animation that became the foundation of digital animation; the nature and principles of animation as well as the methods and techniques of production of 2D animation. This course will also discuss the development of the story, writing the script and storyboards for animation production. Students will be exposed to techniques in the production of 2D animation with the help of software and programming tools. Students will acquire the knowledge necessary to understand and develop the skills to apply the skills of the 2D animation art and graphic design to provide multimedia content such as animated cartoons, software games, advertising and courseware.	- Microsoft Teams - UKMFolio
Object Oriented Software Engineering	TTTK2023	3	This course covers the basic and intermediate topics in object-oriented software development process. At the beginning of the course, students will learn how to analyse software requirements and construct Use Cases and suitable models to represent software requirements. Next, students will learn the concepts, principles and theories related to object-oriented software design, such as UML diagrams, and suitable software architecture design principles and design patterns. In this course, students will also develop the program for the software designs that have been produced based on the object-oriented software design concepts, principles and theories.	- Microsoft Teams - UKMFolio
Human Computer Interaction	TTTK2093	3	The aim of this course is to emphasise the importance of user interface design in producing high quality software. This course is designed to enable clear understanding and knowledge of the basic theories in human cognitive abilities and memory, principles, guidelines and standards in designing of user interfaces. Students are trained with the basic skills to apply the related interaction design principles and techniques to produce effective and intuitive user interfaces.	- Microsoft Teams - UKMFolio

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Mobile Programming	TTTK2323	3	This course will teach fundamental of the mobile app development using Android platform. Topics will include important element in the android app development such as user interface design, user interface building, list view, data handling, fragment, threading and sensor. This course will focus heavily on in-lab participation, out-of-class assignments, and mobile app development project. Students are expected to work on a project that produces a basic mobile app. Students should already have a familiarity with Java, an understanding of basic object-oriented programming, basic algorithms and data structures. Course projects will be written in Java for the Android platform using the Android SDK.	- Microsoft Teams - UKMFolio
Digital Media Processing Technique	TTTK3813	3	Vision is one of the most important senses for human beings for coping with the real world. Nowadays, with the advance of science and technology, many imaging applications have been adapted in the real world, from simple to complex, ranging from business to scientific applications such as in medical, biology, industrial automation, astronomy, law enforcement, defense, robotic and surveillance systems. This course emphasizes general principles of image processing. The topics to be covered are: 1. Digital image fundamentals: representation, sampling and quantization, image acquisition, basic relationships between pixels, imaging geometry, color image models, histograms; 2. Image enhancement: in spatial domain, image smoothing and sharpening; 3. Edges and contours: gradient-based edge detection and edge operators; 4. Finding points of interest: corner detection; 5. Image segmentation: detection of discontinuities, thresholding, region-oriented segmentation.	- Microsoft Teams - UKMFolio
Computer and Network Security	TTTN3513	3	This course exposes students to the computer and network security. In addition, the discussion also covered the threats posed to the security of the computer. This course will be conducted in the classroom and laboratory. For the purpose of understanding of computer security, the basic method of encryption and message confidentiality as well as the concept of the public key and authentication are shown. Applications that require security measures such as electronic mail, Internet Protocol security, network security, and web security are examples of applications in this course. In addition, the topic of hackers, viruses, and firewalls will also be discussed.	- Microsoft Teams - UKMFolio

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Web Programming	TTP2543	3	This course offers students the opportunity to learn the fundamental skills in web programming. It introduces students to the concepts and techniques of designing and creating web pages. Students will be taught to use various tools to organize, retrieve, store and distribute information via the web. Students will be introduced to the client-server dynamic pages. Other relevant issues that will be emphasised include the principle of web pages design, interactive web design, document design, graphics, texts, interfaces and links between the documents. At the end of the course, students will demonstrate their understanding and technical knowledge by developing a mini web-based system project.	- Microsoft Teams - UKMFolio
Natural Language Computing	TTP2633	3	This course is meant to introduce to students to various techniques and applications of natural language processing (NLP). These include regular expressions and finite state automata, linguistic knowledge including morphology, syntax and semantic; grammar and parsing techniques; part of speech tagging and semantic analysis. Applications such as question-answering system, text summarization and machine translation are introduced. At the end of this course, students should be able to implement NLP-based tasks according to the techniques discussed in this course.	- Microsoft Teams - UKMFolio
Modelling and System Simulation	TTR3053	3	This course aims to introduce the concept of industry management. Course content includes strategies and competition within the industry in general. Modelling includes forecasting, aggregate planning, linear programming, inventory control subject to known demand and operation scheduling. This course applies the simulation method to understand the developed modelling.	- Microsoft Teams - UKMFolio

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Quality Management	TTTR2033	3	The aim of this course is to present concepts and techniques of quality management based on the core of Six Sigma quality improvement model, i.e. DMAIC; Define, Measure, Analyze, Improve and Control. This continual loop provides a quality improvement cycle for products and services, starting with defining key measurable objectives, and resulting in implementing solutions and sustaining improvement. The loop complements ITIL improvement process steps; define what you should measure, define what you can measure, gather the data, process the data, analyze the data, present and assess the data, and implement corrective actions. In addition, this course will introduce techniques for IT management to continuously measure, analyze and improve service quality. Techniques such as Pareto Diagram (it helps identify key components that are causing the majority of the problems), Control Charts (ensure that a process or service performance is within an acceptable range, bound by an upper and lower limit), FMEA (it helps mitigate risks by identifying potential failures and the effects of these failures on a process), Cause and Effect Diagram (it helps to get a clear understanding of the causes and effects of problems), Process Map (it helps to understand the people, processes, technology and their relationship), Voice of Customer (to gather customer requirements) and Correlation Diagram (it help indicate the relationships and dependencies between variables). These techniques will be introduced in this course and how they can be applied in IT service processes based on ITIL through series of discussions on certain case studies.	- Microsoft Teams - UKMFolio
Business Process Management	TTTU2023	3	In this course students will be introduced to key concepts and approaches to business process management and improvement. The main focus of this course is both understanding and designing business processes. Students will learn how to identify, document, model, assess, and improve core business processes. Students will be introduced to process design principles. The way in which information technology can be used to manage, transform, and improve business processes is discussed.	- Microsoft Teams - UKMFolio

Software Design for Multimedia System	TTTU2304	4	This course introduces the concepts and fundamental principles of software design. Students will be exposed to various design techniques and models. Based on that basic knowledge, students will learn to decide on the most suitable approach for a particular type of software to be developed. Students will then apply the selected technique and method in a specific multimedia software/system project. At the end of the project, students should be able to evaluate the efficiency of the technique and method, and also incorporate user-friendly attributes in designing the multimedia software/system.	- Microsoft Teams - UKMFolio
Advanced Databases	TTTU2983	3	This course covers advanced concepts in database design and management, as it pertains to relational database systems, and introduces visual programming in 4GL. Among the contents are: distributed databases, concurrency controls, indexing, object oriented databases, and the latest database applications; Development of database applications includes: definition of data-entry forms, structured reports, and embedded queries in 4GL programming; Database management and DBA tasks deals with: verification, transaction control and locking, concurrency control mechanisms, consistency maintenance, and data recovery from errors; Also covered are query processing and transaction management in client-server systems and distributed database systems.	- Microsoft Teams - UKMFolio
Principles of Data Science	TTTC3313	3	Introduction to Data Science offers a comprehensive overview of data science, emphasising on the practice of obtaining, exploring, modeling, and interpreting data. This course is designed to match the needs of the data science industry with solid understanding on data analytics in making better decision and meaningful insights from large and complex datasets. In this course, the students will explore the data science lifecycle, starting from data collection and cleaning, data analysis, visualization, statistical inference and prediction, and decision making. Key principles and techniques to carry out the cycle are discussed. This includes transforming, querying and analysing data; algorithms for machine learning methods based on regression, classification and clustering; principles behind creating informative data visualizations and statistical concepts of measurement error and prediction. Students will be exposed to the use of R statistical programming language to perform real-world data science tasks and to work through real-world examples that illustrate these concepts. Students will also learn key statistical foundations which empowers the data-scientific approach to problem solving.	- Microsoft Teams - UKMFolio

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Data Mining	TTTC		This course will introduce data mining as a new field which is also known as Knowledge Discovery in Databases (KDD). Data mining is a pattern or knowledge discovery technology from a large dataset. The course consists of several sections: introduction, data mining methodology, data preprocessing and the data mining tasks such as classification, prediction, association rule mining, clustering, frequent pattern and structured pattern analysis and outlier analysis. Several techniques for each task will be discussed. Students will be exposed to the hands-on experience of data mining activities such as data preparation, data cleaning, modeling and knowledge analysis. The related multi-disciplinary issues will be discussed including database, data warehouse, machine learning, statistics, data visualizations etc. The data mining tools will be introduced and used in this course.	- Microsoft Teams - UKMFolio
Web Searching and Recommender Systems	TTTP3053	3	The growth of the Web and the improvements in data creation, collection, and use, have led to tremendous increase in the amount and complexity of the data that a search engine needs to handle. How to effectively and efficiently search for the documents relevant to our information needs and how to extract and recommend the valuable information are the subjects of this course. This course covers two hugely popular types of systems which are Web search engines and recommender systems. These systems are the most widely-used tool for accessing information on the Web. Web search engines attempt to locate information items (e.g., documents, Web pages) based on user specifications. Recommender systems discover information items (e.g., people, products) that are likely to be of interest to users. This course will explore both types of systems, underlining their shared principles. Roughly, two thirds of the course will be devoted to search engines and one third to recommender systems.	- Microsoft Teams - UKMFolio

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Enterprise Resource Planning (ERP)	TTTR2043	3	The course provides an overview of Enterprise Resource Planning (ERP) software systems and their role within an organization. The primary purpose of this course is to explore and develop an ERP system in the domain of service industry. Students will gain an understanding of ERP systems from both perspective of organizational business process and implementation of ERP software. Students can learn and explore ERP software from open source in a team project to understand how ERP system works. The ERP system should cover important business operations such as marketing and sales, supply chain management, accounting and finance, and human resource. The hands-on exercise gives experiences to Students to develop their computing and business skills in identifying the requirement, designing and developing IT application for industry needs. The course will also provide a discussion on various business cases in which ERP concepts can be applied	- Microsoft Teams - UKMFolio
Introduction to Manufacturing	TTTR3523	3	This course involves an introduction of manufacturing technology and its components. The topic include type of industry, roles of manufacturing industry, manufacturing organization, design and manufacturing aspects, and production and operation management. Besides, general aspects of manufacturing which consists of instrumentation, testing, product quality and liability verification were also been introduced. The course is also discussing the advanced technologies concept in manufacturing technology.	- Microsoft Teams - UKMFolio
Computer and Network Security	TTTN3513	3	This course exposes students to the computer and network security. In addition, the discussion also covered the threats posed to the security of the computer. This course will be conducted in the classroom and laboratory. For the purpose of understanding of computer security, the basic method of encryption and message confidentiality as well as the concept of the public key and authentication are shown. Applications that require security measures such as electronic mail, Internet Protocol security, network security, and web security are examples of applications in this course. In addition, the topic of hackers, viruses, and firewalls will also be discussed.	- Microsoft Teams - UKMFolio

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Network Programming	TTTN3223	3	The course aims to introduce the basic concepts, the network reference model and in particular TCP/IP network protocol, existing architecture for network applications, and network application protocol and services such as e-mail, WWW and multi-media content delivery. Next, network programming fundamentals such as multi-threading, input/output streams and inter-process communication via UDP and TCP sockets applied in the development of client/server applications. Emphasis on Web technologies for back-end components includes Java Servlet and database connectivity to the server using JDBC. Advanced topics such as Remote Method Invocation is also covered.	<ul style="list-style-type: none"> - Microsoft Teams - UKMFolio
Routing Concept and Protocol	TTTN3113	3	This course is an introduction to advanced concept of routers and routing protocols. The focus of this course is on learning the architecture, components, and operations of routers in complex networks. Students will learn how to configure and troubleshoot advance operations of routers and routing protocols for IPv4 and IPv6 networks. The routing protocols include VTP, STP, RSTP, OSPF and EIGRP.	<ul style="list-style-type: none"> - Microsoft Teams - UKMFolio
3D Modeling	TTTH3623	3	This course will introduce to students the concepts and principles of 3D animation production. The course content includes an introduction to 3D animation; visual effects and related technology; digital production process; modeling techniques, mapping, lighting, animation, rendering; animation and effects; and post production. Students will be exposed to the tools and 3D operations and modeling technique, types and methods of applying surface texture, rendering method, types of lighting, camera position, and animation scripting. At the end of the course, students will develop one 3D animation story using any 3D software.	<ul style="list-style-type: none"> - Microsoft Teams - UKMFolio
E-Business Technology	TTTU3833	3	The aim of this course is to introduce to students, both theory and practice in e-business management. Students will develop a comprehensive knowledge of the concept and elements of e-business including business models, business environment, business strategy, digital marketing, social networks and e-commerce website. Students understanding on several specified issues in e-business are evaluated through presentations, assignments and case studies.	<ul style="list-style-type: none"> - Microsoft Teams - UKMFolio

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Introduction to Artificial Intelligence	TTTC2013	3	Discusses in detail the concept of artificial intelligence (AI) and intelligence features such as learning, reasoning, problem solving, logic, understanding and self-consciousness. Techniques and methods to implement intelligence features are discussed such as computerized system that attempts to reason, learning, adaptation and addressing the issue of uncertainty. Techniques and basic methods to enable intelligence features are introduced such as applied artificial neural networks, fuzzy logic, Bayes theorem, genetic algorithms and basic search algorithm such as hill climbing algorithm. Provide an natural overview and the scope that explains the background and philosophy of classical and biological AI. The basic theory of knowledge, technical representation, reasoning and knowledge inference algorithm are also discussed such as the chain forward and backward algorithms. The concept of space and space search techniques in AI problem solving are also detailed. Emphasis will be given to the students in logic programming in processing knowledge to understand how to apply reasoning and inference using specific algorithms. Using logic programming languages such as PROLOG to develop an AI product.	- Microsoft Teams - UKMFolio
Softcomputing	TTTC2273	3	In this course, important techniques in artificial intelligence technology will be discussed as a basis to develop an intelligence system; which is well known as Soft Computing. Student will be prepared for the foundation of intelligence system's concepts, design and application. Detailed focus will be given to fuzzy logic and evolutionary computing. The other three main components, namely machine learning, Bayesian networks, and Chaos Theory has been introduced in different courses. Both of these techniques are the important techniques which imitates human biology systems and the main concepts that enables an intelligence system to learn and make decisions in fuzziness and uncertainties scenario by using Fuzzy Logics as well as getting the best solution at minimum cost (optimization problem) by using evolutionary computing techniques. Two techniques of fuzzy logic reasoning methods such as Mamdani and Sugeno method will be discussed. Evolutionary Computing techniques will be introducing evolutionary algorithms such as genetic algorithms; and metaheuristic and intelligence swarm such as an ant colony optimization, particle swarm optimization, and firefly algorithm. Apart from that, hybrid approach for these techniques will be discussed, as well as other soft computing techniques. The application of soft computing in pattern recognition, financial, medical, bioinformatics, and engineering and control systems domain will be discussed as well.	- Microsoft Teams - UKMFolio

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Applied Robot	TTTC3413	3	This course introduces students to the basic concept of robot with the use of vision as the most important basic feature. It has the potential to use robots in the exploration of space and to analyze the surroundings. This basic theory is crucial to determine the success of a robotic application. Course content covers the introduction of basic robot techniques such as robot perception, identification and recognition of objects, location determination, and robot navigation. Students will work individually and in groups to analyze robot-based issues and to design software solutions. After successfully completing the course, students will be able to utilize the latest visual techniques for effective algorithm designs to address complex-based localization and navigation problem in robot applications.	<ul style="list-style-type: none"> - Microsoft Teams - UKMFolio
Introduction to Artificial Intelligence	TTTC2013	3	Discusses in detail the concept of artificial intelligence (AI) and intelligence features such as learning, reasoning, problem solving, logic, understanding and self-consciousness. Techniques and methods to implement intelligence features are discussed such as computerized system that attempts to reason, learning, adaptation and addressing the issue of uncertainty. Techniques and basic methods to enable intelligence features are introduced such as applied artificial neural networks, fuzzy logic, Bayes theorem, genetic algorithms and basic search algorithm such as hill climbing algorithm. Provide an natural overview and the scope that explains the background and philosophy of classical and biological AI. The basic theory of knowledge, technical representation, reasoning and knowledge inference algorithm are also discussed such as the chain forward and backward algorithms. The concept of space and space search techniques in AI problem solving are also detailed. Emphasis will be given to the students in logic programming in processing knowledge to understand how to apply reasoning and inference using specific algorithms. Using logic programming languages such as PROLOG to develop an AI product.	<p>Microsoft Teams and UKMFolio</p>

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Softcomputing	TTTC2273	3	In this course, important techniques in artificial intelligence technology will be discussed as a basis to develop an intelligence system; which is well known as Soft Computing. Student will be prepared for the foundation of intelligence system's concepts, design and application. Detailed focus will be given to fuzzy logic and evolutionary computing. The other three main components, namely machine learning, Bayesian networks, and Chaos Theory has been introduced in different courses. Both of these techniques are the important techniques which imitates human biology systems and the main concepts that enables an intelligence system to learn and make decisions in fuzziness and uncertainties scenario by using Fuzzy Logics as well as getting the best solution at minimum cost (optimization problem) by using evolutionary computing techniques. Two techniques of fuzzy logic reasoning methods such as Mamdani and Sugeno method will be discussed. Evolutionary Computing techniques will be introducing evolutionary algorithms such as genetic algorithms; and metaheuristic and intelligence swarm such as an ant colony optimization, particle swarm optimization, and firefly algorithm. Apart from that, hybrid approach for these techniques will be discussed, as well as other soft computing techniques. The application of soft computing in pattern recognition, financial, medical, bioinformatics, and engineering and control systems domain will be discussed as well.	Microsoft Teams and UKMFolio
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