



**BACHELOR OF COMPUTER SCIENCE
(GRAPHICS & MULTIMEDIA SOFTWARE)**



**BACHELOR OF COMPUTER SCIENCE
(GRAPHICS AND MULTIMEDIA SOFTWARE)
PROGRAMME SPECIFICATIONS**

The Bachelor of Computer Science (Graphics and Multimedia Software) is offered on a full-time basis. The full-time programme is offered only at the UTM Main Campus in Johor Bahru. The duration of study for the full-time programme is subjected to the student’s entry qualifications and lasts between four (4) years to a maximum of six (6) years.

The programme is offered on full-time basis and is based on a 2-Semester per academic session. Generally, students are expected to undertake courses equivalent to between fourteen (14) to eighteen (18) credit hours per semester. Assessment is based on courseworks and final examinations given throughout the semester.

General Information

1. Awarding Institution	Universiti Teknologi Malaysia
2. Teaching Institution	Universiti Teknologi Malaysia
3. Programme Name	Bachelor of Computer Science (Graphics and Multimedia Software)
4. Final Award	Bachelor of Computer Science (Graphics and Multimedia Software)
5. Programme Code	TC29 (SCSV)
6. Professional or Statutory Body of Accreditation	Ministry of Higher Education
7. Language(s) of Instruction	English
8. Mode of Study (Conventional, distance learning, etc)	Conventional
9. Mode of operation (Franchise, self-govern, etc)	Self-governing
10. Study Scheme (Full Time/Part Time)	Full Time

11. Study Duration		Minimum : 4 yrs (8 semesters) Maximum : 6 yrs (12 Semesters)		
Type of Semester	No. of Semesters		No of Weeks/Semester	
	Full Time	Part Time	Full Time	Part Time
Normal	8	-	14	-
Short				

Course Classification

No.	Classification	Credit Hours	Percentage
i.	University Courses a. General b. Language c. Co-Curriculum d. IT Entrepreneurship	10 8 3 2	17.6%
ii.	Core Courses	74	56.5%
iii.	Elective Courses	34	25.9%
	Total	131	100%
A	Engineering Courses (a) Lecture/Project/Laboratory (b) Workshop/Field/Design Studio (c) Industrial Training (d) Final Year Project	Nil	Nil
Total Credit Hours for Part A			

B	Related Courses (a) Applied Science/Mathematic/Computer (b) Management/Law/Humanities/Ethics/Economy (c) Language (d) Co-Curriculum	Nil	Nil
Total Credit Hours for Part B			
Total Credit Hours for Part A and B		Nil	
Total Credit Hours to Graduate		131 credit hours	

Award Requirements

To graduate, students must:

- Achieve a total of 131 credit hours with minimum CPA of 2.0
- Pass industrial training (equivalent to 12 credit hours), which 4 credits will be graded and 8 credits as HW status.
- Complete Graphics and Multimedia Software Projects.
- Pass 5 Professional Skills Certificate (PSC).

Entry Requirements

The minimum qualifications for candidates who intend to do a Bachelor of Computer Science (Software Engineering) are as follows:

- 1) Minimum results based on **the Malaysian High School Certificate (STPM)** (results would be based on the general requirements as well as other conditions as the pre-requisites for the programme set by the university).

University General Requirements:

- i. Passed and obtained good results in the Malaysian Certificate Examination (SPM) or its equivalent.

- ii. Passed Bahasa Melayu/Bahasa Malaysia with credit in the SPM/equivalent.
- iii. Passed the Malaysian High School Certificate (STPM) or its equivalent and obtained the following:
 - a) Grade C (NGMP 2.00) General paper, and
 - b) Grade C (NGMP 2.00) in TWO (2) other subjects
- iv. Passed the Malaysian University English Test (MUET) with minimum result of Band 1.

Special Requirements for the Programme

- i. Passed with a minimum Grade B- (NGMP 2.67) in TWO (2) of the following subjects:
 - a) Mathematics T / Further Mathematics / Computing AND
 - b) Physics/ Chemistry/ Biology
 - ii. Passed Mathematics with credits in the SPM / equivalent examination.
- 2) Minimum requirements for **Matriculation Certificates (KPM) / Asasi Sains UM** (fulfil the general requirements set by the university as well as other conditions of the programme).

General University Requirements

- i. Passed the Malaysian Certificate Examination (SPM) with good results.
- ii. Obtained passes in Bahasa Melayu/Bahasa Malaysia with credits in the SPM/equivalent examination.
- iii. Passed the Matriculation Certificate Examination KPM/Asasi Sains UM with a minimum CGPA of 2.80 and passed all the core subjects.
- iv. Passed the Malaysian University English Test (MUET) with minimum result of Band 1.

Special Requirements of the Programme:

- i. Passed with a Grade B- (2.67) in two of the following subjects:
 - a) Mathematics AND
 - b) Physics/ Engineering Physics / Biology/ Chemistry / Engineering Chemistry / Computer Science / Computer Engineering
- ii. Passed with credits in Mathematics in the SPM/ equivalent examination.

3) Minimum qualifications for students with **Certificates/Diplomas**

(fulfill the general requirements set by the university as well as specific requirements of the programme).

General University Requirements

- i. Obtained a Diploma in Computer Science from UTM/equivalent with a minimum CPA of 3.00; or for candidates with a CPA below 3.00 but have a minimum of two or more years of working experience in the related area of study will be eligible to apply for a place to study at the university.
- ii. Obtained a credit pass in Mathematics in their SPM/equivalent examination or a minimum grade B- in any of the Mathematics Courses taken at the diploma level.
- iii. Candidates are required to submit the results transcript of all their examinations taken during their Diploma study (semester one until the final semester) to UTM. A copy of the diploma or a letter of completion of study will also have to be submitted together with their applications.
- iv. Passed the Malaysian University English Test (MUET) with minimum result of Band 1.

Note :-

Year of entry and duration of study will be based on the credit exemptions and credit transfer awarded by the university.

Programme Educational Objectives (PEO)

After having exposed to 3 to 5 years working experience, our graduates should become professionals who demonstrate the following competencies:

Code	Intended Educational Objectives
PEO1	Obtain employment as computer scientists in local and global industries and organisations, where they are competent in applying the relevant knowledge, computational principles and skills in Computer Graphics and Multimedia fields to develop software of increasing size and complexity across different application areas.
PEO2	Demonstrate an ability to continue to learn throughout their career (professional, technical or postgraduate education) which can strengthen their analytical and critical thinking skills to position them to advanced computer graphic and multimedia practices and to contribute to the intellectual foundations of the Computer Graphics and Multimedia disciplines.
PEO3	Involve in computer graphics and multimedia software projects that they are proficient in applying theoretical computing and knowledge in analysing, modelling, designing, developing and evaluating computing solutions.
PEO4	Become leaders or technopreneurs in computer graphics and multimedia disciplines.
PEO5	Demonstrate an awareness of professional ethics and social responsibility as computer scientists specialising in computer graphics and multimedia.

Programme Learning Outcomes (PLO)

After having completed the programme, graduates should be able to demonstrate the following competencies:

Code	Intended Learning Outcomes
PLO1	Ability to acquire theory and principles of Computer Science and equip with social science and personal development knowledge.
PLO2	Ability to design and construct computer programs using standard approaches.
PLO3	Ability to identify, formulate and solve real world problems using computer graphics and multimedia tools and techniques.
PLO4	Ability to present technical solutions to a range of audience.
PLO5	Ability to think critically and creatively in order to solve problems.
PLO6	Ability to continuously integrate computer science and software engineering knowledge and skills through lifelong learning process.
PLO7	Ability to lead and work effectively in a team to achieve common goals.
PLO8	Ability to adapt and work effectively in varying cultures of communities, professional fields and environments.
PLO9	Ability to behave ethically, responsibly, and professionally with integrity in carrying out responsibilities and making decisions.
PLO10	Ability to identify business opportunities and develop entrepreneurship mind-set and skills.

UTM PROFESSIONAL SKILLS CERTIFICATE (PSC)

Students are required to enrol and pass all certificate programmes offered by the Centres of Excellence in the University and the School of Professional and Continuing Education (SPACE) during semester breaks

1. How to Get Yourself Employed (HTGYE)
2. ISO 9001: 2008 Quality Management System Requirement (ISO)
3. Occupational Safety and Health Awareness (OSHA)
4. How to Manage Your Personal Finance (HTMYPF)
5. Test of English Communication Skills for Graduating Students (TECS):
 - (i) TECS 1001 (Paper I – Oral Interaction)
 - (ii) TECS 1002 (Paper II - Writing)

COURSE MENU

YEAR 1: SEMESTER 1			
Code	Course	Credit	Pre-requisite
SCSI1013	Discrete Structure	3	
SCSJ1013	Programming Technique I	3	
SCSR1013	Digital Logic	3	
SCSP1513	Technology & Information System	3	
UHAK1012	Graduate Success Attributes	2	
UHAS1172	*Malaysia Dynamic	2	
UHAK1022	**Malaysian Studies 3		
UICI1012	*Islamic and Asian Civilization (TITAS)	2	
ULAM1012	**Malaysia Language for Communication		
	TOTAL CREDIT	18	
	CUMULATIVE CREDITS	18	

* For Malaysian students

** For International students

YEAR 1: SEMESTER 2			
Code	Course	Credit	Pre-requisite
SCSV1113	Mathematics for Computer Graphics	3	
SCSI1143	Probability & Statistical Data Analysis	3	
SCSJ1023	Programming Technique II	3	SCSJ1013
SCSR1033	Computer Organisation and Architecture	3	SCSR1013
UICL2302	The Thought of Sciences and Technology	2	
ULAB1122	Academic English Skills	2	
	TOTAL CREDIT	16	
	CUMULATIVE CREDITS	34	

YEAR 2: SEMESTER 1			
Code	Course	Credit	Pre-requisite
SCSD2523	Database	3	
SCSD2613	System Analysis and Design	3	
SCSJ2013	Data Structure and Algorithm	3	SCSJ1013 SCSJ1023
SCSR2213	Network Communications	3	
SCSV2113	Human Computer Interaction	3	
UKQXxxx2	Co-curriculum	2	
	TOTAL CREDIT	17	
	CUMULATIVE CREDITS	51	

YEAR 2: SEMESTER 2			
Code	Course	Credit	Pre-requisite
SCSJ2203	Software Engineering	3	
SCSV2223	Web Programming	3	
SCSR2043	Operating Systems	3	SCSJ1033
SCSJ2154	Object Oriented Programming	4	SCSJ1023
ULAB2122	Advanced Academic English Skills	2	
<i>Elective Courses - Choose 1 (3 Credits)</i>			
SCSV2213	Fundamental of Computer Graphics	3	SCSV1113 SCSJ1023
SCSJ2363	Software Project Management	3	
	TOTAL CREDIT	18	
	CUMULATIVE CREDITS	69	

YEAR 3: SEMESTER 1			
Code	Course	Credit	Pre-requisite
ULAB3162	English for Professional Purpose	2	
ULAx 1122	* Foreign Language Elective	2	
UHAK 2xx2	**Generic Skills Elective		
UKQE 3001	Extracurricular Experiential Learning	1	
<i>Elective Courses - Choose 4 (13 Credits)</i>			
SCSV3104	Applications Development	4	
SCSJ3553	Artificial Intelligence	3	SCSJ2013
SCSV3113	Geometric Modelling	3	SCSV2213
SCSV3213	Fundamental of Image Processing	3	
SCSJ3263	Mobile Application Programming	3	SCSJ2154
	TOTAL CREDIT	18	
	CUMULATIVE CREDITS	87	

YEAR 3: SEMESTER 2			
Code	Course	Credit	Pre-requisite
SCSV3032	Graphics and Multimedia Software Project I	2	SCSJ3104
SCSJ3203	Theory of Computer Science	3	SCSI1013 SCSJ2013
<i>Elective Courses - Choose 4 (12 Credits)</i>			
SCSV3223	Multimedia Data Processing	3	SCSJ1023
SCSJ3563	Computational Intelligence	3	SCSJ3553
SCSV3263	Multimedia Web Programming	3	
SCSV3233	Data Visualisation	3	
SCSV3123	Real-time Computer Graphics	3	SCSV2213
	TOTAL CREDIT	17	
	CUMULATIVE CREDITS	104	

YEAR 4: SEMESTER 1			
Code	Course	Credit	Pre-requisite
SCSV4118	Industrial Training (HW)	8	92 credits CGPA >= 2.0
SCSV4114	Industrial Training Report	4	
	TOTAL CREDIT	12	
	CUMULATIVE CREDITS	116	

YEAR 4: SEMESTER 2			
Code	Course	Credit	Pre-requisite
SCSV4134	Graphics and Multimedia Software Project II	4	SCSV3032
SCSD3761	Technopreneurship Seminar	1	
UHAK1032	Introduction to Entrepreneurship	2	
UICL 2x2	Enrichment of Knowledge Elective	2	
<i>Elective Courses - Choose 2 (6 Credits)</i>			
SCSV4213	Computer Games Development	3	SCSJ1013
SCSV4233	Advanced Computer Graphics	3	SCSV2213
SCSV4273	Introduction to Speech Recognition	3	SCSJ1023
	TOTAL CREDIT	15	
	CUMULATIVE CREDITS	131	

GRADUATION CHECKLIST

To graduate, students must pass all the stated courses in this checklist. It is the responsibility of the students to ensure that all courses are taken and passed. Students who do not complete any of the course are not allowed to graduate.

NO.	CODE	COURSE	CREDIT EARNED (JKD)	CREDIT COUNT-ED (JKK)	TICK (✓) IF PASSED
COMPUTER SCIENCE COURSES					
CORE COURSES (74 CREDITS)					
1	SCSI1013	Discrete Structure	3	3	
2	SCSJ1013	Programming Technique I	3	3	
3	SCSR1013	Digital Logic	3	3	
4	SCSP1513	Technology & Information System	3	3	
5	SCSI1113	Computational Mathematics	3	3	
6	SCSI1143	Probability & Statistical Data Analysis	3	3	
7	SCSJ1023	Programming Technique II	3	3	
8	SCSR1033	Computer Organisation and Architecture	3	3	
9	SCSD2523	Database	3	3	
10	SCSD2613	System Analysis and Design	3	3	
11	SCSJ2013	Data Structure and Algorithm	3	3	
12	SCSR2213	Network Communications	3	3	
13	SCSV2113	Human Computer Interaction	3	3	
14	SCSJ2203	Software Engineering	3	3	
15	SCSV2223	Web Programming	3	3	
16	SCSR2043	Operating Systems	3	3	
17	SCSJ2154	Object Oriented Programming	4	4	
18	SCSV3032	Graphics and Multimedia Software Project I	2	2	
19	SCSJ3203	Theory of Computer Science	3	3	
20	SCSV4118	Industrial Training	8	HL	
21	SCSV4114	Industrial Training Report	4	4	
22	SCSV4134	Graphics and Multimedia Software Project II	4	4	
23	SCSD3761	Technopreneurship Seminar	1	1	
ELECTIVES COURSES (34 CREDITS)					
24	SCSV2213	Fundamental of Computer Graphics	3	3	
25	SCSJ2363	Software Project Management	3	3	
26	SCSV3104	Applications Development	4	4	
27	SCSJ3553	Artificial Intelligence	3	3	
28	SCSV3113	Geometric Modelling	3	3	
29	SCSV3213	Fundamental of Image Processing	3	3	
30	SCSJ3263	Mobile Application Programming	3	3	
31	SCSV3223	Multimedia Data Processing	3	3	
32	SCSJ3563	Computational Intelligence	3	3	
33	SCSV3263	Multimedia Web Programming	3	3	

34	SCSV3233	Data Visualisation	3	3	
35	SCSV3123	Real-time Computer Graphics	3	3	
36	SCSV4213	Computer Games Development	3	3	
37	SCSV4233	Advanced Computer Graphics	3	3	
38	SCSV4273	Introduction to Speech Recognition	3	3	
TOTAL CREDIT OF COMPUTER SCIENCE COURSES (a)			108	100	
UNIVERSITY GENERAL COURSES					
Cluster 1: Appreciation of Philosophy, Value & History (Faculty of Social Sciences and Humanities)					
1	UHAS 1172	Malaysia Dynamic (for Local Students Only)	2	2	
	UHAK 1022	Malaysian Studies 3 (for International Students only)			
2	UICI 1012	Islamic and Asian Civilisation (for Local Students only)	2	2	
	ULAM1012	**Malaysia Language for Communication for International Students only)			
Cluster 2: Generic Skills					
1	UHAK 1012	Graduate Success Attributes	2	2	
2	UHAK 1032	Introduction to Entrepreneurship	2	2	
Cluster 3: Expansion of Knowledge					
1	UICL 2302	The Thought of Science and Technology	2	2	
2	UICL 2xx2	Enrichment of Knowledge Elective	2	2	
Cluster 4: Co-Curriculum and Service Learning					
1	UKQXxxx2	Co-curriculum	2	2	
Cluster 5: Language Skill (Language Academy, Faculty of Social Sciences and Humanities)					
1	ULAB 1122	Academic English Skills	2	2	
2	ULAB 2122	Advanced Academic English Skills	2	2	
3	ULAB 3162	English for Professional Purposes	2	2	
4	ULAX 1122	Elective Of Foreign Language	2	2	
5	UHAK 2xx2	Generic Skills Elective			
Cluster 6: Extracurricular Experiential Learning/ Pengalaman Pembelajaran Luar Kurikulum					
1	UKQE 3001	Extracurricular Experiential Learning	1	1	
TOTAL CREDIT of UNIVERSITY GENERAL COURSES (c)			23	23	
TOTAL CREDIT TO GRADUATE (a + b + c)			131	123	

OTHER COMPULSORY COURSES			
Professional Skills Certificate (PSC) (UTMSPACE/ School)			
1	GLL 1001	How to Get Your Self Employed	
2	GLL 1029	ISO 9001:2008 Quality Management System Requirement	
3	GLL 1040	Occupational Safety, Health and Environment	
4	GLL 1041	How to Manage Your Personal Finance	
Test of English Communication Skill (TECS) (Language Academy, Faculty of Social Sciences and Humanities)			
1	TECS 1001	Oral Interaction	
2	TECS 1002	Writing	

COURSE SYNOPSIS

CORE COURSES

SCSI1013 Discrete Structure

This course introduces students to the principles and applications of discrete structure in the field of computer science. The topics that are covered in this course are set theory, proof techniques, relations, functions, recurrence relations, counting methods, graph theory, trees and finite automata. At the end of the course, the students should be able to use set theory, relations and functions to solve computer science problems, analyze and solve problems using recurrence relations and counting methods, apply graph theory and trees in real world problems and use deterministic finite automata finite state machines to model electronic devices and problems.

SCSJ1013 Programming Technique I

As a fundamental subject, this course equips the students with theory and practice on problem solving techniques by using the structured approach. Students are required to develop programs using C++ programming language, in order to solve simple to moderate problems. The course covers the following: pre-processor directives, constants and variables, data types, input and output statements, control structures: sequential, selection and loop, built-in and user-defined functions, single and two-dimensional arrays, file operations, pointers, and structured data types.

SCSR1013 Digital Logic

Digital electronics is the foundation of all microprocessor-based systems found in computers, robots, automobiles, and industrial control systems. This course introduces the students to digital electronics and provides a broad overview of many important concepts, components, and tools. Students will get up-to-date coverage of digital fundamentals-from basic concepts to programmable logic devices. Laboratory experiments provide hands-on experience with the simulator software, actual devices and circuits studied in the classroom.

SCSP1513 Technology & Information System

As a primer subject, this course will introduce students to information systems and technology (IS/IT), as well as its uses in daily life both at home and at work. Various aspects of IS/IT encompassing hardware, software, network, communications, internet, multimedia, graphics and systems applications will be introduced. Students will be equipped with basic skills in handling PC installation and productivity tools via practical work in the labs, which shall comprise a major part of the study. At the end of the course, student should be able to distinguish basic IS/IT component and applications.

SCSV1113 Mathematics for Computer Graphics

The aim of this course is to introduce and develop mathematical skills that underpin the technical aspects of computer graphics application. It will emphasize on matrix, vector, geometry and parametric representation, trigonometry, linear algebra and general concept of Vector Calculus. For further understanding about this subject, a lot of exercises will be given. At the end of the course, students should be able to grasp key concept and uses each of the mathematical concept in computer graphics application.

SCSI1143 Probability & Statistical Data Analysis

This course is designed to introduce some statistical techniques as tools to analyse the data. In the beginning the students will be exposed with various forms of data. The data represented by the different types of variables are derived from different sources; daily and industrial activities. The analysis begins with the data representation visually. The course will also explore some methods of parameter estimation from different distributions. Further data analysis is conducted by introducing the hypothesis testing. Some models are employed to fit groups of data. At

the end of course the students should be able to apply some statistical models in analysing data using available software.

SCSJ1023 Programming Technique II

Pre-requisite : SCSJ1013 Programming Technique I

This course presents the concept of object orientation and object-oriented programming (OOP) techniques using the C++ programming language. It equips the students with the theory and practice on problem solving techniques using the object oriented approach. It emphasizes on the implementation of the OOP concepts including encapsulations, associations and inheritance. At the end of this course, students should be able to apply the OOP techniques to solve problems.

SCSR1033 Computer Organisation and Architecture

Pre-requisite : SCSR1013 Digital Logic

This course was designed to give the understanding of basic concept of computer organization and architecture. Topics covered in this subject will be on computer performance, types of data and the representative, arithmetic manipulation, instruction execution, micro programmable control memory, pipelining, memory, input/output and instruction format. At the end of this course, the student should be able to understand the concept of overall computer component and realize the current technology in computer hardware.

SCSD2523 Database

This course introduces students to the concept of database system and how it is used in daily human life and profession. The focus of the course is to equip students with the knowledge and skills on important steps and techniques used in developing a database, especially in the conceptual and logical database design phase. Among topics covered are database environment, database design, entity relationship diagram, normalization, and structured query language (SQL). Students will be taught to use a database management system (DBMS). Students are required to design and develop the database component of an information system using the learned techniques, DBMS and a development tool. At the end of the course, students should be able to apply the knowledge of designing and developing a good database system.

SCSD2613 System Analysis and Design

The main focus of this course is to provide a practical approach of systems analysis and designing skills for the students using structured methodology. Hence the course enables students to study information system requirements for any system application within an organizational context. The contents are sequentially organized directly from planning, analysis, designing and implementation phases. From the resulting output of the planning and analysis phase shall enable students to form input, output and interface design. Hence a prototype design can be demonstrated.

SCSJ2013 Data Structure and Algorithm

Pre-requisite : SCSJ1013 Programming Technique I

SCSJ1023 Programming Technique II

This course emphasis on data structure concepts theoretically and practically with detail algorithms for each of data structure. Students will learn abstract data type concepts using class and apply the concept in the implementation of data structures. Apart from it, student will learn recursive concept as a programming style and algorithm efficiency analysis with Big O notation. Various sorting and searching techniques will be discussed as data structure operations. Analysis of each algorithm will also be explained. Further, students will be exposed to linear data structures such as linked lists, stack and queue. Non-linear data structures such as tree and binary search tree will be discussed. Along the course, students should be able to implement and apply the theory and concepts of data structure in the assignments and mini project which are conducted in group.

SCSR2213 Network Communications

This course will discuss the basic topics of computer network and data communications. Based on TCP/IP Internet protocol stack, the course will apply top down approach. Starts with the important and usage of computer network in commonly applications, the approach will go further detail in the technical aspect in data communication. At the end of this course, students will have an understanding and appreciation of how the network works.

SCSV2113 Human Computer Interaction

This course will introduce students to human-computer interaction theories and design processes. The emphasis will be on applied user

experience (UX) design. The course will present an iterative evaluation-centered UX lifecycle and will introduce a broader notion of user experience, including usability, usefulness, and emotional impact. The lifecycle should be viewed as template intended to be instantiated in many different ways to match the constraints of a particular development project. The UX lifecycle activities we will cover include contextual inquiry and analysis, requirements extraction, design-informing models, design thinking, ideation, sketching, conceptual design, and formative evaluation.

SCSJ2203 Software Engineering

This course is designed to give students an introduction to an engineering approach in the development of high quality software systems. It will discuss the important software engineering concepts in the various types of the common software process models. The students will also learn the concepts and techniques used in each software development phase including requirements engineering, software design and software testing. This course will also expose the students to utilizing object-oriented method (e.g. UML) and tools in analyzing and designing the software. At the end of this course, students are expected to be able to appreciate most of the common software engineering concepts and techniques as well as producing various software artifacts, documentations, and deliverables.

SCSV2223 Web Programming

This course is designed to introduce students the fundamental of knowledge, technologies and components for web application developments. The basic topics includes the standard HTML for content creation, CSS for content presentation, JavaScript for client-side logics, PHP for server-side logics and MySQL for database processing. At the end of the course, the students should be able to apply the web base technologies and then implement it all in the creating functional data-centric online system project.

SCSR2043 Operating Systems

Pre-requisite : SCSJ1033 Computer Organization and Architecture

This course covers introduction to operating systems, which serve as an interface between computer hardware and the user. The operating system is responsible for the management and coordination of processes, sharing

of limited resources of the computer. Students will be exposed to the techniques and algorithms that may be applied in designing an operating system. Topics covered include process management, concurrency and synchronization, deadlock, memory management, file management, secondary storage management and I/O management. At the end of the course, the student shall have a clear understanding on the general concepts that underlie of an operating system.

SCSJ2154 Object Oriented Programming

Pre-requisite : SCSJ1023 Programming Technique II

This course presents the concepts of object orientation and object-oriented programming techniques using Java programming language. It provides students with a thorough look at the basic constructs of the Java programming language such as its basic data types and operations. It also emphasizes on the use of standard Java APIs that allow students to develop text-based and GUI applications. It will also provide the programming techniques on exception handling and input/output files. At the end of this course, students should be able to use the basic constructs in object-oriented programming and utilize the selected Java APIs.

SCSV3032 Graphics and Multimedia Software Project I

Pre-requisite : SCSJ3104 Application Development

This is the initial part of a 2-part Final Year Project that every student must fulfil successfully. Students are introduced to the methodologies of research and application development through a series of lectures. Students are guided through a step-by-step practice to complete the initial stages of proposal, planning and design of a project. Students must also meet regularly with supervisor(s) who will monitor their continuous progress. Students are required to prepare a report and present their initial work.

SCSJ3203 Theory of Computer Science

Pre-requisite : SCSJ1013 Discrete Structure

SCSJ2013 Data Structure and Algorithm

The goal of this course is to provide students with an understanding of basic concepts in the theory of computation. This course introduces students to formal languages and automata theory. It will emphasize on languages, grammars and abstract machines i.e. Regular Language, Context Free Language, Regular Grammar, Context Free Grammar, Finite Automata, Push Down Automata and Turing Machine. The course will also

provide practice on the acceptability of input string by these machines. At the end of the course, students should be able to apply the theory in constructing these abstract machines and testing them with the right input strings.

SCSV4118 Industrial Training (HW)

Pre-requisite : 92 credits AND CGPA \geq 2.0

Industrial Training refers to the placement of a student at an organization for a minimum of 20 weeks to elevate students' knowledge and skills in a specific database profession and at the same time produce graduates who are credible, creative and proficient. This course aims to provide a platform for the students apply their knowledge learned in the university and boost their skills which needed by a profession. It is also intend for the students to gain exposure in every aspect of real career life. The students will be evaluated based on two components; 1) student performance evaluation by organisation supervisor and 2) student performance evaluation by faculty supervisor. The organization supervisor is expected to assess the student performance based on work performance and students personality. The assessment by faculty supervisor more focusing on students' generic skills

SCSV4114 Industrial Training Report

Pre-requisite : 92 credits AND CGPA \geq 2.0

Industrial Training Report refers to the placement of a student at an organization for a minimum of 20 weeks to experience and apply their theoretical knowledge in the industrial training. The students will be evaluated based on four components; 1) technical report, 2) oral presentation, 3) log book and 4) ethics. The aim of the technical report is to educate the students in producing related technical report and able to explain a specific detail on the tasks that have been done during the training. Students need to follow specified format in writing the technical report and submit it within the predetermined date. The students are required to present their training achievement to Industrial Training supervisors (organization and supervisor). Students need to fill in the online log book daily for the purpose of close monitoring between the students and supervisors. Student also needs to practice the good ethical values and work conduct throughout the training. The passing mark is 60%.

SCSV4134 Graphics and Multimedia Software Project II

Pre-requisite : SCSJ3032 Software Engineering Project I

This is the second part of a 2-part Final Year Project that every student must fulfil successfully. In this installation, students are required to execute the next phases of their development plan from Part1. Students are now required to code and integrate the different modules that make up the proposed project. Students will test the developed modules and the final fully-integrated project following software development and research testing practices. Students must meet regularly with supervisor(s) who will monitor their continuous progress. Students are required to prepare a report and present their final work.

SCSD3761 Technopreneurship Seminar

This 1-credit course will provide module and training for students on how to generate digital income through crowdsourcing platforms and methods. Crowdsourcing is a method to generate online income which the work is offered and implemented digitally in global platforms.

ELECTIVE COURSES

SCSV2213 Fundamental of Computer Graphics

Pre-requisite : SCSV1113 Mathematics for Computer Graphics SCSJ1023 Programming Technique II

The course introduces students to the fundamental of computer graphics and its applications. It will emphasize on raster graphics hardware, generation of 2D primitives, 2D and 3D transformations, specification of windows and viewports. Students are required to write 2D/3D application in order to reinforce their understanding. At the end of the course, the student should be able to understand how a computer graphics system works and develop simple graphics application using standard graphics libraries.

SCSJ2363 Software Project Management

This course is designed to provide students with in depth knowledge on software project planning, cost estimation and scheduling, project management tools, factors influencing productivity and success, productivity metrics, analysis of options and risks, software process improvement, software contracts and intellectual property and approaches

to maintenance and long term software development. At the end of this course, students should be able to know how to manage a software development lifecycle.

SCSV3104 Applications Development

Application Development is a comprehensive service learning course which requires student to solve a real community problem by developing an application. Students will learn how to practice design thinking, adopting Agile development methodology. This involves an iterative process starting from community engagement, requirement elicitation and analysis, design solution, application construction and iterative verification process. Students are required to do reflection on the outcome of the project. In this course students should be able to develop their soft skills such as leadership, team collaboration, documentation process and communication skill.

SCSJ3553 Artificial Intelligence

Pre-requisite : SCSJ2013 Data Structure and Algorithm

This course offers students a new perspective on the study of Artificial Intelligence (AI) concepts. The essential topics and theory of AI are presented, but it also includes practical information on data input and reduction as well as data output (i.e. algorithm usage). In particular, this course emphasizes on theoretical and practical aspects of various search algorithms, knowledge representations, and machine learning methods. The course features practical implementations through assignments undertaken both individually and in groups

SCSV 3113 Geometric Modelling

Pre-requisite : SCSV2213 Fundamental of Computer Graphics

This course is designed for students to understand how geometric objects are modeled. This subject emphasizes on the theory of representations, algorithms, and the underlying theoretical framework, essential to solving geometric problems encountered in modeling a 2D/3D object. Selected advanced research issues, such as mesh generation, shape reconstruction; feature-based modeling, non-manifold geometry, and variation surface modeling are also covered. At the end of the course, the student should be able to apply the knowledge of 3D geometric modeling and write program to produce simple 3D models using standard 3D graphics libraries.

SCSV3213 Fundamental Of Image Processing

This course discusses some of the digital image processing techniques and their applications particularly in real life applications. It begins with an understanding of specification and structure of a graphic file format with a special attention to image data extractions procedures. Using the extracted data, the image will be manipulated utilizing some of the most popular image processing techniques, among others: point processing operations; (halftoning and histogram equalization), neighbourhood operations; (convolution, low pass filters, high pass filters, high boost filters, median filter), edge detections, and geometric operations. Due to the nature of the course that emphasizes on hands-on and creativity, students with C/C++ programming skill are preferred.

SCSJ3563 Computational Intelligence

Pre-requisite : SCSJ3553 Artificial Intelligence

The aim of this course is to expose the students to current methods and algorithms utilized in area of computational intelligence. The methods include knowledge representation of vague data and inferences using fuzzy logic, learning using neural network and searching using evolutionary algorithms. Students will be equipped with the theories and the necessary skills to model the domain problems suited to the associated techniques or algorithms. This course will cover the topics on fuzzy logic, neural network and evolutionary algorithms. Hands-on class on how to apply the techniques in solving non-linear problems is also introduced. Conducting a paper review of related journals will expose the students to appreciate the contributions of CI-related techniques in solving real-world problems besides developing academic research writing skill.

SCSJ 3623 Mobile Application Programming

Pre-requisite : SCSJ2154 Object-Oriented Programming

This course is concerned with the development of application for mobile and wireless handheld devices such as personal digital assistants (PDA) and mobile phones. These mobile applications are either native/installation-based, or web applications delivered over HTTP. In this course, the emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. A current and dominant technology will be selected as a basis for teaching programming techniques and design patterns related to the development of these standalone applications and mobile portals to

enterprise and m-commerce systems. Students will work at all stages of the software development life-cycle from inception through to implementation and testing. In doing so, students will be required to consider the impact of user characteristics, device capabilities, networking infrastructure and deployment environment, in order to develop software for the targeted mobile environment.

SCSV3223 Multimedia Data Processing

Pre-requisite : SCSJ1023 Programming Technique II

This course will concentrate on using existing frameworks (Java Media Framework, DirectX or MatLab) for processing multimedia data with the main purpose to train the students to produce multimedia data related software & tools. As multimedia comes with many types of data (text, audio, video, and animation) and varieties of formats for presentation and storage, students will be first exposed with the basic ideas and concept behind multimedia data technology. Students are required to understand the theory and techniques for data acquisition, sampling, storage, and presentation. Next, students are exposed with more advance task which involving multimedia data manipulation. At the end of the course students are required to produce their own software/application for multimedia data presentation & manipulation.

SCSV3263 Multimedia Web Programming

Web environment provide a wide selection of technologies and components for online application development. Current available technologies and components are consisting of standard view elements (HTML and CSS), server-side logic (CGI, Servlet. Server Pages Technologies), client-script logic (JavaScript), data communication and interoperability (AJAX, JSON, XML), 2D/3D graphic system (X3DOM, SVG) and various components provided by other proprietary software vendors. This course will expose the students to the concepts and hands-on experiences on how to fully integrate and exploit all of these components into single application to provide full-featured "Rich Internet Application" (RIA) to the clients.

SCSV3233 Data Visualisation

This course will discuss the basic topics of computer network and data communications. Based on TCP/IP Internet protocol stack, the course will apply top down approach. Starts with the important and usage of computer network in commonly applications, the approach will go further

detail in the technical aspect in data communication. At the end of this course, students will have an understanding and appreciation of how the network works.

SCSV3123 Real-time Computer Graphics

Pre-requisite : SCSV2213 Fundamental of Computer Graphics

This course is to expose students in developing real-time and interactive computer graphics applications. This is an intensive programming subject and students are expected to equip themselves with adequate programming skills. Interactive development such as fast polygon rendering algorithm with level-of detail, scene management, dynamic camera manipulation, real-time shading and rendering and physical simulation will be covered and integrated in the application. Throughout the course, students will design and develop a real-time computer graphics application. At the end of this course, student should be able to acquire the theory and practice of real-time computer graphics.

SCSV4213 Computer Games Development

Pre-requisite : SCSJ1013 Programming Technique I

This course introduces and equips student to the process of developing Computer Games including fundamental theory such as Game Design and Game Programming. The game design provides students with basic skills to design games such as genre-specific, storytelling, level design and project lifecycle and documents. The game programming emphasizes on the development of games using Unity3D, or any latest game engine technology employed in developing games.

SCSV4543 Advanced Computer Graphics

Pre-requisite : SCSV2213 Fundamental of Computer Graphics

Student is expected to have basic knowledge about 3D modelling and rendering techniques. Topics covered include 3D transformation, viewing, projection, 3D Clipping, viewport transformation. Lighting, shading, visible surface detection, adding realism through textures, ray casting, ray tracing and radiosity are also covered. At the end of the course, the students should be able to apply the rendering and lighting algorithms and then implement the algorithms in the creation of a 3D graphics project.

SCSV4273 Introduction to Speech Recognition

Pre-requisite : SCSJ1023 Programming Technique II

This course aims to provide theoretical foundations and practical experience in computer speech processing and recognition. Many of the techniques and algorithms covered under the course are applicable to a variety of areas concerned with recognizing sequences. On completion of the course, students should be able to understand the basic principles of pattern recognition, gain knowledge of automatic speech recognition (ASR) system design, and the various trade-offs involved. It should also enable students to read and discuss technical papers in ASR, speech processing and pattern recognition.