PROGRAM PRASISWAZAH

UNTUK

BUKU PANDUAN 2025/2026

Bachelor of Technology in Cloud Computing and Application with Honours

Programme Details

The Bachelor of Technology in Cloud Computing and Application is aimed at producing knowledgeable and highly skilled graduates in the field of information and communications technology (ICT). Graduates pursuing the programme are equipped with the necessary knowledge and specialized skills in cloud computing technology to meet the needs of the industry. Skills include the delivery of computing services, including servers, storage, databases, networking, software, analytics, and intelligence, over the internet ("the cloud").

Programme Educational Objectives (PEO)

Programme Educational Objectives (PEO)	
After 3 years of graduation, this Bachelor of Technology in Cloud Computing and Application programme is expected to:	
PEO 1	Produce competent cloud computing technologist that perform Information Technology related work. (PLO1, PLO2, PLO3)
PEO 2	Produce professionals that is ethical and aware of social needs and career development. (PLO5, PLO6, PLO8)
PEO 3	Produce leaders with entrepreneurship in cloud computing field. (PLO4, PLO7, PLO9)

Programme Learning Outcomes (PLO)

Upon completion of the programme, graduates should be able to:	
PLO 1	Apply knowledge of technology fundamentals to broadly-defined procedures, processes, systems, and methodologies in cloud computing technology.
PLO 2	Propose and employ current tools and techniques to resolve broadly-defined problems.

PLO 3	Demonstrate deep investigative and significant thinking abilities to solve broadly-defined problems in Cloud Computing technology.
PLO 4	Communicate effectively and flexibly in oral and written language for social, academic and professional purposes.
PLO 5	Illustrate the understanding of corresponding issues related to the society and the subsequent responsibilities to the broadly-defined technology practices.
PLO 6	Acknowledge the requirement of professional establishment and to employ independent continuing learning in Cloud Computing technology.
PLO 7	Illustrate consciousness of management and technopreneurship routine in real perspective.
PLO 8	Illustrate ethical awareness and professionalism.
PLO 9	Illustrate leadership character, mentoring and work efficiently in diverse teams.

Career Prospects

There is a wide range of career opportunities in the field of information and communication technology available for graduates who are specialized in cloud computing, either in the government or private sector. Among the career opportunities are:

1. Cloud architect
2. Cloud engineer
3. Cloud data scientist
4. Cloud automation engineer
5. Cloud consultant
6. Cloud security analyst
7. Cloud network engineer
8. Cloud administrator

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

Curriculum structure

Students are required to complete a minimum of 122 credits to graduate with a Bachelor of Technology in Cloud Computing and Application with Honours. The programme component are as follows:

Bachelor's Degree (Technology) Minimum graduating credit - 122		
Component	Component's Code	Credits
General Module	W	16
Core Module	P	36
Specialization Module	K	40
Final Year Project	P	8
Industrial Training	P	12
Free Module	E	10
	Total Credits	**122**

Year One: Semester 1

Course code	**Course Name**	**Comp Code**	**Contact Hrs**		**Crdt**	**Pre-requisite**
			Lect	**Lab**		
BKKX XXX1	Co-Curriculum 1[1]	W	0	3	1	
BLHW1762	Philosophy and Current Issues	W	2	0	2	
BLLW 1142	English for Academic Purposes	W	2	0	2	
BITS 1133	Operating System & Computer Organisation and Architecture	P	2	2	3	
BITP 1323	Database	P	2	2	3	
BITP 1113	Programming Technique	P	2	2	3	
BITS 1225	Windows System Management and Network Services	K	4	4	5	
				Total Credits	**19**	

[1]This course can be taken in any semester. Please refer to the Co-Curriculum Unit before registering.

Year One: Semester 2

Course code	**Course Name**	**Comp Code**	**Contact Hrs**		**Crdt**	**Pre-requisite**
			Lect	**Lab**		
BITP 1123	Data Structure and Algorithm	P	2	2	3	BITP 1113
BITS 1323	Cloud Computing Fundamental	P	2	2	3	
BITS 2343	Computer Networks	P	2	2	3	
BITS 1513	Cloud Computing Services	P	2	2	3	
BITI 1213	Linear Algebra and Discrete Mathematics	P	2	2	3	

BITS 1235	Linux System Management and Network Services	K	4	4	5	
				Total Credits	**20**	

Year One: Semester 3

Course code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BITU 2913	Workshop 1	P	1[1]		3	BITP 1113
BITS 2535	Enterprise Network Technology and Application	K	4	4	5	
				Total Credits	**8**	

[1]Average official contact hours per week.

Year Two: Semester 1

Course code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLHW 2772	*Penghayatan Etika dan Peradaban*[1]	W	2	0	2	
BKKX XXX1	Co-Curriculum II[2]	W	0	3	1	
BITU 3923	Workshop 2	P	1[3]		3	BITU 2913
BITS 2543	Compilation Technology	P	2	2	3	
BITS 2433	Cloud Security Fundamental	P	2	2	3	
BITS 2135	Storage Technology and Application	K	4	4	5	
				Total Credits	**17**	

[1]For International Students, change to BLHW 2752 Malaysian Culture.
[2]This course can be taken in any semester. Please refer to the Co-Curriculum Unit before registering.
[3]Average official contact hours per week.

Year Two: Semester 2

Course code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLLW 2152	Academic Writing	W	2	0	2	BLLW 1142
BLHW2792	Kursus Integriti dan Anti Rasuah	W	2	0	2	BLHW2792
BITS 2555	Virtualization Technology	K	4	4	5	
BITS 2565	Python Programming	K	4	4	5	BITP 1113
BIT* ***5	Elective 1	E	4	4	5	

Total Credits	**19**	

Year Two: Semester 3

Course code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BITS 3565	OpenStack Cloud Platform Technology	K	4	4	5	
BITU 3974	Final Year Project 1	P	1[1]		4	BITU 3923
				Total Credits	**9**	

[1] Average official contact hours per week.

Year Three: Semester 1

Course code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLLW 3162	English for Professional Interaction	W	2	0	2	BLLW 2152
BITS 3575	Automated Operation and Maintenance	K	4	4	5	
BIT* ***5	Elective	E	4	4	5	
BLLW 12*2	Third Language	W	2	0	2	
BITU 3984	Final Year Project 2	P	1[1]		4	BITU 3974
				Total Credits	**18**	

[1] Average official contact hours per week.

Year Three: Semester 2

Course code	Course Name	Comp Code	Duration	Crdt	Pre-requisite
BITU 3926	Industrial Training	P		6 (Attend & pass)	BITU 3984[1]
BITU 3946	Industrial Training Report	P		6	BITU 3984[1]
			Total Credits	**12**	

[1] Completed all courses

List of Courses in Free Module

Below is the list of courses in free module that can be selected as part of the curriculum. The courses in the free module are divided into two categories, that is,

1. Faculty free module (2 courses, 5 credits each).

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

Course code	Course Name	Contact Hrs		Crdt	Pre-requisite
		Lect	Lab		
Third Language Courses					
BLLW 1242	Korean Language	1	2	2	
BLLW 1252	German I	1	2	2	
Third Language Courses (For International Students)					
BLLW 1172	Bahasa Melayu Komunikasi	2	0	2	
Faculty Free Module I,II (Subject to course availability)					
BITS 2355	Network Analysis and Design	4	4	5	
BITS 3375	Network Project Management	4	4	5	
BITS 3535	Wireless Networks and Mobile Computing	4	4	5	

Core Module Course Synopsis

BITS 1133 OPERATING SYSTEM & COMPUTER ORGANISATION AND ARCHITECTURE

This course is designed to give an exposure to students about basic concepts, theory, technology and techniques used in computer organisation, computer architecture, and operating system such as different types of memory, Input / Output, CPU scheduling, process, thread, and concurrency. Besides that, the architectural issues such as instruction set design and data types are also covered. In addition, students will be introduced to Linux operating system at basic administrative level.

BITS 1323 CLOUD COMPUTING FUNDAMENTAL

This course takes you beyond the definitions of cloud computing and into the realm of architecture-driven practices and principles. It will lead you from start to finish with the essential concepts and technologies of cloud computing, its history, innovation, and business rationale. The course will use informative case studies to illustrate the rich and real-world landscape of organizational decision making as it relates to cloud adoption and implementation. You will be exposed to cloud architectural models, service requirements, infrastructure, and security.

BITS 1513 CLOUD COMPUTING SERVICES

Cloud computing is a method of computing using shared resources and delivers computing services over the Internet. It lowers the cost of services to businesses and individuals, highly scalable and eliminating idle resources. Software as a service (SaaS) is one of the cloud service models alongside infrastructure as a service and platform as a service. This course is designed to build knowledge and skills in SaaS. Students will be exposed to the key concepts, principles and practices in SaaS. Topics

on technical challenges of SaaS such as scalability, multi-tenancy, connectivity, and monitoring will be covered. Significant examples of SaaS applications will be discussed to strengthen the understanding of this course.

BITS 2543 COMPILATION TECHNOLOGY

Know the nature and status of the "Compiling Principles" course, and know the research scope, analytical framework, research methods and application fields of this course. Understand the main concepts, rationale and methods of this course, especially analysis, implementation and code generation. Learn to use some specific lexical and grammatical analysis methods, such as top-down recursive descent and LL analysis, bottom-up priority analysis and LR analysis. Learn semantic analysis and management of the runtime storage environment. Master intermediate code generation, intermediate code optimization, and object code generation. Develop the ability to analyze and implement small and medium compilers.

BITS 2433 CLOUD SECURITY FUNDAMENTAL

Cloud computing are key technologies in building large-scale Internet services and have been widely adopted by industry to save capital and operating expenses. However the cloud computing technologies give rise to new security concerns. This course covers cloud security, the risks and vulnerabilities and designing secure cloud computing. The content of this course cover management, governance, audit, legal issues, and meeting regulatory compliance. Topic related to cloud computing security infrastructure such as secure isolation, application security, data protection, access control, privacy, key management, provisioning, identity and authorization management, high-availability, management, and compliance in a cloud-enabled environment will also be covered in this course.

Specialisation Module Course Synopsis

BITS 1225 WINDOWS SYSTEM MANAGEMENT AND NETWORK SERVICES

Windows System Management and Application, a basic course in cloud computing specialty with the subsequent potential courses Enterprise Network Technology and Application, Virtualization Technology and Storage Technology and Application. Mainly targeted at the skills of Windows system configuration, network service construction and system maintenance needed by relevant posts such as Windows system operation and maintenance, through the teaching method of combining theory with practice, it enables students to master the use method of Windows Server 2019 operating system, build enterprise network basic environment, manage network structure and users, allocate network resources reasonably, and provide network services, and monitor and maintain server data resources.

BITS 1235 LINUX SYSTEM MANAGEMENT AND NETWORK SERVICES

Linux System Management and Network Services is a core basic course in cloud computing technology and application. Its leading courses are Operating System Principles and Data Structure and subsequent courses are Virtualization Technology and OpenStack Cloud Platform Technology. According to the general design requirements of the cloud computing course system with priority to practical purpose, mainly targeted at the skills of operating system management, common service management and operation system tuning that system administrators, system engineers, system architects and other relevant posts need to master, combined with the characteristics of the practical application of cloud computing, it enables students to learn to analyze the system deployment structure as well as system failure issues and resolve common system issues and improve system tuning and troubleshooting ability in the process of completing project tasks

BITS 2535 ENTERPRISE NETWORK TECHNOLOGY AND APPLICATION

Enterprise Network Technology and Application is a core basic course of cloud computing specialty. Its leading courses are Windows System Management and Network Services and Linux System Management and Network Services. According to the overall design requirements of the training programme for cloud computing professionals, mainly targeted at the basic operation and maintenance skills of software and hardware required by relevant posts such as system management and system operation and maintenance, and combined with the characteristics of cloud computing profession, it enables students to learn to use the knowledge they have learnt to deal with the common issues of enterprise network including but not limited to OSI reference model, Ethernet encapsulation, VLAN technology and communication. Switch configuration and management, RIP and OSPF protocol, router configuration and management, network information security, network operation and maintenance under different operating systems and give solutions in the process of completing project tasks so as to enhance the network-related comprehensive processing ability.

BITS 2135 STORAGE TECHNOLOGY AND APPLICATION

Storage Technology and Application is a core basic course of cloud computing specialty. Its leading courses are Linux System Management and Network Services, Enterprise Network Technology and Application and subsequent courses are potentially OpenStack Cloud Platform Technology and Automation Operation and Maintenance. According to the overall design requirements of cloud computing professionals training programme, mainly targeted at storage equipment, storage system, distributed storage and cloud storage required for cloud platform storage engineers, cloud platform operation and maintenance engineers and other relevant posts, with principles as the groundwork and tasks as the drive, it achieves the design, implementation, operation and maintenance of private cloud storage platform.

BITS 2555 VIRTUALIZATION TECHNOLOGY

Virtualization Technology is a core course of cloud computing specialty. Its leading courses are Windows System Management and Network Services and Linux System Management and Network Services. According to the overall design requirements of the training programme for cloud computing professionals, mainly targeted at setup and application of cloud platform skills required for positions related to virtualization technology and using virtualization knowledge, combined with the characteristics of cloud computing, it enables students to learn to set up, apply, operate and maintain a platform using virtualization and improve the ability to resolve comprehensive virtualization troubles using this technology in the process of project task completion.

BITS 2565 PYTHON PROGRAMMING

Python Programming is a core disciplinary course in cloud computing technology and application specialty. Its leading courses are Compilation Technology and Object-Oriented Programming. According to the general design requirements of the cloud computing curriculum system with priority to practical purpose, mainly targeted at the Python language foundation and the Python object-oriented programming skills required for system engineers, cloud platform development engineers and other relevant posts, and combined with the characteristics of cloud computing specialty, it enables students to learn Python operation and maintenance skills in the process of completing project tasks.

BITS 3565 OPENSTACK CLOUD PLATFORM TECHNOLOGY

OpenStack Cloud Platform Technology is a core course of cloud computing specialty. Its leading courses are Linux System Management and Network Services, Enterprise Network Technology and Application, Virtualization Technology and Storage Technology and Application and subsequent potential courses are Automation Operation and Maintenance. According to the overall design requirements of cloud computing professional personnel training programme, mainly targeted at the OpenStack multi-machine setup required for cloud platform system engineers, cloud platform operation and maintenance engineers, cloud platform architects and other relevant posts; OpenStack HA Application; OpenStack command line application and OpenStack operation and maintenance skills, with principles as foundation and tasks as drive, achieves the design, implementation, operation and maintenance of private cloud platform.

BITS 3575 AUTOMATED OPERATION AND MAINTENANCE

Automation Operation and Maintenance is a core course of cloud computing specialty. Its leading courses are Linux System Management and Network Services, Operating System Principles and Enterprise Network Technology and Application. According to the general design requirements of the training programme for cloud computing professionals, mainly targeted at the automatic maintenance skills for production environment servers using puppet and required for automatic operation and maintenance engineers, and combined with the characteristics of cloud computing, it

enables students to learn to deploy applications using Puppet tools and get the ability to maintain production environment servers using puppet during project tasks.

Final Year Project Module Course Synopsis

BITU 3974 FINAL YEAR PROJECT 1

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

BITU 3984 FINAL YEAR PROJECT 2

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

Bachelor of Computer Science (Computer Networking) with Honours

Programme Details

Bachelor of Computer Science (Computer Networking) - **BITC** is aimed to produce highly knowledgeable and skilful graduates in the field of information technology and communication. Graduates are competent in advanced specialised knowledge and skill in analysing, developing, installing, administrating, servicing and controlling the networking system and communication.

Graduate Competency

With the implementation of TVET curriculum, at the end of this program, all BITC students will gain the following competencies:

1. Demonstrate thorough understanding of switching, routing, network hardware, software, protocols, and services to effectively plan, design, install, configure, troubleshoot, and analyze complex network infrastructures.

2. Develop skills in network administration and security tools to perform traffic analysis, conduct security assessments, monitor networks, and implement cybersecurity measures.

3. Apply project management principles and techniques within networking contexts, including defining scopes, gathering requirements, assessing risks, and utilizing relevant tools to support effective planning and execution of network-related tasks.

4. Communicate technical network concepts clearly and collaboratively by designing presentations and reports that meet industry standards and facilitate teamwork.

5. Build a strong foundation in data structures, algorithms, software engineering, and cybersecurity while demonstrating professionalism, ethical responsibility, adaptability, and effective collaboration within networking environments.

Career Prospects

There is a wide range of career opportunities in the field of computer science and information technology available for graduates who are specialised in Computer Networking, either in the government sector or private sector, as well as undertaking business ventures of their own.

Among the career opportunities are:

1. Network Analyst
2. Network System Engineer
3. Network Specialist
4. System Analyst
5. Network Manager
6. Information System Executive
7. Software Developer

Other than that, the graduates also can further their studies at postgraduate level.

Duration of Studies

Mode	Durations of studies	
	Minimum	**Maximum**
Full-time	7 semesters (3.5 years)	11 semesters (5.5 years)
Part-time	13 semesters (5 years)	29 semesters (10 years)

Programme Educational Outcome (PEO)

Programme Educational Objectives (PEO)	
After 4 years of graduation, graduates of the Bachelor of Computer Science (Computer Networking) are expected to become computing practitioners who are able to:	
PEO 1	provide computer networking solutions to complex computing problems using knowledge and technical skills that meet industry needs.
PEO 2	possess leadership characteristics, communication and interpersonal skill in engaging with industry and community
PEO 3	practice lifelong learning with entrepreneurial mindset to improve professional know-how and career development.

PEO 4	uphold professional practices and ethics with integrity principles in fulfilling their responsibilities.

Program Learning Outcome (PLO)

Upon completion of the programme, graduates should be able to:	
PLO 1	analyse computing problems using computer science knowledge.
PLO 2	apply appropriate computer science solutions for computer networking problems.
PLO 3	construct solutions using appropriate computing methods for complex problems.
PLO 4	demonstrate social skills and responsibilities in engaging with society, community and stakeholders.
PLO 5	exhibit effective communication through oral and written modes in engaging with society, community and stakeholders.
PLO 6	deploy a broad range of software or tools to solve industry computing problems.
PLO 7	apply numeracy skills to solve computing problems.
PLO 8	demonstrate leadership characteristics and contribute independently as individual or member in a team to solve computing problems.
PLO 9	demonstrate capabilities in information management, lifelong learning and independent study.
PLO 10	utilise an entrepreneurial mindset in delivering solutions.
PLO 11	uphold professionalism, attitudes and ethical values in workplace.

Curriculum Structure

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

COMPONENT (COURSES)	CREDIT HOURS
University Compulsory (W)	18
Core Computing (P)	18
Discipline Core (P)	36
Specialization (K)	24
Free Elective (E)	6
Final Year Project (P)	6
Industrial Training (P)	12
	120

List of Courses for Each Semester

Year 1 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLHW 1762	Philosophy and Current Issues	W	2	
BLLW 1142	English for Academic Purposes	W	2	
BITP 1323	Database	P	3	
BITP 1113	Programming Technique	P	3	
BITS 1123	Computer Organisation and Architecture	P	3	
BITS 1313	Data Communication and Networking	P	3	
Total Credit			16	

Year 1 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLLW 12*2	Third Language[1]	W	2	
BKK* ***1	Co-Curriculum I	W	1	
BITS 1213	Operating System	P	3	
BITP 1223	System Analysis and Design	P	3	
BITI 1113	Artificial Intelligence	P	3	
BITP 1123	Data Structures and Algorithm	P	3	BITP 1113
BITI 1233	Discrete Structures	P	3	
Total Credit			18	

[1] For International Students, change to BLHW 2752 Malaysian Culture.

Year 2 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLLW 2152	Academic Writing	W	2	BLLW 1142
BLHW 2772	Penghayatan Etika dan Peradaban[1]	W	2	
BITM 2313	Human Computer Interaction	P	3	
BITP 3113	Object Oriented Programming	P	3	
BITM 1213	Graphic Visualization and Computational Modelling	P	3	
BITS 2313	Local Area Network	K	3	BITS 1313
BITU 2913	Workshop I	K	3	BITP 1113
Total Credit			19	

[1] For International Students, change to BLLW 1282 Bahasa Melayu Komunikasi 2.

Year 2 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLHW 2792	Kursus Integriti Anti Rasuah	W	2	
BKK* ***1	Co-Curriculum II	W	1	
BITP 2223	Software Requirement and Design	P	3	

BITP 2113	Algorithm Analysis	P	3	
BITS 3423	Information Technology Security	P	3	
BITS 2323	Wide Area Network	K	3	BITS 2313
BITS 2333	Network Analysis and Design	K	3	BITS 2313
Total Credit			18	

Year 3 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLLW 3162	English for Professional Interaction	W	2	BLLW 2152
BITP 3143	Distributed and Parallel Application Development	P	3	
BITU 3923	Workshop II	K	3	BITU 2913
BITS 3313	Network Administration and Management	K	3	BITS 2313
BITS 3323	Network Project Management	K	3	BITS 1313
Bxxx xxx3	Free Module 1	E	3	
Total Credit			17	

Year 3 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BTMW 4012	Technology Entrepreneurship	W	2	
BITP 3153	Platform Based Development	P	3	
BITP 3463	Professional Practices in Computing	P	3	
BITS 3553	Emerging Network Technologies	K	3	
BITU 3973	Final Year Project I	P	3	BITU 3923
Bxxx xxx3	Free Module 2	E	3	
Total Credit			17	

Year 3 Semester 3		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITU 3983	Final Year Project II	P	3	BITU 3973
Total Credit			3	

Year 4 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITU 3926	Industrial Training	P	6	
BITU 3946	Industrial Training Report	P	6	
Total Credit			12	

List of Courses in Free Module

Course Code	Course Name	Credit
BITS 3343	Fiber Optic	3
BITS 2573	Cloud Computing Foundation	3
BITS 3483	Network Security	3
BITS 3443	Digital Forensics	3
BITM 1123	Interactive Media Authoring	3
BITM 2113	Web Application Development	3
BITM 2123	Digital Audio and Video Technology	3
BMIP 3122	Manufacturing Sustainability	3
BTMP 2243	Strategic Innovation Management	3
BTMP 3523	Industrial Leadership	3
BTMT 3323	Contemporary Business Management	3
BTMT 3383	Social Entrepreneurship	3
BTMU 1093	Business Statistics	3

Third Language Courses

Course Code	Course Name	Credit
BLLW 1212	Arabic I	2
BLLW 1222	Mandarin I	2
BLLW 1232	Japanese I	2
BLLW 1242	Korean Language	2
BLLW 1252	German I	2

Course Synopsis

Core Courses

BITP 1323 DATABASE
Learning Outcomes
By the end of the course, students should be able to:

1. Identify essential database and data modeling concepts including data queries in data management.
2. Construct data models and queries based on given database application scenarios.
3. Report the database concepts, data modeling and data queries for a database application development.

Synopsis
This course provides a comprehensive introduction to the core concepts and practical skills necessary for effective database management. Students will gain a solid foundation in understanding databases, data modeling, executing SQL queries, and developing simple database systems. At the end of this course, students will have gained a comprehensive understanding of database fundamentals and the practical skills required to design, manage, and interact with databases effectively. The course will prepare students to step into roles as database designers and developers, enabling them to apply their knowledge in diverse professional environments and providing a solid foundation for further studies in advanced database courses.

BITP 1113 PROGRAMMING TECHNIQUE
Learning Outcomes
By the end of the course, students should be able to:

1. Apply the fundamental of programming technique like coding, tracing and debugging in troubleshooting program applications.
2. Construct computer program codes by applying suitable programming tools, structures and techniques.

3. Demostrate the ability to use suitable programming techniques in problem solving.

Synopsis

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

BITS 1123 COMPUTER ORGANIZATION AND ARCHITECTURE

Learning Outcomes

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

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Construct a basic function of computer system.

Synopsis

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

BITS 1313 DATA COMMUNICATION AND NETWORKING

Learning Outcomes

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

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

Synopsis

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

BITS 1213 OPERATING SYSTEM

Learning Outcomes

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

1. Demonstrate understanding on the basic concepts, components, design, and functionalities used in operating system.
2. Present knowledge on the operating system management and administration
3. Display the basic administrative task on commonly used operating system.

Synopsis

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

BITP 1223 SYSTEM ANALYSIS AND DESIGN

Learning Outcomes

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

1. Illustrate the information systems and system development methodology.
2. Manipulate suitable system development methodology to plan, analyze, and design a new system.
3. Report the system planning, analysis, and design based on suitable system development methodology.

Synopsis

Students will be introduced to a variety of information systems and system development lifecycles. Then, the system development methodology will be explained with different approaches - structured approach and object-oriented approaches. Next, it discusses the planning phase with a focus on project identification, selection, initiation, and planning. The analysis phase will emphasize the determination and structuring of user requirements. The design phase then discusses the database, input, output, interface, and dialogue design. The final phase of system development will cover the implementation and software quality assurance. Object-oriented concepts with common UML diagrams are also introduced in general as different approaches to system analysis and design methodology.

Discipline Core Courses

BITI 1113 ARTIFICIAL INTELLIGENCE

Learning Outcomes

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

1. Explain basic algorithms from area of Artificial Intelligence.
2. Apply selected algorithm(s) from area of Artificial Intelligence in solving problems.
3. Demonstrate ideas behind different Artificial Intelligence algorithms and their use.

Synopsis

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

BITP 1123 DATA STRUCTURE AND ALGORITHM

Learning Outcomes

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

1. Illustrate the fundamental of data structures and algorithm analysis.
2. Construct programs which implement various data structures approach.
3. Demonstrate the implementation of data structure in problem solving.

Synopsis

This course aims to develop students' knowledge in data structures. Students will be introduced to abstract data type (ADT) concept. The course then introduces the problem-solving using recursion. Students will learn essential data structures like linear and linked list, stack, queue, tree, graph and heaps, along with the operations for maintaining them. The course then discusses various common data structure algorithms. Throughout the semester, students will also be exposed on applying these data structures in solving various problems.

BITI 1233 DISCRETE STRUCTURES

Learning Outcomes

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

1. Know the concepts and techniques of discrete structures.
2. Demonstrate the concepts of formal language and grammar in Computer Science.
3. Demonstrate analytical skills in constructing program correctness in Computer Science.

Synopsis

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

BITM 2313 HUMAN COMPUTER INTERACTION

Learning Outcomes

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

1. Apply the concepts and theories of human computer interaction in designing user interfaces various platforms.
2. Show conceptual thinking in problems solving in system/application development.
3. Demonstrate usability and evaluation activities.

Synopsis

This subject introduces the concept of HCI and its relationship in system/application development. It focuses on optimizing user experiences and making technology more accessible as well as user-friendly. The topics include the basic understanding of multidisciplinary aspect of HCI comprises cognitive psychology, user interface design, interaction design, usability, and evaluation. Other current topics such as universal access, assistive technologies and culture-sensitive design are also discussed in this course.

BITM 1213 GRAPHICS VISUALISATION AND COMPUTATIONAL MODELLING

Learning Outcomes

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

1. Demonstrate principle of graphics visualisations in real world context.
2. Identify computational modelling technique in solving real world problem.
3. Propose creative and innovative strategies for visualizing data.

Synopsis

This course offers an interdisciplinary approach to graphics visualization and computational modeling. Students will learn to create impactful graphics for data representation and explore computational methods for modeling real-world phenomena. Through hands-on projects, they'll gain proficiency in graphic design tools, data visualization techniques, and computational modeling software. By course completion, students will possess the skills to visualize data effectively, analyze models, and communicate insights across various disciplines.

BITP 3113 OBJECT ORIENTED PROGRAMMING

Learning Outcomes

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

1. Assess object-oriented programming principles.
2. Construct programs that implement object-oriented principles.
3. Demonstrate the implementation of object-oriented concepts in problem-solving.

Synopsis

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

BITP 2223 SOFTWARE REQUIREMENTS AND DESIGN

Learning Outcomes

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

1. Analyze software requirement and design the software using object oriented approach
2. Construct software analysis model and software design model using object oriented approach.

3. Write formal software requirements specification and software design document.

Synopsis

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

BITS 3423 INFORMATION TECHNOLOGY SECURITY

Learning Outcomes

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

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

Synopsis

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

BITP 1143 ALGORITHM ANALYSIS

Learning Outcomes

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

1. Illustrate the fundamental of algorithm analysis.
2. Construct programs which implement various algorithmic approach.
3. Demonstrate the implementation of appropriate algorithms in problem solving

Synopsis

This course aims to develop students' knowledge in algorithm analysis. Students will be introduced to abstract data type (ADT) concept. The course then introduces the analysis of algorithm efficiency, followed by problem-solving using recursion. Students will learn essential data structures like linear and linked list, stack, queue, tree, graph and heaps, along with the operations for maintaining them. This course will also enable students to analyze source codes by taking into consideration the efficiency of algorithms. The course then discusses various common searching and sorting

algorithms, followed by problem-solving using greedy and string matching algorithms. Throughout the semester, students will also be exposed on applying algorithms complexity in solving various problems.

BITP 3143 DISTRIBUTED AND PARALLEL APPLICATION DEVELOPMENT

Learning Outcomes

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

1. Apply the suitable concept of distributed and parallel in application development.
2. Construct the software application in distributed and parallel environment.
3. Demonstrate the principle of distributed and parallel programming in building efficient and scalable application.

Synopsis

This course introduces the concepts of distributed and parallel computing. Topics covered include architectural patterns, I/O fundamentals, distributed application development with TCP and UDP programming, multithreading, concurrency, the Fork/Join framework, and performance testing of Fork/Join applications. Upon completion of this course, students will be able to understand the fundamental concepts of distributed and parallel computing, apply architectural patterns to design distributed and parallel applications, use I/O effectively in distributed and parallel applications, develop distributed applications using TCP and UDP programming, understand the basics of multithreading, apply concurrency concepts to design and develop parallel applications, use the Fork/Join framework to develop parallel applications, and perform performance testing of Fork/Join applications.

BITP 3153 PLATFORM-BASED DEVELOPMENT

Learning Outcomes

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

1. Apply the concepts and the principles of web and mobile technologies for application development.
2. Construct both frontend and backend applications including database on web server with the current platform-based framework.
3. Demonstrate multi-user platform-based applications that employ web and mobile principles and methodologies.

Synopsis

Recent developments in the evolution of computing have addressed diverse social and industry needs requiring the collection of different platforms. This course concentrates on designing and developing software applications for specific platforms, with particular attention to web and mobile platforms. This platform-based development involved working with ecosystems and environments that are resource-constrained, feature-restricted, and energy-efficient. Thus, the skills of developing concerning services, APIs, and hardware are covered within the course curriculum, including programming paradigms, component libraries, and security. This course involves significant practical programming components focusing on different platform concepts with a broad range of theoretical and technical advances.

BITP 3463 PROFESSIONAL PRACTICES IN COMPUTING

Learning Outcomes

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

1. Report technical issues to diverse audience using relevant digital tools.
2. Explain effects of societal change due to technology.
3. Integrate effective problem solving within professional computing context.

Synopsis

This subject provides an in-depth examination of the societal effects and real-world uses of technology. Students will learn the importance of interdisciplinary project development and effective communication. This subject also examines the social implications of technology and user-centric approaches towards developing a quality computing solution.

Specialization Courses

BITS 2313 LOCAL AREA NETWORK

Learning Outcomes

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

1. Identify the suitable hardware, software, services and protocols that influence LAN design.
2. Propose the suitable LAN design using appropriate hardware, software, services and protocols.
3. Display understanding of LAN setup and the alternative that exist in the selection of technologies when designing and implementing LANs.

Synopsis

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

BITS 2323 WIDE AREA NETWORK

Learning Outcomes

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

1. Identify the suitable hardware, software, services and protocols that influence WAN topology and design.
2. Propose the suitable WAN topology and design using appropriate hardware, software, services and protocols.
3. Display understanding of WAN setup and the alternative that exist in the selection of technologies when designing and implementing WANs.

Synopsis

This course introduces the concepts, practices, and technologies used in the design and implementation of Wide Area Networks. Topics will include overview of network

fundamentals, considerations for LAN and WAN implementations, network security requirement, and trends in the carrier network services. Students will also be able to understand, explain and apply the fundamentals of Wide Are Network technology concepts and skills in network applications, troubleshooting, and preparing for CCNA examinations.

BITU 2913 WORKSHOP I

Learning Outcomes

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

1. Present the result of tasks given in verbal or written form.
2. Integrate digital skills in developing a system.
3. Demonstrate life-long learning capability to propose a solution for an IT domain problem.
4. Report the completed system in a professional manner, both verbally and in writing.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in developing and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project, while upholding the professional ethics and integrity. Students must use the techniques learned in programming technique and database courses to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and defend the project. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. This course will also introduce the students to intellectual property rights and infringement to avoid common errors, such as plagiarism.

BITU 3923 WORKSHOP II

Learning Outcomes

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

1. Identify project scopes relevant to their major that align with market or industry needs.
2. Construct a project by applying the principles of system analysis, design, and solution implementation, as relevant to the practices learned in previous courses.
3. Work as a team to complete the project within the given time.
4. Produce the required report and present the project output.

Synopsis

This project provides an opportunity to the student to practice their knowledge and experience gained from previous subjects. This subject also develops the students understanding of problem-solving techniques to solve a particular problem based on

their respective project scopes. The project scope is based on their majoring, and they are required to develop their projects in groups of four or five.

BITS 2333 NETWORK ANALYSIS AND DESIGN

Learning Outcomes

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

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

Synopsis

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

BITS 3313 NETWORK ADMINISTRATION AND MANAGEMENT

Learning Outcomes

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

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

Synopsis

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

BITS 3323 NETWORK PROJECT MANAGEMENT

Learning Outcomes

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

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

Synopsis

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

BITS 3553 EMERGING NETWORKS TECHNOLOGIES

Learning Outcomes

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

1. Explain on the concept, architecture, and application of the related emerging technologies.
2. Propose solution to meet current trend and improve open issues that related emerging networking technologies.
3. Demonstrate the application of the emerging technology based on the right fundamental practice.

Synopsis

This course will provide state-of-art of emerging technologies in networking which covers topics in three main areas: smart networking technologies and application, cloud technologies, and wireless communication. For each topic, students will be introduced to the platform, system architecture, and principle designs. In addition, existing barriers, challenges, and opportunities of emerging internetworking technology and security are presented. This course explores the latest trends and advancements in network technologies. Students will gain an understanding of cutting-edge concepts, protocols, and architectures that are shaping the future of networking. The course will cover both theoretical foundations and practical applications of emerging network technologies.

Free Modules Courses

BITS 3343 FIBER OPTIC

Learning Outcomes

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

1. Illustrate the concept of fiber optic basic theories.
2. Assemble the suitable cable and network devices for fiber optic.
3. Demonstrate a network design using fiber optic cable and appropriate tools.

Synopsis

This subject covers basic and advanced applications that will relate to optical fiber in common usage in the network. Specific mechanism will be discussed from operating principles of optical communication device to fiber optic communication technology.

BITS 2573 CLOUD COMPUTING FOUNDATION

Learning Outcomes

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

1. Present knowledge on the term, concept, automation, management, and administration of Cloud Computing.
2. Perform different user interaction in a variety of storage models in Cloud environment.
3. Demonstrate the different application managed services and secure networks in the cloud.

Synopsis

This course teaches the student on how to develop technical proficiency in cloud computing and launch or pivot to careers in a cloud-first world. It will provide a detailed overview of concepts covering cloud basics, big data, and machine learning and where and how Cloud Computing fits in. Starts with an overview of cloud computing and then dives deeper into two areas - cloud computing infrastructure, and big data and machine learning. By the end of the course, students will be able to articulate concepts around cloud computing, big data, and machine learning and demonstrate some hands-on skills.

BITS 3483 NETWORK SECURITY

Learning Outcomes

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

1. Identify security threats, vulnerabilities, and attacks to determine appropriate network security measures. (C4) (C2)
2. Manipulate network security tools and technologies to enhance cybersecurity defenses. (P3) (C3A)
3. Demonstrate a security-conscious mindset by proposing a secure network design based on cybersecurity best practices. (A3) (C3D)

Synopsis

This course introduces fundamental principles of network security, focusing on threats, vulnerabilities, and attacks in various environments. Students will identify security risks, analyze their impact, and determine appropriate protection measures. The course covers authentication mechanisms, secure network protocols, cloud and virtualization security, endpoint protection, and network security technologies. Learners will manipulate security tools to enhance cybersecurity defenses and demonstrate a security-conscious mindset by proposing secure network designs. Through practical applications, students will develop essential technical skills and critical thinking in securing networks against evolving cyber threats.

BITS3443 DIGITAL FORENSICS

Learning Outcomes

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

1. Describe the concept of digital forensic and investigation.
2. Distinguish multi-operating system nuance with respect to digital forensics.
3. Manipulate the process of forensic investigation using particular tools by referring the digital forensic investigation methodology.

Synopsis

This course is an introduction to digital forensics reflects the need for conducting professional computing investigations. Students will explore general computer investigations, security issues with operating systems, setup and maintenance of a digital forensics lab, use of computer forensics tools, digital evidence controls, data acquisition and analysis, e-mail investigations, and the preparation of investigation report.

BITM 1123 INTERACTIVE MEDIA AUTHORING

Learning Outcomes

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

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

Synopsis

This course introduces students to the process of developing an interactive media project, from planning to final product. Students will learn about instructional design, e-learning standards, and how to create engaging learning content. They will gain hands-on experience using relevant tools to design and build interactive learning materials. Students are also expected to work well in teams, manage time effectively, and show creativity and responsibility in completing their project and report by the end of the semester.

BITM2113 WEB APPLICATION DEVELOPMENT

Learning Outcomes

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

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

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are Client Site Technologies: HTML, XHTML, HTML5, CSS, XML, and JavaScript, Server Site Technologies: PHP, Database Server: MySQL and Web Servers : Apache. This course also brings together all of the elements of Web site design, graphics, animation, data storage in the construction of fully functional commercial Web site applications.

BITM2123 DIGITAL AUDIO AND VIDEO TECHNOLOGY

Learning Outcomes

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

1. Demonstrate the knowledge of digital audio and video principles with current technology.
2. Assemble an audio and video solution using suitable software and hardware that can be used to convey information effectively.
3. Follow audio and video production procedures by adapting industry standard practices in a production team.

Synopsis

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

BMIP 3122 MANUFACTURING SUSTAINABILITY

Learning Outcomes

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

1. Describe the sustainable development concepts, scope, and the impacts in aspects of manufacturing.
2. Apply sustainable manufacturing, including the 6 R's, in relation to environmental regulations and the implications in business process.
3. Evaluate impact of manufacturing on environment, economy and social sustainability.

Synopsis

This course is designed to provide students with an understanding of sustainability issues, the concepts and the scope of Sustainable Manufacturing (SM), the strategies in SM, the management approaches in SM, and tools commonly used in SM. In the current situation, integrating sustainability into business process will enhance the business’s total performance and competitiveness. Skills developed and knowledge acquired from this course will prepare students to be environmentally conscious engineers who are sensitive to environment, economic and social/community related problems and capable to solve those problems and enhance total performance of industries.

BTMP 2243 STRATEGIC INNOVATION MANAGEMENT

Learning Outcomes

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

1. Elaborate on knowledge learnt and skills acquired in innovation and management and synthesize the process through strategy-integration
2. Illustrate skills and knowledge and develop mechanisms to create wealth.
3. Organize, formulate changes and determine problem-solving solutions relating to innovation processes and property rights.

Synopsis

This subject discusses strategic imperatives in research implementation and innovation management. Topics include developing research and innovation processes, as well as technology and innovation strategic management. Students will acquire the neccesary knolwedge and skills in innovation processes and management. The subject also discusses intellectual property rights. Case studies will be incorporated to enhance students' understanding on strategic innovation management.

BTMP3523 INDUSTRIAL LEADERSHIP

Learning Outcomes

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

1. Identify and elaborate the theories and importance of industrial leadership.
2. Organize and link the principles of industrial leadership in leading an organization.
3. Nurture and develop effective industrial leadership behaviour according to different organizational situations.

Synopsis

This subject discusses the concepts, theories, strategies and elements of leadership in organizations. Among the topics which also will be discussed are the leadership characterictics, leadership and motivation, empowerment, leadership power and influence, shaping values and culture in the workplace, leading team and leading innovation.

BTMT 3323 CONTEMPORARY BUSINESS MANAGEMENT

Learning Outcomes

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

1. Demonstrate an understanding of technology ventures approaches in advancing the digitisation, disruptive and converging technologies for societal and economic progress in the 4th Industrial Revolution.
2. Critically appraise the impact of digitisation, disruptive and converging technologies on business strategies and competitive advantage in the Industry 4.0.
3. Identify strategic challenges, formulate strategic solutions, and propose new and disruptive business models to take advantage of technology- enabled business opportunities of Industry 4.0.

Synopsis

This subject is designed to develop business talent for the future world of production. Students will be guided through the process of creating, analysing, planning and implementing disruptive and innovative business models with its operational strategies pertaining to the Industry 4.0. Students will be exposed to the theoretical and hands-on exercises of Industry 4.0 business management to enable them to apprehend the concept of the 4th Industrial Revolution. Topics discussed will include the Emergence of Business Model 4.0, 4.0 Products and Services, Industrial Internet of Things (IIoT), Cyber-Physical System, Digital Business Transformation, Digital Enterprise, Smart

Factory, Intelligent Robots and Intelligent Production and Manufacturing. In the hands-on exercises, students will use visualisation software as well as stationary modules or simulators. Students are expected to acquire the skills and knowledge to utilise the Industry 4.0 model in the current and future global marketplace. These would enhance their professional career as a technopreneur, executive or consultant in the field of Industry 4.0 transformation. By the end of this course, students should be able to define, discuss, understand and apply the business strategies and tactics learnt in the context of Industry 4.0.

BTMT 3383 SOCIAL ENTREPRENEURSHIP

Learning Outcomes

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

1. Demonstrates the concept, opportunities and challenges of Social Innovation and Social Entrepreneurship (SISE) for social entrepreneurs and social enterprises
2. Engage in collaborative learning to understand SISE in the context of SISE entrepreneurs and social enterprises
3. Prepare professionally for employment by reflecting on the issues related to SISE entrepreneurs and social enterprises

Synopsis

This course explores the approaches of social innovation and social entrepreneurship (SISE) used by social entrepreneurs to develop innovative social business models and breakthrough solutions to pressing social problems. Students learn about the full range of social business models, including non-profit organisations, businesses that produce income-generating products or services for a social purpose, and socially responsible for-profit businesses. Students must understand how social enterprises use the SISE to develop business models that provide innovative solutions to deep-rooted social challenges. Students will also critically engage with social problems in communities and create innovative strategies for transformative social change. For the course's final project, students will need to design and manage viable SISE projects that target the social beneficiaries or communities they want to transform.

BTMU 1093 BUSINESS STATISTICS

Learning Outcomes

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

1. Identify the statistical terms, properties and procedures.
2. Apply appropriate statistical methods to the different areas of Business.
3. Analyse data for business interpretation and decision making.

Synopsis

This course is related to the application of applied statistics used for problem solving in conducting any business operation. The topics include introduction to statistics, data classification, graphic presentation, central tendency measurement, frequency of spread distribution measurement, concepts of probability, probability distribution, sampling distribution, interval estimation, hypothesis testing, chi-square distribution, variance analysis (ANOVA), simple linear regression analysis, and correlation

analysis. Knowledge acquired will arm students with the competencies in statistics for analyzing and solving daily business problems.

Bachelor of Computer Science (Database Management) with Honours

Programme Details

The Bachelor of Computer Science (Database Management) (BITD) academic programme aims to produce competent graduates in computer science, especially in the database management field. The graduates will be equipped with an in-depth understanding of database foundation including the analysis, design, development, testing of database applications as well as the administration of database systems with the required standards and policy. The programme also provides key and recent technologies to the graduates, making them highly qualified personnel demanded by industry.

Graduate Competency

With the implementation of TVET curriculum, at the end of this program, all BITD students will gain the following competencies:

1. Apply principles of database design to create, implement, and maintain relational and non-relational database systems.

2. Analyse business requirements to develop logical and physical data models, ensuring data consistency, integrity, and efficiency by minimizing data redundancy.

3. Perform essential database administration tasks, including user management, backup and recovery, and implementing robust security measures.

4. Able to write and optimize complex SQL queries including PL/SQL objects for efficient structured and unstructured data management.

5. Able to design and manage data warehousing solutions and apply business intelligence tools to support data-driven decision-making.

Career Prospects

There is a wide range of career opportunities in the field of computer science and information technology available for graduates who are specialised in Database Management. Among the career opportunities are system analyst, system programmer, IT officer, database designer, database application developer, database analyst, data analyst, database administrator, data engineer, and other careers that require expertise in information technology particularly data analysis and management in diverse disciplines. Other than that, the graduates also can further their studies at postgraduate level.

Duration of Studies

Mode	Durations of studies	
	Minimum	**Maximum**
Full-time	7 semesters (3.5 years)	11 semesters (5.5 years)
Part-time	14 semesters (5 years)	29 semesters (10 years)

Programme Educational Outcome (PEO)

Programme Educational Objectives (PEO)	
After 4 years of graduation, graduates of the Bachelor of Computer Science (Database Management) are expected to become computing practitioners who are able to:	
PEO 1	provide database management solutions to complex computing problems using knowledge, numeracy and technical skills that meet industry needs.
PEO 2	possess leadership characteristics, communication and interpersonal skill in engaging with industry and community
PEO 3	practice lifelong learning with entrepreneurial mindset to improve professional know-how and career development.
PEO 4	uphold professional practices and ethics with integrity principles in fulfilling their responsibilities.

Program Learning Outcome (PLO)

Upon completion of the programme, graduates should be able to:	
PLO 1	analyse computing problems using computer science knowledge.
PLO 2	apply appropriate computer science solutions for **database management** problems.

PLO 3	construct solutions using appropriate computing methods for complex problems.
PLO 4	demonstrate social skills and responsibilities in engaging with society, community and stakeholders.
PLO 5	exhibit effective communication through oral and written modes in engaging with society, community and stakeholders.
PLO 6	deploy a broad range of software or tools to solve industry computing problems.
PLO 7	apply numeracy skills to solve computing problems.
PLO 8	demonstrate leadership characteristics and contribute independently as individual or member in a team to solve computing problems.
PLO 9	demonstrate capabilities in information management, lifelong learning and independent study.
PLO 10	utilise an entrepreneurial mindset in delivering solutions.
PLO 11	uphold professionalism, attitudes and ethical values in workplace.

Curriculum Structure

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

COMPONENT (COURSES)	CATEGORY	CREDIT HOURS
University Compulsory	W	18
Computing Core	P	18
Discipline Core	P	36

Specialization	K	24
Free Elective	E	6
Final Year Project	P	6
Industrial Training	P	12
		120

List of Courses for Each Semester

Year 1 Semester 1		**Code**	**Credit**	**Pre-requisite**
Code	**Course**			
BLHW 1762	Philosophy and Current Issues	W	2	
BLLW 1142	English for Academic Purposes	W	2	
BITP 1323	Database	P	3	
BITP 1113	Programming Technique	P	3	
BITS 1123	Computer Organisation and Architecture	P	3	
BITS 1313	Data Communication and Networking	P	3	
BKK* ***1	Co-Curriculum I	W	1	
	Total Credit		17	

Year 1 Semester 2		**Code**	**Credit**	**Pre-requisite**
Code	**Course**			
BITS 1213	Operating System	P	3	
BITP 1223	System Analysis and Design	P	3	
BITI 1113	Artificial Intelligence	P	3	
BITP 1123	Data Structure and Algorithm	P	3	BITP 1113
BITI 1233	Discrete Structures	P	3	
BITP 2313	Database Design	K	3	BITP 1323

BKK* ***1	Co-Curriculum II	W	1	
		Total Credit	19	

Year 2 Semester 1		Code	Credit	Pre-requisite
Code	**Course**			
BLHW 2772	Penghayatan Etika dan Peradaban[1]	W	2	
BITP 3113	Object-Oriented Programming	P	3	
BITM 1213	Graphic Visualization and Computational Modelling	P	3	
BITP 2113	Algorithm Analysis	P	3	BITP 1113
BITP 2413	Database Administration and Security	K	3	BITP 1323
BITU 2913	Workshop I	K	3	BITP 1113
		Total Credit	17	

[1]For International Students, change to BLLW 1282 Bahasa Melayu Komunikasi 2.

Year 2 Semester 2		Code	Credit	Pre-requisite
Code	**Course**			
BLLW 2152	Academic Writing	W	2	BLLW 1142
BITM 2313	Human Computer Interaction	P	3	
BITP 3153	Platform-Based Development	P	3	
BITP 2303	Database Programming	K	3	BITP 1323
BITP 3383	Cloud Data Management	K	3	
BXXX xxx3	Elective 1	E	3	
		Total Credit	17	

Year 3 Semester 1		Code	Credit	Pre-requisite
Code	**Course**			
BLLW12*2	Third Language[2]	W	2	
BITP 2223	Software Requirement and Design	P	3	
BITP 3143	Distributed and Parallel Application Development	P	3	
BITU 3923	Workshop II	K	3	BITU 2913
BITP 3363	Data Warehousing and Business Intelligence	K	3	
BXXX xxx3	Elective 2	E	3	
		Total Credit	17	

[2]For International Students, change to BLHW 2752 Malaysian Culture.

Year 3 Semester 2		Code	Credit	Pre-requisite
Code	**Course**			
BTMW 4012	Technology Entrepreneurship	W	2	
BLHW 2792	Kursus Integriti Anti Rasuah	W	2	
BLLW 3162	English for Professional Interaction	W	2	BLLW 2152
BITP 3463	Professional Practices in Computing	P	3	
BITS 3423	Information Technology Security	P	3	
BITP 3393	Special Topics in Database Technology	K	3	
BITU 3973	Final Year Project I	P	3	BITU 3923
		Total Credit	18	

Year 3 Semester 3		Code	Credit	Pre-requisite
Code	**Course**			
BITU 3983	Final Year Project II	P	3	BITU 3973

Total Credit	3	

Year 4 Semester 1		Code	Credit	Pre-requisite
Code	**Course**			
BITU 3926	Industrial Training	P	6	BITU 3983
BITU 3946	Industrial Training Report	P	6	BITU 3983
		Total Credit	12	

List of Courses in Elective

Course Code	Course Name	Credit	Pre-requisite
BITP 5703	Data Quality Management	3	
BITP 5383	Data Governance and Security	3	
BMIP 3122	Manufacturing Sustainability	3	
BTMT 3323	Contemporary Business Management	3	
BTMT 3303	Seminar in Global Issues and New Business Trends	3	
BTMT 3383	Social Entrepreneurship	3	
BTMP 3243	Strategic Innovation Management	3	
BTMU 1093	Business Statistics	3	
BITM 2113	Web Application Development	3	
BITS 2573	Cloud Computing Foundation	3	
BITP 3233	Strategic Information System Planning	3	
BITP 3253	Software Validation and Verification	3	
BITP 3423	Special Topic in Software Engineering	3	
BITI 2223	Machine Learning	3	BITI 1113
BITS 2313	Local Area Network	3	BITS 1313

BITP 3523	Advanced Database Administration	3	BITP 2413
BITP 3513	Advanced Database Programming	3	BITP2303
BITP 3483	Geographic Information System	3	
BITP 3353	Multimedia Database	3	BITP 1323

List of Third Language Courses

Course Code	Course Name	Credit
BLLW 1212	Arabic I	2
BLLW 1222	Mandarin I	2
BLLW 1232	Japanese I	2
BLLW 1242	Korean I	2
BLLW 1252	German I	2

Course Synopsis

Core Courses

BITP 1113 PROGRAMMING TECHNIQUE

Learning Outcomes

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

1. Apply the fundamental of programming technique like coding, tracing and debugging in troubleshooting program applications.
2. Construct computer program codes by applying suitable programming tools, structures and techniques.
3. Demonstrate the ability to use suitable programming techniques in problem solving.

Synopsis

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

BITS 1123 COMPUTER ORGANIZATION AND ARCHITECTURE

Learning Outcomes

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

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Construct a basic function of computer system.

Synopsis

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

BITS 1313 DATA COMMUNICATION AND NETWORKING

Learning Outcomes

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

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

Synopsis

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

BITP 1323 DATABASE

Learning Outcomes

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

1. Identify essential database and data modeling concepts including data queries in data management.
2. Construct data models and queries based on given database application scenarios.
3. Report the database concepts, data modeling and data queries for a database application development.

Synopsis

This course provides a comprehensive introduction to the core concepts and practical skills necessary for effective database management. Students will gain a solid foundation in understanding databases, data modeling, executing SQL queries, and developing simple database systems. At the end of this course, students will have gained a comprehensive understanding of database fundamentals and the practical skills required to design, manage, and interact with databases effectively. The course will prepare students to step into roles as database designers and developers, enabling them to apply their knowledge in diverse professional environments and providing a solid foundation for further studies in advanced database courses.

BITS 1213 OPERATING SYSTEM

Learning Outcomes

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

1. Demonstrate understanding on the basic concepts, components, design, and functionalities used in operating system.
2. Present knowledge on the operating system management and administration
3. Display the basic administrative task on commonly used operating system.

Synopsis

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

BITP 1223 SYSTEM ANALYSIS AND DESIGN

Learning Outcomes

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

1. Illustrate the information systems and system development methodology.
2. Manipulate suitable system development methodology to plan, analyze, and design a new system.
3. Report the system planning, analysis, and design based on suitable system development methodology.

Synopsis

Students will be introduced to a variety of information systems and system development lifecycles. Then, the system development methodology will be explained with different approaches - structured approach and object-oriented approaches. Next, it discusses the planning phase with a focus on project identification, selection, initiation, and planning. The analysis phase will emphasize the determination and structuring of user requirements. The design phase then discusses the database, input, output, interface, and dialogue design. The final phase of system development will cover the implementation and software quality assurance. Object-oriented concepts with common UML diagrams are also introduced in general as different approaches to system analysis and design methodology.

Discipline Core Courses

BITI 1113 ARTIFICIAL INTELLIGENCE

Learning Outcomes

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

1. Explain basic algorithms from area of Artificial Intelligence.
2. Apply selected algorithm(s) from area of Artificial Intelligence in solving problems.
3. Demonstrate ideas behind different Artificial Intelligence algorithms and their use.

Synopsis

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

BITP 1123 DATA STRUCTURE AND ALGORITHM

Learning Outcomes

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

1. Illustrate the fundamental of data structures and algorithm analysis.
2. Construct programs which implement various data structures approach.
3. Demonstrate the implementation of data structure in problem solving.

Synopsis

This course aims to develop students' knowledge in data structures. Students will be introduced to abstract data type (ADT) concept. The course then introduces problem-solving using recursion. Students will learn essential data structures like linear and linked list, stack, queue, tree, graph and heaps, along with the operations for maintaining them. The course then discusses various common data structure algorithms. Throughout the semester, students will also be exposed on applying these data structures in solving various problems.

BITI 1233 DISCRETE STRUCTURES

Learning Outcomes

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

1. Know the concepts and techniques of discrete structures.
2. Demonstrate the concepts of formal language and grammar in Computer Science.
3. Demonstrate analytical skills in constructing program correctness in Computer Science.

Synopsis

This course introduces the fundamental concepts and techniques of Discrete Mathematics that are needed for computer science. It includes logic, sets, functions,

counting, relations, graphs and trees along with their applications to problems in computer science.

BITP 2113 ALGORITHM ANALYSIS

Learning Outcomes

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

1. Illustrate the fundamental of algorithm analysis.
2. Construct programs which implement various algorithmic approach.
3. Demonstrate the implementation of appropriate algorithms in problem solving.

Synopsis

This course aims to develop students' knowledge in algorithm analysis. Students will be introduced to abstract data type (ADT) concept. The course then introduces the analysis of algorithm efficiency, followed by problem-solving using recursion. Students will learn essential data structures like linear and linked list, stack, queue, tree, graph and heaps, along with the operations for maintaining them. This course will also enable students to analyze source codes by taking into consideration the efficiency of algorithms. The course then discusses various common searching and sorting algorithms, followed by problem-solving using greedy and string-matching algorithms. Throughout the semester, students will also be exposed on applying algorithms complexity in solving various problems.

BITM 1213 GRAPHICS VISUALISATION AND COMPUTATIONAL MODELLING

Learning Outcomes

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

1. Demonstrate principle of graphics visualisations in real world context.
2. Identify computational modelling technique in solving real world problem.
3. Propose creative and innovative strategies for visualizing data.

Synopsis

This course offers an interdisciplinary approach to graphics visualization and computational modeling. Students will learn to create impactful graphics for data representation and explore computational methods for modeling real-world phenomena. Through hands-on projects, they'll gain proficiency in graphic design tools, data visualization techniques, and computational modeling software. By course completion, students will possess the skills to visualize data effectively, analyze models, and communicate insights across various disciplines.

BITP 3113 OBJECT ORIENTED PROGRAMMING

Learning Outcomes

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

1. Assess object-oriented programming principles.
2. Construct programs that implement object-oriented principles.
3. Demonstrate the implementation of object-oriented concepts in problem-solving.

Synopsis

This subject will discuss the concept of object-oriented approaches by using object-oriented programming language. The student will be able to apply and construct the object-oriented programming basic structures (such as polymorphism, inheritance, encapsulation and abstraction), GUI, event handling, exception handling, and database. The student should be able to develop a complete application with database.

BITP 3153 PLATFORM-BASED DEVELOPMENT

Learning Outcomes

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

1. Apply the concepts and the principles of web and mobile technologies for application development.
2. Construct both frontend and backend applications including database on web server with the current platform-based framework.
3. Demonstrate multi-user platform-based applications that employ web and mobile principles and methodologies.

Synopsis

Recent developments in the evolution of computing have addressed diverse social and industry needs requiring the collection of different platforms. This course concentrates on designing and developing software applications for specific platforms, with particular attention to web and mobile platforms. This platform-based development involved working with ecosystems and environments that are resource-constrained, feature-restricted, and energy-efficient. Thus, the skills of developing concerning services, APIs, and hardware are covered within the course curriculum, including programming paradigms, component libraries, and security. This course involves significant practical programming components focusing on different platform concepts with a broad range of theoretical and technical advances.

BITM 2313 HUMAN COMPUTER INTERACTION

Learning Outcomes

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

1. Apply the concepts and theories of human computer interaction in designing user interfaces various platforms.
2. Show conceptual thinking in problems solving in system/application development.
3. Demonstrate usability and evaluation activities.

Synopsis

This subject introduces the concept of HCI and its relationship in system/application development. It focuses on optimizing user experiences and making technology more accessible as well as user-friendly. The topics include the basic understanding of multidisciplinary aspect of HCI comprises cognitive psychology, user interface design, interaction design, usability, and evaluation. Other current topics such as universal access, assistive technologies and culture-sensitive design are also discussed in this course.

BITP 3143 DISTRIBUTED AND PARALLEL APPLICATION DEVELOPMENT

Learning Outcomes

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

1. Apply the suitable concept of distributed and parallel in application development.
2. Construct the software application in distributed and parallel environment.
3. Demonstrate the principle of distributed and parallel programming in building efficient and scalable application.

Synopsis

This course introduces the concepts of distributed and parallel computing. Topics covered include architectural patterns, I/O fundamentals, distributed application development with TCP and UDP programming, multithreading, concurrency, the Fork/Join framework, and performance testing of Fork/Join applications. Upon completion of this course, students will be able to understand the fundamental concepts of distributed and parallel computing, apply architectural patterns to design distributed and parallel applications, use I/O effectively in distributed and parallel applications, develop distributed applications using TCP and UDP programming, understand the basics of multithreading, apply concurrency concepts to design and develop parallel applications, use the Fork/Join framework to develop parallel applications, and perform performance testing of Fork/Join applications.

BITP 2223 SOFTWARE REQUIREMENT AND DESIGN

Learning Outcomes

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

1. Analyze software requirement and design the software using object oriented approach.
2. Construct software analysis model and software design model using object oriented approach.
3. Write formal software requirements specification and software design document

Synopsis

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

BITP 3463 PROFESSIONAL PRACTICES IN COMPUTING

Learning Outcomes

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

1. Report technical issues to diverse audience using relevant digital tools.
2. Explain effects of societal change due to technology.
3. Integrate effective problem solving within professional computing context.

Synopsis

This subject provides an in-depth examination of the societal effects and real-world uses of technology. Students will learn the importance of interdisciplinary project development and effective communication. This subject also examines the social implications of technology and user-centric approaches towards developing a quality computing solution.

BITS 3423 INFORMATION TECHNOLOGY SECURITY

Learning Outcomes

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

1. Report technical issues to diverse audience using relevant digital tools.
2. Explain effects of societal change due to technology.
3. Integrate effective problem solving within professional computing context.

Synopsis

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

Specialization Courses

BITU 2913 WORKSHOP I

Learning Outcomes

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

1. Present the result of tasks given in verbal or written form.
2. Integrate digital skills in developing a system.
3. Demonstrate life-long learning capability to propose a solution for an IT domain problem.
4. Report the completed system in a professional manner, both verbally and in writing.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in developing and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project, while upholding

the professional ethics and integrity. Students must use the techniques learned in programming technique and database courses to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and defend the project. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. This course will also introduce the students to intellectual property rights and infringement to avoid common errors, such as plagiarism.

BITU 3923 WORKSHOP II

Learning Outcomes

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

1. Comply with the concept of intellectual property and the sustainability for the project.
2. Work as a teamwork to complete the project within the given time.
3. Construct the project by applying the concept of system analysis, design and development learnt in the previous subjects

Synopsis

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

BITP 2313 DATABASE DESIGN

Learning Outcomes

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

1. Discover different database design models and their application in database development.
2. Construct data models using relational and non-relational data modeling techniques.
3. Demonstrate solutions for database design issues in relevant applications.

Synopsis

This course emphasizes the importance of database design and presents the fundamental principles and design issues related to non-relational data models like object oriented and object-relational data model together with the enhanced features of ERD (EERD). A practical database design methodology is used to demonstrate the design process which involves not only constructing the data model but also checking and validating the accuracy of the model in line with the user transaction requirements. NoSQL databases concept and design such as document, key-value, wide-column, and graph will also be included. The introduction on the distributed database design are part of the topics delivered to the students too.

BITP 2303 DATABASE PROGRAMMING

Learning Outcomes

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

1. Apply PL/SQL objects for various database operations and applications
2. Manipulate the PL/SQL objects such as procedures, functions, packages and triggers in suitable applications
3. Demonstrate the applicability of database objects in solving relevant problems

Synopsis

This subject introduces the concepts of declarative and procedural language in database applications, using SQL and PL/SQL syntax. This includes the development, implementation and maintenance of database constructs and objects such as variables, cursors, parameters, procedures, functions, packages and database triggers for effective database management in an application. By the end of the course, students will possess valuable skills in PL/SQL programming, vital for careers in database development.

BITP 2413 DATABASE ADMINISTRATION AND SECURITY

Learning Outcomes

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

1. Apply the concepts of database administration and security in terms of DBA roles according to DBMS functions.
2. Demonstrate functions of database administration and security in terms of DBA roles according to DBMS functions.
3. Report on the implementation of administration and security configurations on database to enhance data security and compliance.

Synopsis

In this course, students will step into the roles, challenges, and responsibilities of a database administrator, gaining a deep understanding of the critical tasks involved in managing database systems. They will explore key functions such as optimizing performance, ensuring data integrity, and implementing robust security measures to protect sensitive information. Through hands-on activities, students will apply essential database administration techniques, including backup and recovery, access control, and troubleshooting common issues. By the end of the course, students will be equipped with the practical skills and knowledge needed to effectively administer and secure database systems in various organizational environments.

BITP 3363 DATA WAREHOUSING AND BUSINESS INTELLIGENCE

Learning Outcomes

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

1. Apply the concepts, components and purpose of data warehousing and business intelligence for data-driven decision support within a given business context.
2. Demonstrate data warehouse implementation based on the data warehousing model and lifecycle.

3. Illustrate the application of business intelligence techniques and tools for solving problems in related applications.

Synopsis

This subject focuses on data warehousing fundamentals which includes the importance of data warehousing, multi-dimensional data analysis and factors involved in the analysis, planning, design, loading, maintenance and exploitation of successful data warehouse. It will also cover techniques and tools for business intelligence and data visualization.

BITP 3383 CLOUD DATA MANAGEMENT

Learning Outcomes

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

1. Discover the fundamental concepts and architectures of cloud computing and data storage to distinguish between different cloud service models and deployment types.
2. Analyze cloud database implementation and application in cloud environment ensuring cost efficiency and high data quality.
3. Demonstrate the ability to manage cloud storage, databases, and data management tools, emphasizing best practices in data consistency, security, and availability.

Synopsis

This subject introduces the fundamental concepts of cloud computing and data management, focusing on architectures, deployment models, and storage solutions. This includes cloud networking, security practices, and database implementation including cloud database. The subject covers data integration, data migration strategies, analytics, visualization, and governance in cloud environments. By the end of the course, students will be able to design, implement, and manage cloud-based data solutions while applying best practices and data governance in cloud computing.

BITP 3393 SPECIAL TOPICS IN DATABASE TECHNOLOGY

Learning Outcomes

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

1. Discover the concepts, methods, techniques, and applications of specialized database technology in various real-world contexts and adhering to industry standards
2. Manipulate the techniques of the specialized database technology to solve problems in selected scenarios or case studies
3. Demonstrate the findings or results from the given individual or group tasks and activities for selected scenario or case studies

Synopsis

This course explores advanced and specialized topics within the domain of database technologies, covering cutting-edge concepts, frameworks, and methodologies. Students will have a solid foundation of the specialized topics in data engineering, big data analytics, AI applications in databases, data governance, emerging technologies, and gain insights into the future directions and research frontiers in the field. Through

hands-on activities and real-world scenarios, students will discover, apply, and present specialized database techniques, preparing them to meet industry standards and solve complex data challenges. The topics covered in this course may vary or change depending on the latest technology trends.

Elective Courses

Elective I

BITP 5703 DATA QUALITY MANAGEMENT

Learning Outcomes

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

1. Assess data quality management processes by identifying and proposing solutions for data quality issues.
2. Explain the impact of data quality issues based on selected case studies.
3. Propose strategies for data quality management implementation.

Synopsis

This course covers data quality management strategies across the data lifecycle. It emphasizes architecting for reliability and introduces the ISO 8000-61 standard for managing quality at scale. Topics include ISO processes, capability maturity models, implementation considerations like organizational factors, and real-world case studies. Additionally, the course prepares organizations for implementing data quality management, highlighting the human factor's impact on data quality, and provides insights from real-world case studies to equip students with practical knowledge.

BITP 5383 DATA GOVERNANCE AND SECURITY

Learning Outcomes

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

1. Describe the concepts, techniques, and issues in the data governance and security in enterprise systems, based on internal data standards and policies that also control data usage.
2. Discuss the challengers and pillars of data governance.
3. Demonstrate the ability to apply the framework, best practices and implementation of ensuring data security.

Synopsis

The aim of this course is to teach students the process of managing the availability, usability, integrity and security of the data in enterprise systems, based on internal data standards and policies that also control data usage. They will also explore how to manage organizations' evolving data privacy regulations, effective data governance, ensuring the consistency and trustworthiness of data. Topics include the introduction of data governance, the framework, best practices and implementation of ensuring data security. The topic will also include the challenges and pillars of data governance.

BITP 2573 CLOUD COMPUTING FOUNDATION

Learning Outcomes

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

1. Explain the term, concept, automation, management, and administration of cloud computing.
2. Perform different user interaction in a variety of storage models in cloud environment.
3. Demonstrate the different application managed services and secure networks in the cloud.

Synopsis

This course teaches the student how to develop technical proficiency in cloud computing and launch or pivot to careers in a cloud-first world. It will provide a detailed overview of concepts covering cloud basics, big data, and machine learning and where and how Cloud Computing fits in. Starts with an overview of cloud computing and then dives deeper into two areas - cloud computing infrastructure, and big data and machine learning. By the end of the course, students will be able to articulate concepts around cloud computing, big data, and machine learning and demonstrate some hands-on skills.

BMIP 3122 MANUFACTURING SUSTAINABILITY

Learning Outcomes

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

1. Describe the sustainable development concepts, scope, and the impacts in aspects of manufacturing.
2. Apply sustainable manufacturing, including the 6 R's, in relation to environmental regulations and the implications in business process.
3. Evaluate impact of manufacturing on environment, economy and social sustainability.

Synopsis

This course is designed to provide students with an understanding of sustainability issues, the concepts and the scope of Sustainable Manufacturing (SM), the strategies in SM, the management approaches in SM, and tools commonly used in SM. In the current situation, integrating sustainability into business process will enhance the business’s total performance and competitiveness. Skills developed and knowledge acquired from this course will prepare students to be environmentally conscious engineers who are sensitive to environment, economic and social/community related problems and capable to solve those problems and enhance total performance of industries.

BTMP 3243 STRATEGIC INNOVATION MANAGEMENT

Learning Outcomes

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

1. Elaborate on knowledge learnt and skills acquired in innovation and management and synthesize the process through strategy-integration
2. Illustrate skills and knowledge and develop mechanisms to create wealth.

3. Organize, formulate changes and determine problem-solving solutions relating to innovation processes and property rights.

Synopsis

This subject discusses strategic imperatives in research implementation and innovation management. Topics include developing research and innovation processes, as well as technology and innovation strategic management. Students will acquire the necessary knowledge and skills in innovation processes and management. The subject also discusses intellectual property rights. Case studies will be incorporated to enhance students' understanding on strategic innovation management.

BTMT 3383 SOCIAL ENTREPRENEURSHIP

Learning Outcomes

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

1. Demonstrates the concept, opportunities and challenges of Social Innovation and Social Entrepreneurship (SISE) for social entrepreneurs and social enterprises
2. Engage in collaborative learning to understand SISE in the context of SISE entrepreneurs and social enterprises
3. Prepare professionally for employment by reflecting on the issues related to SISE entrepreneurs and social enterprises

Synopsis

This course explores the approaches of social innovation and social entrepreneurship (SISE) used by social entrepreneurs to develop innovative social business models and breakthrough solutions to pressing social problems. Students learn about the full range of social business models, including non-profit organisations, businesses that produce income-generating products or services for a social purpose, and socially responsible for-profit businesses. Students must understand how social enterprises use the SISE to develop business models that provide innovative solutions to deep-rooted social challenges. Students will also critically engage with social problems in communities and create innovative strategies for transformative social change. For the course's final project, students will need to design and manage viable SISE projects that target the social beneficiaries or communities they want to transform.

BTMT 3323 CONTEMPORARY BUSINESS MANAGEMENT

Learning Outcomes

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

1. Demonstrate an understanding of technology ventures approaches in advancing the digitisation, disruptive and converging technologies for societal and economic progress in the 4th Industrial Revolution.
2. Critically appraise the impact of digitisation, disruptive and converging technologies on business strategies and competitive advantage in the Industry 4.0.
3. Identify strategic challenges, formulate strategic solutions, and propose new and disruptive business models to take advantage of technology- enabled business opportunities of Industry 4.0.

Synopsis

This course is designed for students to learn on how to create and implement innovative business models for the Industry 4.0 era. Through both theory and practical exercises, students will learn about key topics like the Industrial Internet of Things (IIoT), smart factories, and digital business transformation. The course aims to equip students with the skills to become professionals like technopreneurs, executives, or consultants in the field of Industry 4.0.

BTMU 1093 BUSINESS STATISTICS

Learning Outcomes

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

1. Identify the statistical terms, properties and procedures.
2. Apply appropriate statistical methods to the different areas of Business.
3. Analyse data for business interpretation and decision making.

Synopsis

This course is related to the application of applied statistics used for problem solving in conducting any business operation. The topics include introduction to statistics, data classification, graphic presentation, central tendency measurement, frequency of spread distribution measurement, concepts of probability, probability distribution, sampling distribution, interval estimation, hypothesis testing, chi-square distribution, variance analysis (ANOVA), simple linear regression analysis, and correlation analysis. Knowledge acquired will arm students with the competencies in statistics for analyzing and solving daily business problems.

Elective II

BITP 3513 ADVANCED DATABASE PROGRAMMING

Learning Outcomes

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

1. Apply appropriate model designs for developing a database-driven application in response to given requirements.
2. Demonstrate proficiency in implementing various components, including processes, validations, computations, and dynamic actions to enhance a database-driven application.
3. Report the development and implementation process of a database-driven application.

Synopsis

This course is designed to provide students with the essential skills to develop robust, secure, and visually appealing database-driven applications. Students will gain hands-on experience in building application pages, reports, and related items and components. Furthermore, they will be able to create processes, validations, computations, and dynamic actions while learning to customize the look and feel of web applications using built-in themes and templates. The course also covers critical security aspects, including implementing authorization schemes and leveraging plug-

ins to extend application functionality. By the end of this course, students will be proficient in the complete development cycle of a modern data-driven application.

BITP 3523 ADVANCED DATABASE ADMINISTRATION

Learning Outcomes

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

1. Apply appropriate advanced database administration methods and tools for database optimization and tuning.
2. Demonstrate proficiency in identifying, troubleshooting, and solving common problems related to database performance.
3. Propose strategies and techniques for optimizing database performance by tuning the database server and its environment.

Synopsis

This course is an advanced course in database administration. It is designed to enhance students' understanding of database performance tuning and optimization. The curriculum provides a practical, hands-on approach to using specialized tools to identify, troubleshoot, and resolve common database administration problems in a selected DBMS. This course is a valuable set of skills for students pursuing a career as a database developer or administrator.

BITP 3483 GEOGRAPHIC INFORMATION SYSTEM

Learning Outcomes

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

1. Apply GIS concepts, spatial data types, and analytical techniques to produce solutions for real-world spatial problems using appropriate tools and methods
2. Demonstrate proficiency in implementing various components, including processes, validations, computations, and dynamic actions to enhance a database-driven application.
3. Report the development and implementation process of a database-driven application.

Synopsis

This course introduces students to the world of Geographic Information Systems (GIS), a powerful technology for managing, analyzing, and visualizing spatial data. Students will learn core GIS concepts, data types, and spatial analysis techniques, while gaining hands-on experience with modern, industry-standard tools for creating interactive maps, visualizing real-time data, integrating multiple datasets, and building smart dashboards. The course highlights how GIS supports decision-making in diverse areas, including governance, environmental and resource management, disaster response, urban planning, business analytics, and more. Beginning with mapping fundamentals and traditional cartographic principles, students’ progress to advanced methods for capturing, organizing, and analyzing spatial information using the latest technologies. By the end of the course, they will have developed practical, transferable skills to apply GIS in solving complex, real-world problems in an increasingly data-driven world.

BITS 2313 LOCAL AREA NETWORK

Learning Outcomes

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

1. Identify the suitable hardware, software, services and protocols that influence LAN design.
2. Propose the suitable LAN design using appropriate hardware, software, services and protocols.
3. Display understanding of LAN setup and the alternative that exist in the selection of technologies when designing and implementing LANs.

Synopsis

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

BITP 3353 MULTIMEDIA DATABASE

Learning Outcomes

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

1. Explain the fundamental concept of multimedia database and its requirements.
2. Demonstrate understanding in dealing with various multimedia data types.
3. Apply the multimedia database design concept in storing and retrieving multimedia data.

Synopsis

Multimedia database management systems are DBMS that supports both traditional and multimedia data types and is capable of handling large collections of multimedia entities. This subject revolves around fundamental components that need to be integrated into conventional database management systems to make them practical for developing multimedia database applications. The most important thing is to overview various feature and approaches for handling large collections of multimedia entities by existing relational and object-relational DBMSs. Then, developing a set of features and functions that multimedia DBMS should provide to effectively and efficiently support various multimedia data types, such as text document, images, audio, and video.

BITM 2113 WEB APPLICATION DEVELOPMENT

Learning Outcomes

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

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

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective World Wide Web sites. It emphasis 4 components in developing web applications which are Client Site Technologies: HTML, XHTML, HTML5, CSS, XML, and JavaScript, Server Site Technologies: PHP, Database Server: MySQL and Web Servers: Apache. This course also brings together all of the elements of Web site design, graphics, animation, and data storage in the construction of fully functional commercial Web site applications.

BITI 2223 MACHING LEARNING

Learning Outcomes

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

1. Differentiate the basic concepts and techniques of machine learning dan deep learning.
2. Select the appropriate techniques for solving machine learning and deep learning problem.
3. Demonstrate machine learning and deep learning techniques solutions for a specific problem.

Synopsis

This course provides an introduction to machine learning and deep learning. Students will learn a range of techniques, starting with simple linear regression and progressing to deep neural networks. In addition, various applications of machine learning, including sentiment analysis, natural language processing, image prediction, product recommendation, and computer vision, will be introduced.

BITP 3233 STRATEGIC INFORMATION SYSTEM PLANNING

Learning Outcomes

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

1. Describe the business organization components, environment, challenges, objectives and costing of information systems (IS) implementation.
2. Manipulate the IS planning techniques used in planning process.
3. Propose relevant strategic information systems for small enterprise.

Synopsis

This subject will introduce the importance of information systems (IS) to enhance organization competitiveness. Therefore, the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitively other organizations. Then students will work to integrate organization’s business objectives with IS that support its business direction and create competitive advantage to the organization.

BITP 3423 SPECIAL TOPIC IN SOFTWARE ENGINEERING

Learning Outcomes

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

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

Synopsis

This course gives exposure to the students about the software testing concept and focuses on process to develop and implement testing plans, testing strategy, software check, unit testing, integration testing, system testing and acceptance testing. The students will implement software quality assurance activities such as quality requirements, quality criteria, software metrics, software quality model, software evaluation, and review.

Bachelor of Information Technology (Game Technology) with Honours

Programme Details

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

The learning outcomes of this programme are to equip the students with the basic knowledge in every aspect of computer games technology, to provide the students with sufficient theoretical knowledge and skills to apply the knowledge learnt through the practiced concept, to enable the students to be able to apply the interactivity concept in the design and development of computer games, to equip the students with deep understanding and high skills in the development and management of computer games,as well as to produce graduates that are capable to develop high quality interactive games products and games applications which fulfil the industry specifications.

Programme Learning Outcomes (PLO)

The aim of the Bachelor of Information Technology (Game Technology) programme is to produce students with the following characteristics:

Upon completion of the programme, graduates should be able to:	
PLO 1	Able to apply knowledge of computer science and information technology.
PLO 2	Able to analyse, design and develop information and communication technology applications.
PLO 3	Able to apply interactivity concept in designing and developing interactive games technique.
PLO 4	Able to apply the knowledge and practice of interactive game development process using various software and tools.
PLO 5	Able to develop interactive games with the quality that fulfils industry specifications.

PLO 6	Able to resolve problems in creative way and able to communicate effectively.
PLO 7	Able to contribute individually or in a team in various disciplines and domains.
PLO 8	Able to lead with ethics and have entrepreneurship skills.
PLO 9	Able to perform continuous self-learning to obtain knowledge and skills.

Career Prospects

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

Curriculum Structure

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

Bachelor's Degree (Information Technology) Minimum graduating credit - 120		
Component	Component's Code	Credits
General Module	W	18
Core Module	P	33
Specialisation Module	K	42
Final Year project	P	6
Industrial Training	P	12
Free Module	E	9
	Total Credits	120

Curriculum Structure for Each Semester

Year One: Semester 1

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BITE 1513	Programming Fundamentals	P	2	2	3	
BITI 1213	Linear Algebra and Discrete Mathematics	P	2	2	3	
BITS 1123	Computer Organisation and Architecture	P	2	2	3	
BITS 1213	Operating System	P	2	2	3	
BITE 1723	Game Design Principle	K	2	2	3	
B**W ***2	Third Language[1]	W	2	0	2	
				Total Credits	17	

[1]For International Students, change to BLHW 2752 Malaysian Culture.

Year One: Semester 2

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLHW 1762	Philosophy and Current Issues	W	2	0	2	
BKK* ***1	Co-Curriculum I[1]	W	0	3	1	
BLLW 1142	English for Academic Purposes	W	2	0	2	
BITI 1223	Calculus and Numerical Methods	P	2	2	3	
BITP 1323	Database	P	2	2	3	
BITE 1523	Computer Game Programming	K	2	2	3	
BITE 1613	2D Game Development	K	2	2	3	
				Total Credits	17	

[1]This course can be taken in any semester. Please refer to Co-Curriculum Unit before register.

Year Two: Semester 1

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLHW 2772	Penghayatan Etika dan Peradaban[1]	W	2	0	2	
BLLW 2152	Academic Writing	W	2	0	2	BLLW 1142

BKK* ***1	Co-Curriculum II[2]	W	0	3	1	
BITU 2913	Workshop I	P	1[3]		3	BITE 1513
BITS 1313	Data Communication and Networking	P	2	2	3	
BITE 1713	Game Architecture	K	2	2	3	
BITE 2513	Game Engine Development I	K	2	2	3	
				Total Credits	17	

[l] For International Students, change to BLLW 1282 Bahasa Melayu Komunikasi 2.

[2]This course can be taken in any semester. Please refer to Co-Curriculum Unit before register.

[3]Average official contact hours per week.

Year Two: Semester 2

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLHW 2792	Kursus Integriti Anti Rasuah	W	2	0	2	
BITI 2233	Statistics and Probability	P	2	2	3	
BITM 2313	Human Computer Interaction	P	2	2	3	
BITE 2123	Artificial Intelligence for Games	K	2	2	3	
BITE 2613	Interactive 3D Animation	K	2	2	3	
BITE 2633	Audio Video Production for Game	K	2	2	3	
BIT* ***3	Faculty Free Module I	E	2	2	3	
				Total Credits	20	

Year Three: Semester 1

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLLW 3162	English for Professional Interaction	W	2	0	2	BLLW 2152
BITU 3923	Workshop II	K	1[1]		3	BITU 2913
BITE 2523	Web Game Development	K	2	2	3	
BITE 3513	Game Engine Development II	K	2	2	3	
BITE 3713	Multi-platform Game	K	2	2	3	
BIT* ***3	Faculty Free Module II	E	2	2	3	
				Total Credits	17	

[1]Average official contact hours per week.

Year Three: Semester 2

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BTMW 4012	Technology Entrepreneurship	W	2	0	2	
BITS 3423	Information Technology Security	P	2	2	3	
BITU 3973	Final Year Project I	P	1[1]		3	BITU 3923
BITE 2623	3D Game Development	K	2	2	3	
BITE 3613	Game Project Management	K	2	2	3	
BIT* ***3	Faculty Free Module III	E	2	2	3	
				Total Credits	17	

[1]Average official contact hours per week.

Year Three: Special Semester

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BITU 3983	Final Year Project II	P	1[1]		3	BITU 3973
				Total Credits	3	

[1]Average official contact hours per week.

Year Four: Semester 1

Course Code	Course Name	Comp Code	Duration (weeks)	Crdt	Pre-requisite
BITU 3926	Industrial Training	P	24	6 (Attend & Pass)	BITU 3983[1]
BITU 3946	Industrial Training Report	P	24	6	BITU 3983[1]
			Total Credits	12	

[1] Completed all Courses.

List of Courses in Free Module

Student need to take 3 courses (3 credit each) from the faculty free module. List of courses offered can be changed from time to time in accordance with industry needs. Below is the list that can be selected as part of the curriculum.

Course Code	Course Name	Contact Hrs		Crdt	Pre-requisite
		Lect	Lab		
Faculty Free Module I, II, III (Subject to course availability)					
BITE 3523	Game Physics	2	2	3	
BITE 3623	Motion Graphics	2	2	3	
BITE 3633	Game Play	2	2	3	
BITE 3723	Game Mechanics	2	2	3	
BITS 3333	Multimedia Networking	2	2	3	

List of Third Language Courses

Student need to take a Third Language course by choosing one of the six language offered. Below is the list that can be selected as part of the curriculum.

Course Code	Course Name	Contact Hrs		Crdt	Pre-requisite
		Lect	Lab		
Third Language (For Local Students)					
BLLW 1212	Arabic I	2	0	2	
BLLW 1222	Mandarin I	2	0	2	
BLLW 1232	Japanese I	2	0	2	
BLLW 1242	Korean I	2	0	2	
BLLW 1252	German I	2	0	2	
Language Course (For International Students)					
BLLW 1282	Bahasa Melayu Komunikasi 2	2	0	2	

Course Synopsis

Core Courses

BITE 1513 PROGRAMMING FUNDAMENTALS

Learning Outcomes

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

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

Synopsis

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

operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

BITI 1213 LINEAR ALGEBRA AND DISCRETE MATHEMATICS

Learning Outcomes

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

1. Apply basic concepts of Linear Algebra in solving mathematical problems.
2. Apply basic concepts of Discrete Mathematics in solving mathematical problems.
3. Propose solution to Linear Algebra and Discrete Mathematics problems.

Synopsis

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

BITS 1123 COMPUTER ORGANIZATION AND ARCHITECTURE

Learning Outcomes

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

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Construct a basic function of computer system.

Synopsis

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

BITS 1213 OPERATING SYSTEM

Learning Outcomes

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

1. Demonstrate understanding on the basic concepts, components, design, and functionalities used in operating system.
2. Present knowledge on the operating system management and administration
3. Display the basic administrative task on commonly used operating system.

Synopsis

This course is designed to give an exposure to students about basic concepts, theory and technology used in operating system such as concurrency, kernel, deadlock and multithreading. Student will learn about the fundamental of operating system including

process, management of memory, file, I/O and CPU scheduling. In addition, students will be introduced to Linux operating system at basic administrative level.

BITI 1223 CALCULUS AND NUMERICAL METHODS

Learning Outcomes

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

1. Apply fundamental concepts of Calculus to solve mathematical problem.
2. Use suitable techniques in Numerical Methods to solve application problems
3. Propose solutions to Calculus and Numerical problems with appropriate technique.

Synopsis

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

BITU 2913 WORKSHOP I

Learning Outcomes

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

1. Present the result of tasks given in verbal or written form.
2. Integrate digital skills in developing a system.
3. Demonstrate life-long learning capability to propose a solution for an IT domain problem.
4. Report the completed system in a professional manner, both verbally and in writing.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in developing and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project, while upholding the professional ethics and integrity. Students must use the techniques learned in programming technique and database courses to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and defend the project. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. This course will also introduce the students to intellectual property rights and infringement to avoid common errors, such as plagiarism.

BITP 1323 DATABASE

Learning Outcomes

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

1. Apply the basic concepts of relational data model, entity-relationship model, relational database design, Relational Algebra (RA) and Structured Query Language(SQL)
2. Construct Entity Relationship Diagram (ERD) and SQL statements based on given database application scenarios
3. Report the database design and data queries for a database system.

Synopsis

This course will introduce student to the fundamental concepts of database management, which include the aspects of data models, database language; structured query language (SQL) and Relational Algebra (RA) as well as database design. This course also focuses on practical skills which make students be able to apply fundamental concepts required for designing a database using suitable design tools, and formulating queries and execute the queries using Database Management Systems (DBMS).

BITS 1313 DATA COMMUNICATION AND NETWORKING

Learning Outcomes

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

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

Synopsis

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

BITI 2233 STATISTICS AND PROBABILITY

Learning Outcomes

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

1. Apply the concept of probability in problem solving.
2. Apply the concept of statistics in problem solving.
3. Perform solutions for application problems using statistical software.

Synopsis

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

BITM 2313 HUMAN COMPUTER INTERACTION

Learning Outcomes

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

1. Apply the concepts and theories of human computer interaction in designing user interfaces various platforms.
2. Show conceptual thinking in problems solving in system/application development.
3. Demonstrate usability and evaluation activities.

Synopsis

This subject introduces the concept of HCI and its relationship in system/application development. It focuses on optimizing user experiences and making technology more accessible as well as user-friendly. The topics include the basic understanding of multidisciplinary aspect of HCI comprises cognitive psychology, user interface design, interaction design, usability, and evaluation. Other current topics such as universal access, assistive technologies and culture-sensitive design are also discussed in this course

BITS 3423 INFORMATION TECHNOLOGY SECURITY

Learning Outcomes

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

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

Synopsis

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

Specialization Courses

BITE 1723 GAME DESIGN PRINCIPLES

Learning Outcomes

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

1. Apply computer game design concepts and theories in the development of games
2. Explain computer game design elements in various genres of games.
3. Follow game design principles in designing games using appropriate tools.

Synopsis

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

BITE 1523 COMPUTER GAME PROGRAMMING

Learning Outcomes

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

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

Synopsis

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

BITE 1613 2D GAME DEVELOPMENT

Learning Outcomes

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

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

Synopsis

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

BITE 1713 GAME ARCHITECTURE

Learning Outcomes

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

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

Synopsis

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

BITE 2513 GAME ENGINE DEVELOPMENT I

Learning Outcomes

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

1. Apply the theory and practice of programming video games.
2. Produce their own game engine design using basic game design approach.
3. Develop their own games using existing game engines.

Synopsis

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

BITE 2123 ARTIFICIAL INTELLIGENCE FOR GAMES

Learning Outcomes

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

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

Synopsis

The purpose of this course is for undergraduate and graduate students in Computing and related fields to gain a breadth of understanding of the toolbox of AI approaches employed in digital games. This involves learning some basic topics covered in other AI courses, but with a focus on applied knowledge within the context of digital games. The discipline of (academic) Game AI was launched with a justification of interactive entertainment (i.e., computer games) as a domain of study in AI when they posited that computer games could act as testbeds for achieving human-level intelligence in computers, leveraging the fidelity of their simulations of real world dynamics [c.f. `Human-Level AI's Killer Application: Interactive Computer Games' by Laird and van Lent]. There is an additional (industry) perspective on AI for games: increasing the engagement and enjoyment of the player.

BITE 2613 INTERACTIVE 3D ANIMATION

Learning Outcomes

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

1. Explain the animation principles, 3D environment development design for 3D modeling with interactivity elements.
2. Display, texturing, animating, lighting and rendering techniques using software and devices following 12 principles of animation
3. Follow 3D environment development principles and interactivity in their interactive animation project.

Synopsis

This course addresses the design and creation of 3D environments using software for modeling and animation and using tools for adding interactivity. Students are invited

to explore the unique feeling of being immersed in a virtual world by creating new types of user experiences. Attention is given to the use of physical input devices or interaction regimes in the service of creating the user's feeling of delight in the artificial world.

BITE 2633 AUDIO AND VIDEO PRODUCTION FOR GAMES

Learning Outcomes

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

1. Apply the knowledge and principles of digital audio and video in computer games environment.
2. Demonstrate advanced skills in using audio video software and hardware including the digital media composition techniques as well as develop the idea and to edit digital audio video products in a group.
3. Construct audio video project in the conducive production environment with the latest and relevance information.

Synopsis

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

BITU 3923 WORKSHOP II

Learning Outcomes

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

1. Comply with the concept of intellectual property and the sustainability for the project.
2. Work as a teamwork to complete the project within the given time.
3. Construct the project by applying the concept of system analysis, design and development learnt in the previous subjects

Synopsis

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

BITE 2523 WEB GAME DEVELOPMENT

Learning Outcomes

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

1. Explain the latest web game technology and design approach.
2. Distinguish the design principles of web game design and production of experimental procedures using various tools and software.
3. Produce Web Game application in accordance to industry standard framework.

Synopsis

This course will expose the student with all necessary technologies into making a web game. The student will learn most of the common web technology and languages that comply with the World Wide Web Consortium (W3C) in order for them to create their initial web application. Moreover, the student will also learn the industry standards by engaging them with industry's best practices to their lab works, assignments and project. Upon understanding the web application development concept, the student will begin to develop their web game using various tools and some game engine. Similar to any software development, the student will develop their web game based on current industries framework.

BITE 3513 GAME ENGINE DEVELOPMENT II

Learning Outcomes

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

1. Apply computer graphic interactive fundamentals as core architecture for game engine development.
2. Manipulate various library such as physic library, sound library, input library for game development.
3. Integrate all of the components of game engine to become a template to develop Game.

Synopsis

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

BITE 3713 MULTIPLATFORM GAME

Learning Outcomes

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

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

Synopsis

This course provide student with a study of multiplatform development strategy in game development pipeline. Understanding multiplatform concept is an important step

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

BITE 2623 3D GAME DEVELOPMENT

Learning Outcomes

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

1. Apply 3D Game fundamentals to create 3D game.
2. Build several 3D games based on current trends and industry standard.
3. Integrate necessary game elements and assets according to 3D Game Development pipeline using various techniques and tools.

Synopsis

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

BITE 3613 GAME PROJECT MANAGEMENT

Learning Outcomes

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

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

Synopsis

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

Bachelor of Computer Science (Interactive Media) with Honours

Programme Details

Bachelor of Computer Science (Interactive Media) academic programme is offered to prepare graduates with a thorough understanding and superior skills in information technology particularly in the area of multimedia.

The learning outcomes of this programme are to equip the students with the basic knowledge in every aspect of information technology, to provide the students with su cient theoretical knowledge and skills to apply the knowledge learnt through the practiced concept, enable the students to be able to apply the interactivity concept in the design and development of multimedia-based application, to equip the students with deep understanding and high skills in the development and management of web sites, animation, computer graphics, virtual reality and development of computer games, as well as to produce graduates that are capable to develop high quality interactive media products and multimedia applications which fulfil the industry specifications.

Graduate Competency

With the implementation of a TVET-aligned curriculum, at the end of this program, all **Bachelor of Computer Science (Interactive Media)** students will gain the following competencies:

1. Apply computing and multimedia principles to analyze, design, and develop interactive systems, applications, and experiences aligned with current industry standards and emerging technologies.
2. Construct, prototype, and evaluate interactive media content and systems using creative coding, real-time rendering, animation, extended reality (XR), and human-computer interaction techniques to ensure functionality, usability, and user engagement.
3. Collaborate effectively in multidisciplinary teams by integrating visual design, programming, narrative, and media production workflows—applying strong communication, project management, and problem-solving skills across development pipelines.
4. Operate, maintain, and integrate interactive media tools and platforms, including industry-standard engines, design software, and hardware interfaces such as motion capture systems, XR devices, and real-time production tools.
5. Produce project documentation, interactive design artefacts, and technical assets while practicing continuous professional development through reflective media practice and adopting future-facing technologies like AI-generated content and immersive storytelling.

Programme Educational Outcomes (PEO)

Graduates of Bachelor of Computer Science (Interactive Media) are expected to become computing practitioner who are able to:

PEO 1	provide interactive media development solutions to complex computing problems using knowledge and technical skills that meet industry needs.
PEO 2	possess leadership characteristics, communication and interpersonal skill in engaging with industry and community
PEO 3	practice lifelong learning with entrepreneurial mindset to improve professional know-how and career development.
PEO 4	uphold professional practices and ethics with integrity principles in fulfilling their responsibilities.

Programme Learning Outcomes (PLO)

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

PLO 1	analyse computing problems using computer science knowledge.
PLO 2	apply appropriate computer science solutions for interactive media development problems.
PLO 3	construct solutions using appropriate computing methods for complex problems.
PLO 4	demonstrate social skills and responsibilities in engaging with society, community and stakeholders.
PLO 5	exhibit effective communication through oral and written modes in engaging with society, community and stakeholders.
PLO 6	deploy a broad range of software or tools to solve industry computing problems.

PLO 7	apply numeracy skills to solve computing problems.
PLO 8	demonstrate leadership characteristics and contribute independently as individual or member in a team to solve computing problems.
PLO 9	demonstrate capabilities in information management, lifelong learning and independent study.
PLO 10	utilise an entrepreneurial mindset in delivering solutions.
PLO 11	uphold professionalism, attitudes and ethical values in workplace.

Career Prospects

There is a wide range of career opportunities in the eld of computer science and information technology available for graduates who are specialised in Interactive Media. Among the career opportunities are:

1. Interactive Media Developer.
2. UI/UX Designer.
3. Game Developer (Front-end)
4. Multimedia Programmer
5. Visual Effects and Motion Graphics Artist
6. Augmented / Virtual Reality Developer
7. Creative Technologist
8. Digital Content Producer / Editor
9. Web & Front-End Developer (Interactive Web)
10. Technical Artist / Pipeline Technical Director (Game/Animation Studios)

Curriculum Structure

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

COMPONENT (COURSES)	CREDIT HOURS
University Compulsory (W)	18
Core Computing (P)	18
Discipline Core (P)	36
Specialization (K)	24

Free Elective (E)	6
Final Year Project (P)	6
Industrial Training (P)	12
	120

Curriculum Structure for Each Semester

Year One: Semester 1

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLHW 1762	Philosophy and Current Issues	W	2	0	2	
BKK****1	Co-Curriculum I[1]	W	0	3	1	
BITI 1233	Discrete Structure	P	2	2	3	
BITP 1323	Database	P	2	2	3	
BITP 1113	Programming Technique	P	2	2	3	
BITS 1123	Computer Organization and Architecture	P	2	2	3	
BLLW 1142	English for Academic Purpose	W	2	0	2	
				Total Credits	17	

[1]This course can 1 be taken in any semester. Please refer to Co-Curriculum Unit before register.

Year One: Semester 2

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLLW 2152	Academic Writing	W	2	0	2	BLLW 1142
BLHW 2702	Kursus Integriti Anti Rasuah	W	2	0	2	
BKK* ***1	Co-Curriculum II[1]	W	0	3	1	
BITP 1223	System Analysis and Design	P	2	2	3	
BITP 1123	Data Structure and Algorithm	P	2	2	3	BITP 1113
BITS 1313	Data Communication and Networking	P	2	2	3	
BITM 2123	Digital Audio and Video Technology	K	2	2	3	
				Total Credits	17	

[1]This course can 1 be taken in any semester. Please refer to Co-Curriculum Unit before register

Year Two: Semester 1

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLHW 2772	Penghayatan Etika dan Peradaban[1]	W	2	0	2	
BITU 2913	Workshop I	P	1[2]		3	BITP 1113
BITP 3113	Object Oriented Programming	P	2	2	3	
BITS 1213	Operating System	P	2	2	3	
BITM 1213	Graphic Visualization and Computational Modelling	K	2	2	3	
BITM 2213	Computer Animation	K	2	2	3	
BITM 2313	Human Computer Interaction	K	2	2	3	
				Total Credits	20	

[1] For International Students, change to BLHW 2752 Malaysian Culture.

[2]Average official contact hours per week.

Year Two: Semester 2

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BITP 2223	Software Requirement and Design	P	2	2	3	
BITI 1113	Artificial Intelligence	P	2	2	3	
BITP 2113	Algorithm Analysis	P	2	2	3	
BITM 3213	Interactive Computer Graphics	P	2	2	3	
BLLW12*2	Third Language	W	2	0	2	
				Total Credits	14	

Year Three: Semester 1

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BLLW 3162	English for Professional Interaction	W	2	0	2	BLLW 2152
BITU 3923	Workshop II	K	1[1]		3	BITU 2913
BITP 3153	Platform Based Development	K	2	2	3	
BITS 3423	Information Technology Security	P	2	2	3	
BITM 2113	Web Application Development	K	2	2	3	
BITM 3113	Interactive Media Project Management	K	2	2	3	

BIT* ***3	Faculty Free Module I	E	2	2	3	
				Total Credits	20	

[1]Average official contact hours per week.

Year Three: Semester 2

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BTMW 4012	Technology Entrepreneurship	W	2	0	2	
BITU 3973	Final Year Project I	P	1[1]		3	BITU 3923
BITP 3143	Distributed and Parallel Application Development	K	2	2	3	
BITP 3463	Professional Practices in Computing	K	2	2	3	
BITM 3763	Extended Reality Technology	K	2	2	3	
BIT* ***3	Faculty Free Module II	E	2	2	3	
				Total Credits	17	

[1]Average official contact hours per week.

Year Three: Special Semester

Course Code	Course Name	Comp Code	Contact Hrs		Crdt	Pre-requisite
			Lect	Lab		
BITU 3983	Final Year Project II	P	1[1]		3	BITU 3973
				Total Credits	3	

[1]Average official contact hours per week.

Year Four: Semester 1

Course Code	Course Name	Comp Code	Duration (weeks)	Crdt	Pre-requisite
BITU 3926	Industrial Training	P	24	6 (Attend & Pass)	BITU 3983[1]
BITU 3946	Industrial Training Report	P	24	6	BITU 3983[1]
			Total Credits	12	

[1]Completed all Courses.

List of Courses in Free Module

Student need to take 3 courses (3 credit each) from the faculty free module. List of courses offered can be changed from time to time in accordance with industry needs. Below is the list that can be selected as part of the curriculum.

Course Code	Course Name	Contact Hrs		Crdt	Pre-requisite
		Lect	Lab		
Faculty Free Module I and II (Subject to course availability)					
BTMT 3323	Contemporary Business Management	2	2	3	
BTMP 3523	Industrial Leadership	2	2	3	
BTMT 3383	Social Entrepreneurship	2	2	3	
BTMP 3243	Strategic Innovation Management	2	2	3	
BTMT 3303	Seminar in Global Issues and New Business Trends	2	2	3	
BTMT 4293	Risk Management	2	2	3	
BTMP 2083	Franchise and Retail Management	2	2	3	
BITI 2223	Machine Learning	2	2	3	
BITP 3453	Mobile Application Development	2	2	3	
BITS 2573	Cloud Computing Foundation	2	2	3	
BITM 2323	Digital Imaging for Multimedia	2	2	3	
BITE 3623	Motion Graphics	2	2	3	
BITE 3713	Multi-platform Game	2	2	3	
BITP 3353	Multimedia Database	2	2	3	
BITE 3723	Game Mechanics	2	2	3	
BITE 3523	Game Physics	2	2	3	
BITE 3633	Gameplay	2	2	3	

List of Third Language Courses

Student need to take a Third Language course by choosing one of the six language offered. Below is the list that can be selected as part of the curriculum.

Course Code	Course Name	Contact Hrs		Crdt	Pre-requisite
		Lect	Lab		
Third Language (For Local Students)					
BLLW 1212	Arabic I	2	0	2	
BLLW 1222	Mandarin I	2	0	2	
BLLW 1232	Japanese I	2	0	2	
BLLW 1242	Korean I	2	0	2	

BLLW 1252	German I	2	0	2	
Language Course (For International Students)					
BLLW 1282	Bahasa Melayu Komunikasi 2	2	0	2	

Course Synopsis

Core Courses

BITM 2313 HUMAN COMPUTER INTERACTION

Learning Outcome

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

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

Synopsis

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

Specialisation Courses

BITM 2113 WEB APPLICATION DEVELOPMENT

Learning Outcomes

Upon completion of this course the student will able to:

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

Synopsis

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

- Client Site Technologies: HTML, XHTML, HTML5, CSS, JavaScript, jQuery
- Server Site Technologies: PHP
- Database Server: MySQL.

- Web Servers: Apache

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

BITM 2123 DIGITAL AUDIO AND VIDEO TECHNOLOGY

Learning Outcomes

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

1. Apply the knowledge and principles of digital audio and video.
2. Manipulate various sources such as audio, images, videos, text and etc as required components for audio and video production
3. Demonstrate audio and video production pipeline by adapting industry standard practices in a conducive production environment.

Synopsis

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

BITM 2213 COMPUTER ANIMATION

Learning Outcomes

Upon completion this course, students will be able to:

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

Synopsis

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

details (in order to fit in the production pipeline and schedule) as well as achieving the artistic goals. The format of the subject is one-hour lecture followed by four hours lab.

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

BITM 3113 INTERACTIVE MEDIA PROJECT MANAGEMENT

Learning Outcomes

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

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

Synopsis

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

BITM 3133 COMPUTER GAMES DEVELOPMENT

Learning Outcomes

Upon completion this course, students will be able to:

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

Synopsis

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

BITM 3213 INTERACTIVE COMPUTER GRAPHICS

Learning Outcomes

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

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

Synopsis

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

BITM 3763 EXTENDED REALITY TECHNOLOGY

Learning Outcomes

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

1. Explain about Extended Reality (XR) Technology, and development workflow from conceptual to deployment.
2. Construct XR technology based on required skills and techniques such as 3D asset development, 3D Game Engine scripting, animation handling, packaging strategy and version control.
3. Identify the current issues pertaining XR Technology in relation to societal issues, human factor, industries adoption and future advancement in general

Synopsis

This course offers a comprehensive exploration of Extended Reality (XR) technologies, encompassing Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). Students will gain a deep understanding of XR principles, development tools, and design techniques. Practical labs and projects will facilitate hands-on learning, enabling students to create immersive VR environments, interactive AR applications, and spatial MR experiences. By the course's conclusion, students will

possess the skills to design, develop, and evaluate XR applications, preparing them for diverse career opportunities in the rapidly expanding XR industry. The culmination of final projects will allow students to showcase their expertise and reflect on their learning journey in the dynamic realm of Extended Reality.

BITM 1213 GRAPHIC VISUALIZATION AND COMPUTATIONAL MODELLING
Learning Outcomes
Upon completion of this course, the student should be able to:
1. Demonstrate principle of graphics visualisations in real world context.
2. Identify computational modelling technique in solving real world problem.
3. Propose creative and innovative strategies for visualizing data

Synopsis
This course offers an interdisciplinary approach to graphics visualization and computational modeling. Students will learn to create impactful graphics for data representation and explore computational methods for modeling real-world phenomena. Through hands-on projects, they'll gain proficiency in graphic design tools, data visualization techniques, and computational modeling software. By course completion, students will possess the skills to visualize data effectively, analyze models, and communicate insights across various disciplines.

Free (Elective) Courses

BITE 3523 GAME PHYSICS
Learning Outcomes
Upon completing this subject, students should be able to:
1. Manipulate the concept of mathematics and physics in computer games programming.
2. Explain the application of computer games physics in problem solving computer game development.
3. Follow the techniques of 3D graphics in computer games physics to generate realistic design idea.

Synopsis
This course discusses techniques to create realistic 3D graphics environments using advanced computer game programming (C ++). The emphasis is on mathematics and physic concepts in the development of computer games. The topics discussed range from geometry, matrix, kinematics, rotation and offense and its application in the development of computer games.

BITE 3623 MOTION GRAPHICS

Learning Outcomes

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

1. Apply the knowledge and concept of visual effects and motion graphics development.
2. Solve a visual effects and motion graphics problem with selected approach using appropriate application.
3. Select a suitable approach from relevance information to solve a visual effects and motion graphics application.

Synopsis

This course is designed to expose the students to the basic visual effect and motion graphics. This includes understanding and designing aspects by using a visual effect and motion graphics application. The students will be exposed to the skill of using a visual effect and motion graphics software such as After Effect.

BITE 3633 GAMEPLAY

Learning Outcomes

Upon completion of this course the student will able to:

1. Explain the concepts of game theory in solving computer problems.
2. Reproduce computer game design skills to apply basic design according to industry specifications.
3. Describe issues related to computer games according to various sources of information.

Synopsis

This course is designed to provide fundamental level and basic requirement aspects of game design and gameplay. Topics include basic understanding of casual gaming, game mechanic, and gameplay type such as matching, sorting, seeking, managing, hitting, chaining, constructing, bouncing, tossing, rolling, stacking and socializing. Other topics include such as game reward and ranking in game. Current issues related to the latest trends and trend game players and platforms were also discussed at the end of the course.

BITE 3723 GAME MECHANICS

Learning Outcomes

Upon completion of this course the student will able to:

1. Identify the core concepts of the game mechanic.
2. Develop applications combining elements of the game such as text, graphics, audio, video and animation according to the current requirements.
3. Relate learned skills to solve the problem by selecting some game mechanic environment in which can be used in the game presentation.

Synopsis

This course focuses on the game's graphics, physics, sound, and input of artificial intelligent, networking and recognition levels. This course provides a comprehensive

foundation in the relevant field of computer games, serving as a premier and provides a context for special courses in final year. This course provide students with an introduction to the theory and practice of video game programming. Students will be involved in lab training sessions and also work together as a team for the awakening of the real game, designing and building their own game works by using the existing game engine (eg OPENGL C++ or Micosoft XNA or DirectX)

BITM 2323 DIGITAL IMAGING FOR MULTIMEDIA

Learning Outcomes

Upon completion of this course the student will able to:

1. Apply the knowledge and principles of digital imaging
2. Show the skills in using photography software and hardware.
3. Demonstrate life long learning by applying photography understanding in other related courses.

Synopsis

This beginner digital imaging course is meant to help students to master the creation of one of the multimedia elements; image, using digital camera. They will learn the basic functions of DSLR camera, capturing high-quality images suitable for industry standard multimedia production. Lecturer will show them how to see the world like a photographer, whether they are just starting out or have been taking photos for years. This course focusing on practical training, rather than just theory. Throughout the course, they will complete a series of photo projects that will help them practice the skills of photography. The lecurer will work with them, reviewing their photos and helping them to improve as they complete the program. A critics session among peers and audience will be held to help students to get better exposure in the process of learning. At the end of the course, they will have the skills and know-how to take professional-quality photographs.

Bachelor of Computer Science (Software Development) with Honours

Programme Details

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

Graduate Competency

With the implementation of TVET curriculum, at the end of this program, all BITS students will gain the following competencies:

1. Apply software engineering principles to analyze and develop software solutions by evaluating user and system requirements and designing reliable solutions in line with industry standards.

2. Construct, test, and validate computer software systems using current tools, methodologies, and best practices to ensure functionality and performance.

3. Collaborate effectively in multidisciplinary teams by applying communication, coordination, and problem-solving skills in joint technical projects.

4. Maintain, troubleshoot, and enhance software systems by identifying and correcting errors, adapting to new hardware, and improving overall system performance.

5. Produce technical documentation and engage in lifelong learning through effective documentation practices and continuous professional development in line with evolving technologies.

Career Prospects

There is a wide range of career opportunities (both in the Government sector and private sector) in the eld of computer science and information technology available for graduates who are specialised in Software Engineering. Among the career opportunities are:

1. Software Developer
2. Computer System Analyst

3. Multimedia and Web Developer
4. Application Programmer
5. Software Tester
6. Application Assurance Engineer
7. IT Auditor
8. Solution Architect
9. ICT Manager

Other than that, the graduates also can further their studies at postgraduate level.

Duration of Studies

Mode	Durations of studies	
	Minimum	**Maximum**
Full-time	7 semesters (3.5 years)	11 semesters (5.5 years)
Part-time	14 semesters (5 years)	29 semesters (10 years)

In addition to the full-time conventional mode, students may apply for the 3u1i mode (3 years at the university + 1 year in the industry). This option is available only to full-time students and provides extended industrial exposure and practical experience to enhance graduate employability. Students who are interested in this mode may apply during their second year (semester 4) of study. Selection is based on academic performance, faculty approval, and the availability of suitable industrial placements.

Programme Educational Outcome (PEO)

Programme Educational Objectives (PEO)	
After 4 years of graduation, graduates of the Bachelor of Computer Science (Software Development) are expected to become computing practitioners who are able to:	
PEO 1	provide software development solutions to complex computing problems using knowledge and technical skills that meet industry needs.
PEO 2	possess leadership characteristics, communication and interpersonal skill in engaging with industry and community

PEO 3	practice lifelong learning with entrepreneurial mindset to improve professional know-how and career development.
PEO 4	uphold professional practices and ethics with integrity principles in fulfilling their responsibilities.

Program Learning Outcome (PLO)

Upon completion of the programme, graduates should be able to:	
PLO 1	analyse computing problems using computer science knowledge.
PLO 2	apply appropriate computer science solutions for **software development** problems.
PLO 3	construct solutions using appropriate computing methods for complex problems.
PLO 4	demonstrate social skills and responsibilities in engaging with society, community and stakeholders.
PLO 5	exhibit effective communication through oral and written modes in engaging with society, community and stakeholders.
PLO 6	deploy a broad range of software or tools to solve industry computing problems.
PLO 7	apply numeracy skills to solve computing problems.
PLO 8	demonstrate leadership characteristics and contribute independently as individual or member in a team to solve computing problems.
PLO 9	demonstrate capabilities in information management, lifelong learning and independent study.
PLO 10	utilise an entrepreneurial mindset in delivering solutions.
PLO 11	uphold professionalism, attitudes and ethical values in workplace.

Curriculum Structure

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

COMPONENT (COURSES)	CREDIT HOURS
University Compulsory (W)	18
Core Computing (P)	18
Discipline Core (P)	36
Specialization (K)	24
Free Elective (E)	6
Final Year Project (P)	6
Industrial Training (P)	12
	120

List of Courses for Each Semester

Year 1 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLHW 1762	Philosophy and Current Issues	W	2	
BLLW 1142	English for Academic Purposes	W	2	
BITP 1323	Database	P	3	
BITP 1113	Programming Technique	P	3	
BITS 1123	Computer Architecture and Organisation	P	3	
BITS 1313	Data Communication and Networking	P	3	
BKK* ***1	Co-Curriculum I	W	1	
Total Credit			17	

Year 1 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLHW 2722	Kursus Integriti Anti Rasuah	W	2	
BLHW 2772	Penghayatan Etika dan Peradaban [1]	W	2	
BITS 1213	Operating System	P	3	
BITP 1223	System Analysis and Design	P	3	
BITI 1113	Artificial Intelligence	P	3	
BITP 1123	Data Structures and Algorithm	P	3	BITP 1113
BITI 1233	Discrete Structures	P	3	
Total Credit			19	

[1] BLLW 1282 Bahasa Melayu Komunikasi 2 (For International Students).

Year 2 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BKK* ***1	Co-Curriculum II	W	1	
BLLW12*2	Third Language[1]	W	2	
BITP 2223	Software Requirement and Design	P	3	
BITP 3113	Object Oriented Programming	P	3	
BITM 1213	Graphic Visualization and Computational Modelling	P	3	
BITP 2213	Algorithm Analysis	P	3	BITP 1113
BITU 2913	Workshop I	K	3	BITP 1113
Total Credit			18	

[1] BLHW 2752 Malaysian Culture (For International Students)

Year 2 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLLW 2152	Academic Writing	W	2	BLLW 1142
BTMW 4012	Technology Entrepreneurship	W	2	
BITP 3153	Platform Based Development	P	3	

BITM 2313	Human Computer Interaction	P	3	
BITP 3253	Software Verification and Validation	K	3	
BITP 3173	Internet of Things Development	K	3	
B*** xxx3	Free Module 1	E	3	
Total Credit			19	

Year 3 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BLLW 3162	English for Professional Interaction	W	2	BLLW 2152
BITP 3423	Special Topic in Software Engineering	K	3	
BITU 3923	Workshop II	K	3	BITU 2913
BITS 3423	Information Technology Security	P	3	
BITP 3463	Professional Practices in Computing	P	3	
B*** xxx3	Free Module 2	E	3	
Total Credit			17	

Year 3 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITP3143	Distributed and Parallel Application Development	P	3	
BITP 3453	Mobile Application Development	K	3	
BITP 3223	Software Project Management	K	3	
BITP 3163	Software Development and Operations	K	3	
BITU 3973	Final Year Project I	P	3	BITU 3923
Total Credit			15	

Year 3 Semester 3		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITU 3983	Final Year Project II	P	3	BITU 3973
Total Credit			3	

Year 4 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITU 3926	Industrial Training	P	6	BITU 3983
BITU 3946	Industrial Training Report	P	6	BITU 3983
Total Credit			12	

For 3u1i Mode (Starting Year 3 Semester 2)

The following structure applies to students who have been approved for the 3u1i mode.

Year 3 Semester 2		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITP 3143i	Distributed and Parallel Application Development	P	3	
BITP 3453i	Mobile Application Development	K	3	
BITP 3223i	Software Project Management	K	3	
BITP 3163i	Software Development and Operations	K	3	
BITU 3973i	Final Year Project I	P	3	BITU 3923
Total Credit			15	

Year 3 Semester 3		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITU 3983i	Final Year Project II	P	3	BITU 3973
Total Credit			3	

Year 4 Semester 1		Comp. Code	Credit	Pre-requisite
Code	**Course**			
BITU 3926i	Industrial Training	P	6	BITU 3983
BITU 3946i	Industrial Training Report	P	6	BITU 3983
Total Credit			12	

List of Courses in Free Module

Course Code	Course Name	Credit
BITP 2323	Database Administration	3
BITP 3233	Strategic Information System Planning	3
BITP 3483	Geographic Information System	3
BITS 2313	Local Area Network	3
BITI 2213	Knowledge-based System	3
BTMT 3343	Technopreneurship Growth Strategy	3
BTMT 3323	Contemporary Business Management	3
BTMT 3383	Social Entrepreneurship	3
BTMP 3243	Strategic Innovation Management	3
BITM 1123	Interactive Media Authoring	3
BITM 2113	Web Application Development	3
BITS 2573	Cloud Computing Foundation	3
BMTU 1093	Business Statistic	3
BITS 3343	Fiber Optic	3

Third Language Courses

Course Code	Course Name	Credit
BLLW 1212	Arabic I	2
BLLW 1222	Mandarin I	2

BLLW 1232	Japanese I	2
BLLW 1242	Korean Language	2
BLLW 1252	German I	2

Course Synopsis

Core Courses

BITS 1123 COMPUTER ORGANIZATION AND ARCHITECTURE
Learning Outcomes
By the end of the course, students should be able to:

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Construct a basic function of computer system.

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

BITP 1323 DATABASE
Learning Outcomes
By the end of the course, students should be able to:

1. Identify essential database and data modeling concepts including data queries in data management.
2. Construct data models and queries based on given database application scenarios.
3. Report the database concepts, data modeling and data queries for a database application development.

Synopsis
This course provides a comprehensive introduction to the core concepts and practical skills necessary for effective database management. Students will gain a solid foundation in understanding databases, data modeling, executing SQL queries, and developing simple database systems. At the end of this course, students will have gained a comprehensive understanding of database fundamentals and the practical skills required to design, manage, and interact with databases effectively. The course will prepare students to step into roles as database designers and developers,

enabling them to apply their knowledge in diverse professional environments and providing a solid foundation for further studies in advanced database courses.

BITS 1313 DATA COMMUNICATION AND NETWORKING

Learning Outcomes

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

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

Synopsis

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

BITS 1213 OPERATING SYSTEM

Learning Outcomes

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

1. Demonstrate understanding on the basic concepts, components, design, and functionalities used in operating system.
2. Present knowledge on the operating system management and administration
3. Display the basic administrative task on commonly used operating system.

Synopsis

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

BITP 1113 PROGRAMMING TECHNIQUE

Learning Outcomes

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

1. Apply the fundamental of programming technique like coding, tracing and debugging in troubleshooting program applications.
2. Construct computer program codes by applying suitable programming tools, structures and techniques.

3. Demostrate the ability to use suitable programming techniques in problem solving.

Synopsis

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

BITP 1223 SYSTEM ANALYSIS AND DESIGN

Learning Outcomes

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

1. Illustrate the information systems and system development methodology.
2. Manipulate suitable system development methodology to plan, analyze, and design a new system.
3. Report the system planning, analysis, and design based on suitable system development methodology.

Synopsis

Students will be introduced to a variety of information systems and system development lifecycles. Then, the system development methodology will be explained with different approaches - structured approach and object-oriented approaches. Next, it discusses the planning phase with a focus on project identification, selection, initiation, and planning. The analysis phase will emphasize the determination and structuring of user requirements. The design phase then discusses the database, input, output, interface, and dialogue design. The final phase of system development will cover the implementation and software quality assurance. Object-oriented concepts with common UML diagrams are also introduced in general as different approaches to system analysis and design methodology.

Discipline Core Courses

BITP 2113 ALGORITHM ANALYSIS

Learning Outcomes

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

1. Illustrate the fundamental of algorithm analysis.
2. Construct programs which implement various algorithmic approach.
3. Demonstrate the implementation of appropriate algorithms in problem solving.

Synopsis

This course aims to develop students' knowledge in algorithm analysis. Students will be introduced to abstract data type (ADT) concept. The course then introduces the analysis of algorithm efficiency, followed by problem-solving using recursion. Students will learn essential data structures like linear and linked list, stack, queue, tree, graph and heaps, along with the operations for maintaining them. This course will also enable

students to analyze source codes by taking into consideration the efficiency of algorithms. The course then discusses various common searching and sorting algorithms, followed by problem-solving using greedy and string matching algorithms. Throughout the semester, students will also be exposed on applying algorithms complexity in solving various problems.

BITI 1233 DISCRETE STRUCTURES

Learning Outcomes

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

1. Know the concepts and techniques of discrete structures.
2. Demonstrate the concepts of formal language and grammar in Computer Science.
3. Demonstrate analytical skills in constructing program correctness in Computer Science.

Synopsis

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

BITM 2313 HUMAN COMPUTER INTERACTION

Learning Outcomes

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

1. Apply the concepts and theories of human computer interaction in designing user interfaces various platforms.
2. Show conceptual thinking in problems solving in system/application development.
3. Demonstrate usability and evaluation activities.

Synopsis

This subject introduces the concept of HCI and its relationship in system/application development. It focuses on optimizing user experiences and making technology more accessible as well as user-friendly. The topics include the basic understanding of multidisciplinary aspect of HCI comprises cognitive psychology, user interface design, interaction design, usability, and evaluation. Other current topics such as universal access, assistive technologies and culture-sensitive design are also discussed in this course.

BITP 3113 OBJECT ORIENTED PROGRAMMING

Learning Outcomes

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

1. Assess object-oriented programming principles.
2. Construct programs that implement object-oriented principles.
3. Demonstrate the implementation of object-oriented concepts in problem-solving.

Synopsis

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

BITI 1113 ARTIFICIAL INTELLIGENCE

Learning Outcomes

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

1. Explain basic algorithms from area of Artificial Intelligence.
2. Apply selected algorithm(s) from area of Artificial Intelligence in solving problems.
3. Demonstrate ideas behind different Artificial Intelligence algorithms and their use.

Synopsis

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

BITP 3143 DISTRIBUTED AND PARALLEL APPLICATION DEVELOPMENT

Learning Outcomes

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

1. Apply the suitable concept of distributed and parallel in application development.
2. Construct the software application in distributed and parallel environment.
3. Demonstrate the principle of distributed and parallel programming in building efficient and scalable application.

Synopsis

This course introduces the concepts of distributed and parallel computing. Topics covered include architectural patterns, I/O fundamentals, distributed application development with TCP and UDP programming, multithreading, concurrency, the Fork/Join framework, and performance testing of Fork/Join applications. Upon completion of this course, students will be able to understand the fundamental concepts of distributed and parallel computing, apply architectural patterns to design distributed and parallel applications, use I/O effectively in distributed and parallel applications, develop distributed applications using TCP and UDP programming, understand the basics of multithreading, apply concurrency concepts to design and develop parallel applications, use the Fork/Join framework to develop parallel applications, and perform performance testing of Fork/Join applications.

BITP 3153 PLATFORM-BASED DEVELOPMENT

Learning Outcomes

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

1. Apply the concepts and the principles of web and mobile technologies for application development.
2. Construct both frontend and backend applications including database on web server with the current platform-based framework.
3. Demonstrate multi-user platform-based applications that employ web and mobile principles and methodologies.

Synopsis

Recent developments in the evolution of computing have addressed diverse social and industry needs requiring the collection of different platforms. This course concentrates on designing and developing software applications for specific platforms, with particular attention to web and mobile platforms. This platform-based development involved working with ecosystems and environments that are resource-constrained, feature-restricted, and energy-efficient. Thus, the skills of developing concerning services, APIs, and hardware are covered within the course curriculum, including programming paradigms, component libraries, and security. This course involves significant practical programming components focusing on different platform concepts with a broad range of theoretical and technical advances.

BITP 2223 SOFTWARE REQUIREMENT AND DESIGN

Learning Outcomes

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

1. Analyze software requirement and design the software using object oriented approach.
2. Construct software analysis model and software design model using object oriented approach.
3. Write formal software requirements specification and software design document

Synopsis

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

BITP 3463 PROFESSIONAL PRACTICES IN COMPUTING

Learning Outcomes

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

1. Report technical issues to diverse audience using relevant digital tools.
2. Explain effects of societal change due to technology.
3. Integrate effective problem solving within professional computing context.

Synopsis

This subject provides an in-depth examination of the societal effects and real-world uses of technology. Students will learn the importance of interdisciplinary project development and effective communication. This subject also examines the social implications of technology and user-centric approaches towards developing a quality computing solution.

BITM 1213 GRAPHIC VISUALIZATION AND COMPUTATIONAL MODELLING

Learning Outcomes

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

1. Demonstrate principle of graphics visualisations in real world context.
2. Identify computational modelling technique in solving real world problem
3. Propose creative and innovative strategies for visualizing data

Synopsis

This course offers an interdisciplinary approach to graphics visualization and computational modeling. Students will learn to create impactful graphics for data representation and explore computational methods for modeling real-world phenomena. Through hands-on projects, they'll gain proficiency in graphic design tools, data visualization techniques, and computational modeling software. By course completion, students will possess the skills to visualize data effectively, analyze models, and communicate insights across various disciplines.

BITS 3423 INFORMATION TECHNOLOGY SECURITY

Learning Outcomes

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

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

Synopsis

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

Specialization Courses

BITU 2913 WORKSHOP I

Learning Outcomes

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

1. Identify project scopes relevant to their major that align with market or industry needs.
2. Construct a project by applying the principles of system analysis, design, and solution implementation, as relevant to the practices learned in previous courses.
3. Work as a team to complete the project within the given time.
4. Produce the required report and present the project output.

Synopsis

Workshop 1 aims to provide exposure and skills to the students in developing and presenting a project of application/system development individually. Students must use the knowledge that had been learned to solve problems and think creatively to get result that achieved the objective and scope of the proposed project, while upholding the professional ethics and integrity. Students must use the techniques learned in programming technique and database courses to assure that the project built will have a logical process flow and in precise with the system's criteria of robustness, consistent, have an interesting interface and able to handle error in data input/output process. At the end of this Workshop, students must present and defend the project. The process of supervision/evaluation is handled in terms of supervision and progress evaluation by a supervisor within 12 weeks besides the presentation evaluation by an evaluator. This course will also introduce the students to intellectual property rights and infringement to avoid common errors, such as plagiarism.

BITU 3923 WORKSHOP II

Learning Outcomes

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

1. Comply with the concept of intellectual property and the sustainability for the project.
2. Work as a teamwork to complete the project within the given time .
3. Construct the project by applying the concept of system analysis, design and development learnt in the previous subjects

Synopsis

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

BITP 3253 SOFTWARE VERIFICATION AND VALIDATION

Learning Outcomes

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

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

Synopsis

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

BITP 3173 INTERNET OF THINGS DEVELOPMENT

Learning Outcomes

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

1. Interpret IoT products, platforms, and solutions
2. Construct smart IoT applications
3. Utilise the convergence of technologies and emerging applications of IoT

Synopsis

The Internet of Things allows billions of devices, sensors, cloud infrastructure and business intelligence tools to come together to enable people to make informed decisions. This subject covers the concepts of the Internet of Things (IoT), its conceptual framework and how the IoT contributes to business and daily life. It will also cover the IoT architecture and gives an overview of the core technologies required for supporting IoT. It also provides knowledge on both the underlying technologies which support IoT and M2M communications, and engages the students in the creative development of simulation scenarios for innovative Internet of Things applications.

BITP 3223 SOFTWARE PROJECT MANAGEMENT

Learning Outcomes

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

1. Identify activities and scopes to manage software development project
2. Demonstrate ability to manage software project start-up, monitoring, controlling and closing
3. Prepare formal software development plan document

Synopsis

This course provides students with fundamental discipline in managing software development project. The course exposes students to a variety of techniques to prepare and manage people, budget, schedule, risks and quality of software project. The course also provides skills to the students how to use software tools and modeling

approaches in constructing software project plan such as Microsoft Project, MS Excel spreadsheets and MS Words.

BITP 3163 SOFTWARE DEVELOPMENT AND OPERATIONS

Learning Outcomes

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

1. Assess the process and cycle of development and operation to conform with Agile Methodology
2. Build solution for delivering and automate deployment in compliance with software development practices
3. Follow the concept of development and operation in the SDLC

Synopsis

The course exposes the students to the culture and practises of Development and Operation in the software development life cycle. The students will also expose to the best practises in securing the project during development and ensuring the project able to operate continuously after being deployed to the production environment. At the end of the course, the students should gain insight into how a software project can be delivered and what are the post development actions that must be done in regard to agile development methodology.

BITP 3453 MOBILE APPLICATION DEVELOPMENT

Learning Outcomes

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

1. Elucidate the concept of mobile application development
2. Construct a mobile application via stored to local storage
3. Prepare mobile application deployment into device

Synopsis

This course exposes the students to the development of mobile application development, focusing on Android platform. The topics included in this course ranging from the concept of mobile development to the components that are used to develop an Android application, use the storing data such local database and mysql to store and retrieve the data. Finally, student able to deploy developed android application to mobile devices.

BITP 3423 SPECIAL TOPIC IN SOFTWARE ENGINEERING

Learning Outcomes

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

1. Analyze the concepts, methods and techniques as software solution in the software engineering
2. Propose the applicability of the software solutions, methods or techniques to solve real-world software engineering challenges
3. Synthesize the software solutions, methods and techniques to solve problems in the selected case studies.

Synopsis

This course delves into advanced topics in computer science, specifically focusing on emerging technologies within software engineering. Students will analyze research publications to understand the principles, techniques, and tools essential to software engineering, equipping them to address real-world challenges. Students will delve into contemporary research publications to gain a comprehensive understanding of the principles, techniques, and tools shaping modern software development. Through theoretical learning and practical applications, students will acquire the expertise needed to tackle real-world software engineering challenges. Through research and hands-on activities, they will explore cutting-edge techniques influencing modern software development and be encouraged to propose innovative solutions to complex problems. A conceptual paper investigating ethical considerations and industry trends will align with Malaysia's national initiatives, including the MySTIE Framework, the Sustainable Development Goals (SDGs), the Malaysia Digital Economy Blueprint, and Industry4Wrd. Engaging in hands-on projects, case studies, and capstone projects will allow students to apply their skills in real-world scenarios, effectively preparing them for success in the ever-evolving field of software engineering.

Free Modules Courses

BTMT 3383 SOCIAL ENTREPRENEURSHIP

Learning Outcomes

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

1. Demonstrates the concept, opportunities and challenges of Social Innovation and Social Entrepreneurship (SISE) for social entrepreneurs and social enterprises
2. Engage in collaborative learning to understand SISE in the context of SISE entrepreneurs and social enterprises
3. Prepare professionally for employment by reflecting on the issues related to SISE entrepreneurs and social enterprises

Synopsis

This course explores the approaches of social innovation and social entrepreneurship (SISE) used by social entrepreneurs to develop innovative social business models and breakthrough solutions to pressing social problems. Students learn about the full range of social business models, including non-profit organisations, businesses that produce income-generating products or services for a social purpose, and socially responsible for-profit businesses. Students must understand how social enterprises use the SISE to develop business models that provide innovative solutions to deep-rooted social challenges. Students will also critically engage with social problems in communities and create innovative strategies for transformative social change. For the course's final project, students will need to design and manage viable SISE projects that target the social beneficiaries or communities they want to transform.

BTMP 3243 STRATEGIC INNOVATION MANAGEMENT

Learning Outcomes

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

1. Elaborate on knowledge learnt and skills acquired in innovation and management and synthesize the process through strategy-integration
2. Illustrate skills and knowledge and develop mechanisms to create wealth.
3. Organize, formulate changes and determine problem-solving solutions relating to innovation processes and property rights.

Synopsis

This subject discusses strategic imperatives in research implementation and innovation management. Topics include developing research and innovation processes, as well as technology and innovation strategic management. Students will acquire the neccesary knolwedge and skills in innovation processes and management. The subject also discusses intellectual property rights. Case studies will be incorporated to enhance students' understanding on strategic innovation management.

BITS 2313 LOCAL AREA NETWORK

Learning Outcomes

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

1. Identify the suitable hardware, software, services and protocols that influence LAN design.
2. Propose the suitable LAN design using appropriate hardware, software, services and protocols.
3. Display understanding of LAN setup and the alternative that exist in the selection of technologies when designing and implementing LANs.

Synopsis

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

BTMT 3323 CONTEMPORARY BUSINESS MANAGEMENT

Learning Outcomes

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

1. Demonstrate an understanding of technology ventures approaches in advancing the digitisation, disruptive and converging technologies forsocietal and economic progress in the 4th Industrial Revolution.
2. Critically appraise the impact of digitisation, disruptive and converging technologies on business strategies and competitive advantage in the Industry 4.0.
3. Identify strategic challenges, formulate strategic solutions, and propose new and disruptive business models to take advantage of technology- enabled business opportunities of Industry 4.0.

Synopsis

This subject is designed to develop business talent for the future world of production. Students will be guided through the process of creating, analysing, planning and implementing disruptive and innovative business models with its operational strategies pertaining to the Industry 4.0. Students will be exposed to the theoretical and hands-on exercises of Industry 4.0 business management to enable them to apprehend the concept of the 4th Industrial Revolution. Topics discussed will include the Emergence of Business Model 4.0, 4.0 Products and Services, Industrial Internet of Things (IIoT), Cyber-Physical System, Digital Business Transformation, Digital Enterprise, Smart Factory, Intelligent Robots and Intelligent Production and Manufacturing. In the hands-on exercises, students will use visualisation software as well as stationary modules or simulators. Students are expected to acquire the skills and knowledge to utilise the Industry 4.0 model in the current and future global marketplace. These would enhance their professional career as a technopreneur, executive or consultant in the field of Industry 4.0 transformation. By the end of this course, students should be able to define, discuss, understand and apply the business strategies and tactics learnt in the context of Industry 4.0.

BITI 2213 KNOWLEDGE-BASED MANAGEMENT

Learning Outcomes

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

1. Apply fundamental concept of knowledge-based system in solving problems.
2. Build a basic knowledge-based system based on appropriate concept and components.
3. Construct knowledge-based systems in various domains.

Synopsis

The purpose of this course is to introduce the students to the concept of knowledge-based systems (KBS) such as phases of developing KBS, types of knowledge representations, knowledge acquisitions, and types of inference techniques and reasoning. Students also are exposed to Expert Systems as one of the KBS.

BITM 1123 INTERACTIVE MEDIA AUTHORING

Learning Outcomes

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

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

Synopsis

This course introduces students to the process of developing an interactive media project, from planning to final product. Students will learn about instructional design, e-learning standards, and how to create engaging learning content. They will gain hands-on experience using relevant tools to design and build interactive learning materials. Students are also expected to work well in teams, manage time effectively,

and show creativity and responsibility in completing their project and report by the end of the semester.

BITM 2113 WEB APPLICATION DEVELOPMENT

Learning Outcomes

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

1. Explain the concept and the principle of internet and www based on the latest technologies.
2. Use the important components in web applications which are client site technology, server site technology, database server and web server.
3. Demonstrate the appropriate use of important components in developing web applications.

Synopsis

The purpose of this course is to provide students with a comprehensive understanding of the tools and problem-solving techniques related to building effective world wide web sites. The course emphasis 4 components in developing web applications which are 1) Client site technologies: html, xhtml, html5, css, javascript, jquery 2) Server site technologies: php 3) Database server: mysql. 4) Web servers: apache. This course also brings together all of the elements of web site design, graphics, animation, and data storage for the construction of fully functional commercial web site applications.

BITP 2323 DATABASE ADMINISTRATION

Learning Outcomes

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

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

Synopsis

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

BITP 3233 STRATEGIC INFORMATION SYSTEM PLANNING

Learning Outcomes

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

1. Explain the business organization components, environment, challenges and objectives of information systems (IS) investment.
2. Use the IS and strategic planning tools in planning process.
3. Propose information systems strategically appropriate for the business organization.

Synopsis

This subject will introduce the importance of information systems (is) to enhance organisation competitiveness. Therefore the students will be equipped with various types of information systems and a strategic planning process, tools and techniques to propose business information systems that strategically differentiate and competitive than other organisations. Then students will work to integrate

organisation’s business objectives with is that support its business direction and creating competitive advantage to the organisation.

BITS 2573 CLOUD COMPUTING FUNDAMENTAL

Learning Outcomes

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

1. Explain concepts around cloud computing, big data, and machine learning and demonstrate some hands-on skills.
2. Describe the roles and workplace skills required to support Cloud transformation.
3. Demonstrate an understanding of the technical aspects of Cloud technologies,
4. Costings and impact on the organisation.

Synopsis

This course teaches the student on how to develop technical prociency in cloud computing and launch or pivot to careers in a cloud-computing world. It will provide a detailed overview of concepts covering cloud basics, big data, and machine learning and where and how Cloud Computing works starting with an overview of cloud computing and then dives deeper into two areas - cloud computing infrastructure, and big data and machine learning.

BITP 3483 GEOGRAPHIC INFORMATION SYSTEMS

Learning Outcomes

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

1. Discover the fundamental theory of Geographic Information Systems (GIS) and develop an awareness of GIS capabilities and limitations.
2. Manipulate GIS tools to conduct spatial analyses and create fit-for- purpose maps that convey the intended information effectively.
3. Demonstrate GIS-based solutions for geographic modeling and analysis tasks to address practical issues or research questions by creating maps that can be shared with non-GIS users.

Synopsis

This course will introduce Geographic Information Systems (GIS), a computer-based tool for managing, analyzing, and visualizing spatial data. GIS is an advanced database encompassing theory, concepts, and related disciplines. The topics covered include fundamental terminology and technologies associated with GIS, practical examples of GIS applications, raster and vector spatial data representations, data modeling, file and database systems, data collection methods, spatial analysis, data quality, spatial data management, and organizational issues. The course will also explore GIS applications in electronic government, resources management, disaster management, businesses, banking, and insurance industries. Students are expected to have basic knowledge of traditional methods of identifying and describing locations using paper maps. The course will begin with an examination of the geographic basics of mapping and how spatial data can be recorded, captured, stored, and processed using computers, followed by an introduction to the methods used in spatial analysis.

BTMU 1093 BUSINESS STATISTICS

Learning Outcomes

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

1. Identify the statistical terms, properties and procedures
2. Apply appropriate statistical methods to the different areas of Business.
3. Analyse data for business interpretation and decision making.

Synopsis

This course is related to the application of applied statistics used for problem solving in conducting any business operation. The topics include introduction to statistics, data classification, graphic presentation, central tendency measurement, frequency of spread distribution measurement, concepts of probability, probability distribution, sampling distribution, interval estimation, hypothesis testing, chi-square distribution, variance analysis (anova), simple linear regression analysis, and correlation analysis. Knowledge acquired will arm students with the competencies in statistics for analysing and solving daily business problems.

BTMT 3343 TECHNOPRENEURSHIP GROWTH STRATEGY

Learning Outcomes

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

1. Describe the elements of technopreneurial growth.
2. Recognize the challenges of global technopreneurial growth.
3. Demonstrate effective application of technopreneurial growth strategy by developing technopreneurship growth plan.

Synopsis

This subject is designed to introduce students to the basic concepts of business growth. This course then drives students to explore the process of growth, and how to manage the ingredient of growth required for the right leadership, culture, and people. The objective of the course is to offer students to the basic steps required to examine, assesses and plan growth in technopreneurial context. The course materials provide guidance and useful management tools, company success is determined by the team's efforts. Students are required to identify "real" technopreneurs at the growing stage; to define and deliver products and services: to negotiate with suppliers, administrative agencies and other stakeholders; and to finance company operations using various digital technology tools. This is a real world, real time experience, supplemented by classroom analysis and sharing of lessons learned.

BITS 3343 FIBER OPTIC

Learning Outcomes

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

1. Illustrate the concept of fiber optic basic theories.
2. Assemble the suitable cable and network devices for fiber optic.
3. Demonstrate a network design using fiber optic cable and appropriate tools.

Synopsis

This subject covers basic and advanced applications that will relate to optical fiber in common usage in the network. Specific mechanism will be discussed from operating principles of optical communication device to fiber optic communication technology.

Diploma in Computer Science

Programme Details

Diploma in Computer Science - **DCS** deals with designing innovative methodologies and sophisticated tools for developing software systems. Students are exposed to various techniques of analysing user requirements and specifications, as well as design and implementation of software systems. Some of the core courses include object-oriented programming, database systems, software analysis and design and human computer interaction.

Graduate Competency

1. Apply programming principles and problem-solving techniques to design, model, and implement software applications. Students will be able to use structured and object-oriented approaches, applying tools such as UML, flowcharts, and low-code solutions to deliver effective programs in line with industry standards.
2. Analyse user requirements and develop system solutions by applying software development life cycle (SDLC) methodologies, structured and object-oriented modelling, and database design principles. Graduates will be able to transform business needs into reliable and functional systems through requirement gathering, process modelling, and systematic documentation.
3. Develop web and mobile applications by integrating front-end and back-end technologies with relevant frameworks. Emphasis is placed on user interface and user experience (UI/UX) principles to ensure applications are user-friendly, adaptable, and aligned with modern industry practices.
4. Install, configure, and secure networks and computer systems by applying knowledge of data communication, network technologies, and computer security services. Students will be able to troubleshoot, monitor, and protect systems using appropriate tools and methods to ensure system reliability and data safety.
5. Communicate and collaborate effectively in multidisciplinary teams, demonstrating professional skills in documentation, report writing, and presentations. Graduates will also embrace lifelong learning, adaptability, and accountability to remain relevant with evolving ICT technologies and future career opportunities.

Career Prospects

There is a wide range of career opportunities in the field of computer science and information technology available for graduates of Diploma in Computer Science. Among the career opportunities are programmers, analyst programmers, multimedia programmers, network administrators, software developers and any Computer Science related positions. Other than that, the graduates also have the opportunity to further their studies at degree level.

Duration of Studies

Mode	Durations of studies	
	Minimum	**Maximum**
Full-time	5 semesters (2 years 6 months)	10 semesters (5 years)
Part-Time	8 semesters (4 years)	16 semesters (8 years)

Programme Educational Outcome (PEO)

Programme Educational Objectives (PEO)	
Graduates of the Diploma in Computer Science are expected within 3 -5 years after graduated to be computer technicians who are able to:	
PEO 1	Provide computer solutions to computing problems using basic knowledge, numeracy and technical skills that meet industry needs.
PEO 2	Possess supervisory ability, communication and interpersonal skills in engaging within industry and the community.
PEO 3	Practice lifelong learning and entrepreneurial mindset to improve their self and career development.
PEO 4	Uphold professional practices and ethics with integrity principles in fulfilling their responsibilities

Program Learning Outcome (PLO)

Upon completion of the programme, students should be able to:	
PLO 1	Explain a broad range of concepts, principles and theories to address issues in Computer Science discipline.
PLO 2	Apply appropriate tools and procedures to produce computing solutions for well-defined and routine problems.
PLO 3	Perform appropriate skills to support and develop computing solutions for related job functions.
PLO 4	Demonstrate effective interaction in engaging with stakeholders and society within an organisation.
PLO 5	Exhibit effective communication through oral and written modes in engaging with stakeholders and society within an organisation.
PLO 6	Use a range of computing software or tools to solve problems related to job functions.
PLO 7	Apply appropriate numerical skills in computing to solve problems related to job functions.
PLO 8	Demonstrate supervisory skills to manage teams in performing job functions with autonomy and responsibility.
PLO 9	Commit to self-improvement initiatives for independent and lifelong learning in academic and career development.
PLO 10	Demonstrate an entrepreneurial mindset in delivering solutions.
PLO 11	Commit to professionalism and ethical values in performing job and organisational functions.

Curriculum Structure

Students are required to complete a minimum of 90 credits to graduate with a Diploma in Computer Science. The programme components are as follows:

COMPONENT (COURSES)	CREDIT HOURS
University Compulsory (W)	14
Core Computing (P)	33
Discipline Core (K)	31
Final Year Project (P)	4
Industrial Training (P)	8
	90

List of Courses for Each Semester

Year 1 Semester 0		Code	Credit	Pre-requisite
Code	**Course**			
DLLW 1112	Foundation English	W	2	
DLHW 2722	Kursus Integriti Anti Rasuah	W	2	
DLHW 2772	Appreciation of Ethics and Civilizations	W	2	
Total Credit			**6**	

Year 1 Semester 1		Code	Credit	Pre-requisite
Code	**Course**			
DKK* ***1	Co-Curriculum I	W	1	
DTMW 1012	Fundamentals of Entrepreneurial Acculturation	W	2	
DITI 1253	Discrete Mathematics	P	3	
DITP 1113	Programming 1	P	3	
DITP 1333	Database	P	3	
DITM 1413	Ethics in Computing	P	3	

DITS 1133	Computer Organization and Architecture	P	3	
Total Credit			**18**	

Year 1 Semester 2		**Code**	**Credit**	**Pre-requisite**
Code	**Course**			
DKK* ***1	Co-Curriculum I	W	1	
DLLW 2122	English for Effective Communication	W	2	
DITI 1263	Calculus and Algebra	P	3	
DITP 2213	System Analysis and Design	P	3	
DITS 2213	Operating System	P	3	
DITM 1313	Human Computer Interaction	K	3	
DITP 1123	Programming 2	K	3	DITP 1113
Total Credit			**18**	

Year 1 Semester 3		**Code**	**Credit**	**Pre-requisite**
Code	**Course**			
DITS 2313	Data Communication and Networking	P	3	
DITP 2113	Data Structure and Algorithm	K	3	DITP 1113, DITP 1123
Total Credit			**6**	

Year 2 Semester 1		**Code**	**Credit**	**Pre-requisite**
Code	**Course**			
DLLW 3132	English for Marketability	W	2	
DITI 2233	Statistics and Probability	P	3	
DITS 2413	Computer Security	P	3	
DITM 2123	Web Programming	K	3	
DITP 3113	Object-oriented Programming	K	3	DITP 1113

DITU 3934	System Development Workshop	K	4	DITP 2213
Total Credit			**18**	

Year 2 Semester 2		Code	Credit	Pre-requisite
Code	**Course**			
DITI 3133	Applied Artificial Intelligence	K	3	
DITP 2133	Platform-based Development	K	3	
DITP 3123	Distributed and Parallel Application Development	K	3	
DITS 2223	System Fundamentals	K	3	
DITU 3964	Diploma Project	P	4	DITU 3934
Total Credit			**16**	

Year 3 Semester 1		Code	Credit	Pre-requisite
Code	**Course**			
DITU 2346	Industrial Training	P	6	
DITU 2362	Industrial Training Report	P	2	
Total Credit			**8**	

Course Synopsis

University Compulsory

DLLW 1112 FOUNDATION ENGLISH

Learning Outcomes

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

1. Interpret various types of texts.
2. Demonstrate group interaction skills.
3. Produce a report based on non-linear texts.

Synopsis

This subject is designed to help students to improve their proficiency in the English language and to communicate effectively in both spoken and written forms. Three main aspects: speaking, reading, and writing are taught in an integrated approach to

build confidence among the learners to become efficient speakers of English in their tertiary education.

DLLW 3132 ENGLISH FOR MARKETABILITY

Learning Outcomes

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

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

Synopsis

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

DLLW 2122 ENGLISH FOR EFFECTIVE COMMUNICATION

Learning Outcomes

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

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

Synopsis

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

DLHW2772 PENGHAYATAN ETIKA DAN PERADABAN

Learning Outcomes

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

1. Menerangkan konsep etika dan peradaban dalam konteks penghayatannya mengikut acuan Malaysia.
2. Membincangkan sistem, tahap perkembangan, kemajuan sosial dan kebudayaan merentas budaya
3. Menghubung kaitkan isu kontemporari berkaitan ekonomi, politik, sosial, budaya dan alam sekitar daripada perspektif etika dan peradaban

Synopsis

Kursus ini mempersiapkan pelajar untuk menghayati etika dan peradaban yang wujud dalam masyarakat kepelbagaian etnik di Malaysia untuk memperteguhkan pemikiran kritikal dan analitikal mereka bagi menangani kehidupan yang lebih mencabar.

Pengisian kursus ini memfokuskan kepada penghayatan etika dan peradaban dalam acuan Malaysia. Pelajar akan didedahkan dengan dinamika konsep etika dan peradaban yang menjadi kekuatan kepada pembentukan negara Malaysia berdasarkan susur masa evolusi sejarahnya dari era pra-kolonial sehingga ke pasca-kolonial. Kefahaman tentang pembentukan etika dan peradaban dalam masyarakat kepelbagaian dibincangkan bagi meningkatkan penghayatan etika dan peradaban ke arah pemantapan kesepaduan nasional dan bangsa Malaysia. Peradaban acuan Malaysia perlu dikupas serta diperdebatkan dalam aktiviti akademik berpandukan Perlembagaan Persekutuan sebagai tapak integrasi dan wahana etika dan peradaban. Pembinaan kesepaduan nasional amat dipengaruhi oleh globalisasi dan perkembangan teknologi maklumat dan komunikasi yang kompleks. Oleh kerana itu, penghayatan etika dan peradaban menzahirkan perilaku tanggungjawab sosial dan digerakkan pada peringkat individu, keluarga, komuniti, masyarakat dan negara. Justeru, perubahan yang berlaku dalam masyarakat dan pembangunan langsung ekonomi telah membawa cabaran baru dalam mengukuhkan kelestarian etika dan peradaban di Malaysia. Amalan Pendidikan Berimpak Tinggi (HIEPS) dipraktikkan dalam pengajaran dan pembelajaran bagi mendalami kursus ini.

DLHW2722 KURSUS INTEGRITI DAN ANTI RASUAH

Learning Outcomes

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

1. Memupuk minat untuk mengamalkan nilai integriti dalam kehidupan seharian.
2. Menghubungkaitkan antara penolakan dengan penerimaan sebarang bentuk pelakuan rasuah dan salah guna kuasa dalam kehidupan dan organisasi.
3. Mengaplikasi aktiviti berkaitan dengan pemupukan nilai integriti dan pencegahan rasuah.

Synopsis

Kursus Integriti dan Anti Rasuah (KIAR) ini bertujuan memperkenalkan kepada para pelajar mengenai amalan integriti dan kepentingan membanteras rasuah dalam kehidupan masyarakat dan organisasi. Tumpuan kursus memfokuskan kepada nilai integriti dan pencegahan rasuah, isu, permasalahan dan cabaran pengurusan jenayah rasuah dalam masyarakat dan organisasi. Aktiviti pembelajaran merangkumi perbincangan dalam kumpulan, pelaporan dan kerja lapangan dalam masyarakat pelbagai sektor (sektor awam, swasta, NGO, politik dan pelajar).

DTMW 1012 FUNDAMENTALS OF ENTREPRENEURIAL ACCULTURATION

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

akan dibekalkan dengan kemahiran yang perlu untuk menyediakan penyata aliran tunai dan asas dalam membangunkan dan menyediakan perancangan perniagaan.

Core Computing Courses (P)

DITI 1253 DISCRETE MATHEMATICS

Learning Outcomes

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

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

Synopsis

This course introduces the fundamental concepts and techniques of Discrete Mathematics that are needed for computer science. Topics include Fundamental of Logics, Fundamentals of Proofs, Set Theory, Functions. Algorithms, Integers, Induction, Recursion, Counting, Relation, Graphs, Trees and Boolean Algebra.

DITP 1113 PROGRAMMING I

Learning Outcomes

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

1. Construct solutions for a problem with suitable tools, programming techniques and structures.
2. Practice program codes in troubleshooting program and problem solving.
3. Construct computer program codes by applying suitable programming techniques and structures.

Synopsis

This course covers the introductory topics in structured programming language. It includes the introduction to computers and programming as well as the fundamentals of programming problems. Data types and operators, selection, repetition, function are among the topics covered in the course.

DITP 1333 DATABASE

Learning Outcomes

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

1. Apply essential database and data modeling concepts including data queries in data management.
2. Construct data models and queries based on given database application scenarios.
3. Report the database concepts, data modeling and data queries on a database application development.

Synopsis

This course provides a comprehensive introduction to the core concepts and practical skills necessary for effective database management. Students will gain a solid

foundation in understanding databases, data modeling, executing SQL queries, and developing simple database systems. At the end of this course, students will have gained a comprehensive understanding of database fundamentals, and the practical skills required to design, manage, and interact with databases effectively. The course will prepare students to step into roles as database designers and developers, enabling them to apply their knowledge in diverse professional environments and providing a solid foundation for further studies in advanced database courses.

DITM 1413 ETHICS IN COMPUTING

Learning Outcomes

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

1. Understand the ethical issues in computing.
2. Communicate effectively about ethical issues in computing
3. Demonstrate ethical decision making about the use of technology.

Synopsis

This course is an introduction to the ethical issues in the field of computer technology. It will explore a range of topics, including the nature of ethical reasoning and its application to computing; the ethical implications of new technologies, the ethical responsibilities of computer scientists in the workplace; and the social implications of computer technology. The course will use a variety of teaching methods, including lectures, class discussions, and case studies. Students are expected to complete a number of assignments, final project and presentations.

DITS1133 COMPUTER ORGANIZATION AND ARCHITECTURE

Learning Outcomes

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

1. Demonstrate the concept of functional computer components and the detail interactions in computer systems.
2. Explain the principles and techniques used in implementing a processor.
3. Construct a basic function of computer system.

Synopsis

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

DITI 1263 CALCULUS AND ALGEBRA

Learning Outcomes

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

1. Explain the knowledge and fundamental concepts of calculus and algebra.
2. Construct solutions to application problems by relevant information using suitable techniques

3. Demonstrate application problems solutions using any suitable tools by referring to the theories

Synopsis

Students are exposed to the concept of probability and inferential statistics. The course starts with data description and numerical measures, probability, This course covers two areas of mathematics namely Calculus and Algebra. Topics for the first part include Functions, Exponential and Natural Logarithm, Limits, Differentiation and Its Applications, Integration and Its Applications. The second part topics consist of Matrics, Determinant, Systems of Linear Equations and Vectors.

DITP 2213 SYSTEM ANALYSIS AND DESIGN

Learning Outcomes

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

1. Illustrate the information systems and system development methodology.
2. Manipulate suitable system development methodology to plan, analyze, and design a new system.
3. Report the system planning, analysis, and design based on suitable system development methodology.

Synopsis

Students will be introduced to a variety of information systems and system development lifecycles. Then, the system development methodology will be explained with different approaches - structured approach and object-oriented approaches. Next, it discusses the planning phase with a focus on project identification, selection, initiation, and planning. The analysis phase will emphasize the determination and structuring of user requirements. The design phase then discusses the database, input, output, interface, and dialogue design. The final phase of system development will cover the implementation and software quality assurance. Object-oriented concepts with common UML diagrams are also introduced in general as different approaches to system analysis and design methodology.

DITS 2213 OPERATING SYSTEM

Learning Outcomes

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

1. Describe the major components and functionalities of an operating system along with its underlying structure.
2. Display basic system administration tasks in different operating system.
3. Discuss the different types of operating system algorithms such as I/O scheduling, memory scheduling and uniprocessor scheduling.

Synopsis

This course is designed to give an exposure to students about the fundamental of operating system including process, management of memory, file and I/O and also about CPU scheduling. The introduction part consists of the evolution of operating system since it started until now. Student will also learn about the basic concepts, technology and theory used in operating system such as concurrency, kernel,

deadlock and multithreading. In addition, students will be introduced to few types of operating systems at basic administrative level.

DITS 2313 DATA COMMUNICATION AND NETWORKING

Learning Outcomes

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

1. Apply the knowledge of data communication fundamental and networking concepts.
2. Follow the best practices or techniques to configuring current network and telecommunication technology.
3. Differentiate types of media, network topology and network technologies.

Synopsis

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

DITI 2233 STATISTICS AND PROBABILITY

Learning Outcomes

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

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

Synopsis

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

DITS 2413 COMPUTER SECURITY

Learning Outcomes

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

1. Explain the concept and issues of information technology security.
2. Manipulate an appropriate security system mechanism ethically

3. Differentiate the suitable components used to provide security services and mechanism in computer software, operating system, database and network system

Synopsis

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

Discipline Core (K)

DITM 1313 HUMAN COMPUTER INTERACTION

Learning Outcomes

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

1. Apply the concepts and theories of human computer interaction in the system development.
2. Show conceptual thinking in problems solving related to application, website or product design.
3. Select appropriate evaluation techniques related to application, website or product design.

Synopsis

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

DITP 1123 PROGRAMMING II

Learning Outcomes

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

1. Contruct solutions for a problem with suitable tool, programming techniques and structures.
2. Practice program codes in troubleshooting program and problem solving.
3. Construct computer program codes by applying suitable programming techniques and structures.

Synopsis

This course is a continuity on fundamental functional programming from previous course, which covers topics such as array, cstring manipulation, structured data, pointer as well as the problem solving resolves around these topics. Some Standard Library – Math/Date/Map library will be applied

DITP 2113 DATA STRUCTURE AND ALGORITHM

Learning Outcomes

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

1. Illustrate the fundamental of data structures and algorithms by visualizing data structure concept.
2. Construct programs which implement various data structures and common searching and sorting algorithms.
3. Demonstrate the implementation of data structures and algorithms in problem solving.

Synopsis

This course aims to develop students' knowledge of data structures and algorithms. It begins with a review of basic abstract data type (ADT) concepts, which will later be applied to the implementation of data structures. The course then introduces the analysis of algorithm efficiency, followed by problem-solving using recursion. Students will learn about essential data structures such as array-based lists, linked lists, stacks, queues, trees, graphs, and heaps, along with the operations for maintaining them. The course then discusses various searching and sorting algorithms, followed by problem-solving using greedy algorithms. Throughout the semester, students will also be exposed to applying these data structures and algorithms to solve various challenges and problems.

DITM 2123 WEB PROGRAMMING

Learning Outcomes

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

1. Apply the concepts and the principles of Internet and WWW based on the latest technologies.
2. Discuss the important components which are Client Site Technology, Server Site Technology, Database Server and Web Server in the development of web applications.
3. Display the effective application of key components in the development of web applications.

Synopsis

This course is designed to give an exposure to students about the fundamental of operating system including process, management of memory, file and I/O and also about CPU scheduling. The introduction part consists of the evolution of operating system since it started until now. Student will also learn about the basic concepts, technology and theory used in operating system such as concurrency, kernel, deadlock and multithreading. In addition, students will be introduced to few types of operating systems at basic administrative level.

DITP 3113 OBJECT ORIENTED PROGRAMMING

Learning Outcomes

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

1. Assess object-oriented programming principles in software development.
2. Construct application programs that implement object-oriented principles.

3. Demonstrate the implementation of object-oriented concepts in problem-solving.

Synopsis

This course will introduce the fundamentals of object-oriented programming such as encapsulation, polymorphism, and inheritance. Apart from that, the collection framework, exception handling, and connecting applications to the database will be explained.

DITU3934 SYSTEM DEVELOPMENT WORKSHOP

Learning Outcomes

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

1. Propose a project for implementation within a group setting.
2. Solve problems by using software development methodologies within a development project
3. Perform the project in groups ethically

Synopsis

This course aims to provide exposure and skills to the students in developing and presenting a project of application/system development in a group. In this course students should be able to integrate subjects learned in earlier semesters such as analysis and design, programming, data structures and algorithms to develop a system.

DITI 3133 APPLIED ARTIFICIAL INTELLIGENCE

Learning Outcomes

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

1. Explain the definition of Artificial Intelligence and its techniques.
2. Reproduce several types of Artificial Intelligence techniques.
3. Propose suitable Artificial Intelligence techniques in solving problems.

Synopsis

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

DITP 2133 PLATFORM-BASED DEVELOPMENT

Learning Outcomes

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

1. Apply the concepts and the principles of web and mobile technologies for application development.
2. Construct both frontend and backend applications including database on web server with the current platform-based framework
3. Demonstrate multi-user platform-based applications that employ web and mobile principles and methodologies.

Synopsis

This course concentrates on designing and developing software applications for specific platforms, with particular attention to web and mobile platforms. This platform-based development involved working with ecosystems and environments that are resource-constrained, feature-restricted, and energy-efficient. Thus, the skills of developing concerning services, APIs, and hardware are covered within the course curriculum, including programming paradigms, component libraries, and security. This course involves significant practical programming components focusing on different platform concepts with a broad range of theoretical and technical advances.

DITP 3123 DISTRIBUTED AND PARALLEL APPLICATION DEVELOPMENT

Learning Outcomes

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

1. Apply the suitable concept of distributed and parallel in application development.
2. Construct the software application in distributed and parallel environment.
3. Demonstrate the principle of distributed and parallel programming in building efficient and scalable applications.

Synopsis

This course introduces the concepts of distributed and parallel computing. Topics covered include architectural patterns, I/O fundamentals, distributed application development with TCP and UDP programming, multithreading, concurrency, the Fork/Join framework, and performance testing of Fork/Join applications. Upon completion of this course, students will be able to understand the fundamental concepts of distributed and parallel computing, apply architectural patterns to design distributed and parallel applications, use I/O effectively in distributed and parallel applications, develop distributed applications using TCP and UDP programming, understand the basics of multithreading, apply concurrency concepts to design and develop parallel applications, use the Fork/Join framework to develop parallel applications, and perform performance testing of Fork/Join applications.

DITS 2223 SYSTEMS FUNDAMENTALS

Learning Outcomes

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

1. Describe the basic concepts, principles and theories related to computer systems.
2. Display appropriate computer systems mechanism related to virtual machines and processor architecture.
3. Study the parallelism techniques to improve the performance of a computer.

Synopsis

This subject introduces students to the fundamental concepts of computer systems which comprises of basic knowledge of computer organization and architecture, and operating systems. It provides a thorough understanding of the hardware and the system software and the relationship between the two. It introduces the concepts of digital logic, assembly language, processor architecture, and memory hierarchy. In

addition, this subject explores techniques in scheduling, pipelining and parallelism to achieve high performance.

Final Year Project (P)

DITU 3964 DIPLOMA PROJECT

Learning Outcomes

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

1. Identify problems related to industrial needs in the ICT domain.
2. Complete the development of a computer system using relevant project management methods.
3. Organise information to produce a formal report.
4. Present a completed project demonstrating key objectives, outcomes and challenges.

Synopsis

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

Industrial Training (P)

DITU 2346 INDUSTRIAL TRAINING

Learning Outcomes

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

1. Integrate tasks related to ICT.
2. Practice the knowledge and skills that they've learned in classes throughout their internship.
3. Explain technical tasks performed into a logbook.

Synopsis

Students must do the internship no less than 16 weeks in an organization that they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship activities in their logbooks. The faculty supervisor will visit the student only once and usually, it will be near the end of the 16 weeks. During the visit, students are required to do a presentation at the organization in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of the Industrial Training Report to the faculty supervisor for evaluation.

DITU 2362 INDUSTRIAL TRAINING REPORT

Learning Outcomes

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

1. Perform an internship presentation
2. Report on the knowledge and skills gained throughout their internship
3. Demonstrate interpersonal skills by interacting with staff, colleagues, and personnel.

Synopsis

This subject is an extension of DITU 2346 where students must do the internship no less than 16 weeks in an organization that they have chosen. Throughout the internship, students are guided and monitored by the industrial supervisor. Students are required to report their internship activities in their logbooks. The faculty supervisor will visit the student only once and usually, it will be near the end of the 16 weeks. During the visit, students are required to do a presentation at the organization in attendance of both Industrial and Faculty supervisor. Students must also submit a copy of the Industrial Training Report to the faculty supervisor for evaluation.