UTM
UNIVERSITI TEKNOLOGI MALAYSIA

COURSE INFORMATION

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School/Faculty:	**Faculty of Computing**		
Program name:	**Bachelor of Computer Science (Graphics and Multimedia Software) with Honours** **Bachelor of Computer Science (Computer Networks and Security) with Honours** **Bachelor of Computer Science (Bioinfomatics) with Honours** **Bachelor of Computer Science (Data Engineering) with Honours** **Bachelor of Computer Science (Software Engineering) with Honours**		
Course code:	**SECJ 1013**	**Academic Session/Semester:**	**2025/2026 - 1**
Course name:	**Programming Technique I**	**Pre/co requisite (course name and code, if applicable):**	
Credit hours:	**3**		

Course synopsis	As a fundamental subject, this course equips the students with theory and practice on problem solving techniques by using the structured approach. The course covers the following: preprocessor 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. Students are required to develop programs using C++ programming language, in order to solve simple to moderate problems. A learning approach that combines lectures, lab exercises, and assignments strengthens both conceptual understanding and practical programming skills. Students will be able to apply systematic problem-solving methods to analyze and address programming challenges. Develop structured approach C++ programs to solve problems of varying complexity within a specified time frame.
Course coordinator (if applicable)	Dr. Cik Suhaimi bin Yusof

Course lecturer(s)	**Name**	**Office**	**Contact no.**	**E-mail**
	Dr. Cik Suhaimi bin Yusof (Sec. 1&9)	N28-207-09		suhaimi@utm.my
	Dr. Muhammad Luqman bin Mohd Shafie (Sec. 2)	N28-346-03		muhammadluqman.ms@utm.my
	Ts. Dr. Goh Eg Su (Sec. 3&8)	N28a-05-12-01		eg.su@utm.my
	Ms. Lizawati binti Mi Yusuf (Sec. 4&6)	N28-438-03		lizawati@utm.my
	Dr. Jumail bin Taliba (Sec. 5&7)	N28-206-09		jumail@utm.my
	Dr. Suriati binti Sadimon (Sec. 10)	N28-206-05		suriati@utm.my

Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:

No.	CLO*	PLO **(MQF Cluster Code)	***Taxonomies and ****Graduate attributes	T&L methods	*****Assessment methods
CLO1	Solve problems systematically using problem solving methods.	PLO1 (C1)	C3 (SC1)	Lecture, Lab-based Learning	T, LE, Asg
CLO2	Apply structured programming principles in C++ to solve problems ranging from simple to moderate complexity and construct efficient C++ programs using a systematic approach to address analyzed problems effectively.	PLO1 (C1), PLO3(C3A)	C3 (SC1), P3 (SC3)	Lecture, Lab-based Learning	T, LE, F

CLO3	solve programming problems within a specified time frame and construct efficient C++ programs using appropriate tools.	PLO2 (C2), PLO3(C3A)	C3 (SC2), P4 (SC3)	Lecture, Active Learning, Group-based Learning	Asg, T, F

This is the basic mapping required for the CI. Any added information is allowed (extra columns for weight or other elements) provided this is made consistent for all CI at program/school/faculty level.
*Up to 5 CLO
Refer ***Taxonomies of Learning and ****UTM's Graduate Attributes for measurement of outcomes achievement
*****T – Test; LE - Lab Exercise; Asg – Assignment; F – Final Exam.

**MQF Cluster Code

C1 = Knowledge & Understanding, **C2** = Cognitive Skills, **C3A** = Practical Skills, **C3B** = Interpersonal Skills, **C3C**= Communication Skills, **C3D** = Digital Skills, **C3E** = Numercy Skills, **C3F** = Leadership, Autonomy & Responsibility, **C4A** = Personal Skills, **C4B** = Enterpreneurial Skills, **C5** = Ethics & Professionalism

Details on Innovative T&L practices:

No.	Type	Implementation
1	Lab-based Learning	Conducted through in-lab activities.
2	Group-based Learning	Conducted through assignments. Students in a group of 2 are given 3 projects that require programming solutions (pair programming).
3		

Transferable skills (generic skills learning in course of study which can be useful and utilised in other settings) :

N/A

Student learning time (SLT) / Effective Learning Time (ELT) details:

Week/ Meeting	Course Content Outline and Subtopics	CLO* Compulsory	Learning and Teaching Activities									TOTAL SLT
			Face-to-Face (F2F)								Non F2F Independent Learning	
			Physical				Online (Synchronous)				Online (Asynchronous)	Others
			L	T	P	O	L	T	P	O		
Week 1	1.0 PROGRAMMING PROBLEM-SOLVING 1.1Problem-Solving Process 1.1.1Input, Process, and Output 1.1.2The Programming Process 1.1.3Procedural and Object-Oriented Programming	CLO1	2	1								3	6
Week 2	1.2Problem-Solving Techniques 1.2.1Pseudo codes 1.2.2Flowcharts -Flowchart Symbols -Flowchart Structures (Sequential, Selection, Repetition) -Modular Flowcharting (Functions)	CLO1	2	1								3	6
Week 3	2.0 ELEMENTARY PROGRAMMING 2.1Variables and Assignments 2.1.1Variables 2.1.2Identifiers 2.1.3Assignment statements 2.2Input and Output 2.2.1Input using cin 2.2.2Output using cout 2.3Data Types and Constants 2.3.1Numeric data types 2.3.2Character data type 2.3.3Boolean data type 2.3.4Naming constants	CLO1, CLO3	2	1								3	6
Week 4	2.4Arithmetic Expressions 2.4.1Arithmetic operators and expressions 2.4.1Arithmetic operators and expressions 2.4.2Type conversion 2.4.3Overflow and underflow 2.4.4Type Casting 2.4.5Multiple assignments and combined assignments	CLO1 CLO3	2	1								3	6

Week 5	3.0 CONTROL STRUCTURES 3.1Boolean and Logical Expressions 3.2Selection/ Branch 3.2.1The if statement 3.2.2The if/else statement 3.2.3The if/else if statement 3.2.4The switch statement 3.2.5The break, continue statement	CLO2	2	1								3	6
Week 6	3.3Loop 3.3.1The for loop 3.3.2The while loop 3.3.3The do-while loop 3.3.4Nested loop	CLO2	2	1								3	6
Week 7	4.0 FUNCTION 4.1Predefined/ Library Functions 4.1.1Mathematical functions 4.1.2Random generator 4.1.3Character manipulations 4.1.4String manipulations	CLO2	2	1								3	6
Week 8	MID SEMESTER BREAK												
Week 9	4.2User-Defined Functions 4.2.1Function definitions and prototypes 4.2.2Sending data by value 4.2.3Sending data by reference	CLO2	2	1								3	6
Week 10	5.0 ARRAY 5.1One Dimension 5.1.1Declaration and definition 5.1.2Accessing arrays 5.1.31-D Array in functions	CLO2, CLO3	2	1								3	6
Week 11	5.2Two Dimension 5.2.1Declaration and definition 5.2.2Accessing arrays 5.2.32-D Array in functions 5.3Multidimensional Arrays	CLO2, CLO3	2	1								3	6
Week 12	6.0 INPUT AND OUTPUT 6.1Formatting Output 6.2Formatted Input 6.3Introduction to Files	CLO3	2	1								3	6
Week 13	7.0 POINTERS 7.1Address of a Variable 7.2Pointer Variable 7.3The Relationship Between Arrays and Pointer 7.4Pointer Arithmetic	CLO2	2	1								3	6
Week 14	7.5Initializing Pointers 7.6Comparing Pointers 7.7Pointers as Function Parameters 7.8Dynamic Memory Allocation 7.9Returning Pointers from Functions	CLO2	2	1								3	6
Week 15	8.0 STRUCTURED DATA 8.1Combining Data into Structures 8.2Accessing Structure Members 8.3Initializing the Structure 8.1Arrays of structures 8.2Unions a nd enumerated data types	CLO2	2	1								3	6
											SUB-TOTAL SLT :		**78**

	Continous Assessment	%	Face-to-Face (F2F)		NF2F Independent Learning for Assessment		TOTAL SLT
			Physical	Online (Synchronous)	Online (Asynchronous)	Others	
1	Lab 1	4	1			1	2
2	Lab 2 - 4	11	2			2	4
3	Test 1 - Written	15	2			4	6
4	Test 2 - Practical (CLO3)	15	3			6	9
5	Assignment 1 (CLO1)	6				2	2

6	Assignment 2 - 3 (CLO3)	14				4	4
					SUB-TOTAL SLT :		**27**

Summative Assessment		**%**	**Face-to-Face (F2F)**		**NF2F Independent Learning for Assessment**		**TOTAL SLT**
			Physical	**Online (Synchronous)**	**Online (Asynchronous)**	**Others**	
1	Final Examination - Written (CLO2)	20	2			4	6
2	Final Examination - Practical (CLO3)	15	3			6	9
3							0
4							0
5							0
					SUB-TOTAL SLT :		**15**
					SLT for Assessment:		**42**
					GRAND TOTAL SLT:		**120**

A	% SLT for F2F Physical Component	43.33
B	% SLT for Online & Independent Learning Component :	56.67
C	%SLT for Online Component:	0.00
D	% SLT for All Practical Component:	0.00
D1	% SLT for F2F Physical Practical Component:	0.00
D2	% SLT for F2F Online Practical Component:	0.00
Please tick (/) if this course is Industrial Training/ Clinical Placement/ Practicum using 50% of Effective Learning Time (ELT)		

Identify special requirement or resources to deliver the course (e.g.,software,nursery, computer lab, simulation room etc)

Computer Programming Lab and Software: Visual Studio Code @ Dev C++.

References (include required and further readings, and should be the most current)

Text book (if applicable)

Lizawati Mi Yusuf, Jumail Taliba, Nor Azizah Sa'adon, Noraniah Mohd. Yassin, Dayang Norhayati Abang Jawawi, & Radziah Mohamad. (2019). Lab module: Programming techniques I (C++) (7th ed.). School of Computing.

Main references

Gaddis, T. (2024). Starting Out with C++: Early Objects (10th edition). Pearson Education.
Gaddis, T. (2022). Starting out with C++: From control structures through objects, brief version (10th ed.). Pearson Education.
D. S. Malik (2014), C++ Programming: From Problem Analysis to Program Design, 7th edition. Cengage Learning.

Additional references

Walter Savitch (2015), Problem Solving with C++. 9th edition. Pearson Education.
H.M. Deitel and P.J. Deitel (2014), C++ How to Program. 9th edition. Pearson Education.

Online

http://elearning.utm.my

Other additional information (if applicable)

Academic honesty and plagiarism: *(Below is just a sample)*

Lab exercises are individual tasks and NOT group activities (UNLESS EXPLICITLY INDICATED AS GROUP ACTIVITIES). Copying of work (texts, simulation results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of ZERO for the assignment/ lab exercise and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

Other additional information (if applicable)

1.Attendance is compulsory and will be taken in every lecture session. Student with less than 80% of total attendance is not allowed to sit for final exam.
2.Students are required to behave and follow the University's dressing regulation and etiquette all the time.
3.Exercises and tutorial will be given in class and some may be taken for assessment. Students who do not do the exercise will lose the coursework marks for the exercise.
4.Assignments must be submitted on the due dates. Some points will be deducted for late submissions. Assignments submitted three days after the due date will not be accepted.
5.Make up exam will not be given, except to students who are sick and submit medical certificate which is confirmed by UTM panel doctors. Make up exam can only be given within one week of the initial date of exam.

Disclaimer:

ELT = (Theory + Industrial Guidance + Assessment) x 50%

Total of credit for LI/Practical = ELT/40 Notional Hours
Note: For ODL Programme : Courses with mandatory practical requirement imposed by programme standards or any related standards can be exempted from complying to the minimum 80% ODL delivery rule in the SLT.

Prepared by: **Name: Cik Suhaimi bin Yusof** **Signature:** **Date: 2 October 2025**	**Certified by:** **Name:** Radziah Mohamad **Signature:** **Date:** 5/10/2025