

COURSE INFORMATION

School/Faculty:	Computing/ Engineering	Page:	1 of 6
Program name:	Bachelor of Computer Science		
Course code:	SECJ1023/ SCSJ1023	Academic Session/Semester:	20242025/2
Course name:	Programming Technique II	Pre/co requisite (course name and code, if applicable):	Programming Technique I (SECJ1013/ SCSJ1013)
Credit hours:	3		

Course synopsis	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, inheritance and polymorphism. At the end of this course, students should be able to apply the OOP techniques to solve problems.			
Course coordinator (if applicable)	Ms. Lizawati binti Mi Yusuf			
Course lecturer(s)	Name	Office	Contact no.	E-mail (@utm.my)
	Dr. Nur Eiliyah @ Wong Yee Leng			nureiliyah
	Dr. Nies Hui Wen			huiwennies
	Ms. Lizawati binti Mi Yusuf	N28-438-03	012-7409224	lizawati
	Dr. Cik Suhaimi bin Yusof			suhaimi

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

No.	CLO	PLO (CODE)	*Taxonomies and **generic skills	T&L methods	***Assessment methods
CLO1	Analyse problems systematically using object- oriented approaches.	KW Knowledge	*C4	Lecture, active learning, Project-based learning	Test, Exam, Project
CLO2	Develop programs using object-oriented principles	AP Application	*C5, P2, A2	Lecture, Active-learning, Project-based learning	Exercise, Project, Test, Exam
CLO3	Work in a team to develop a medium to complex program as a	TW Teamworking	*C5, A2, P4 **TW1, TW3	Project-based learning	Project, Teamworking Assessment

Prepared by: Name: Lizawati binti Mi Yusuf Signature: Date: 28/02/2025	Certified by: Name: Assoc. Prof. Dr. Radziah binti Mohamad Signature: Date:
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	group mini project, using C++ programming language.				
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Details on Innovative T&L practices:

No.	Type	Implementation
1.	Active learning	Conducted through in-class activities such as pair programming, group discussion
2.	Project-based learning	Conducted through a group project (3 or 4 students per group). The project is divided into several deliverables.

Weekly Schedule:

Week	Topics	Assessments
Week 1 17/3-21/3 <i>* Sultan of Johor's Birthday (23/3 - Sunday)</i>	1.0 Introduction 1.1 Overview of Programming Paradigms <ul style="list-style-type: none"> Procedural Programming Object-Oriented Programming Functional Programming 1.2 Revision on Programming Technique I 1.3 Setting Up Programming Environment	
Week 2 24/3-28/3	1.4 Overview of Object-Oriented Programming Principles <ul style="list-style-type: none"> Abstractions Data Hiding Encapsulations Associations Inheritances 1.5 UML Class Diagram	Group Formation for the project and discussion of the project idea.
Week 3 31/3-4/4 <i>*Hari Raya AidilFitri (31/3 & 1/4 - Monday & Tuesday)</i>	2.0 Introduction to Classes and Objects 2.1 Defining Classes 2.2 Creating Objects 2.3 Private Members <ul style="list-style-type: none"> Why Have Private Members? Using Private Member Functions 2.4 Separating Class Specification from Implementation 2.5 Inline Member Functions	Exercise 1 <i>Introduction to Classes and Objects</i> Project Deliverable 1 (Project Proposal), Week 3 - 5
Week 4 7/4-11/4	3.0 Constructors and Destructors 3.1 Constructors 3.2 Passing Arguments to Constructors 3.3 Destructors 3.4 Overloading Constructors 3.5 Copy Constructors	
Week 5 14/4-18/4	4.0 Class and Object Manipulations 4.1 Friend of Classes 4.2 Pointers to Objects	Exercise 2 <i>Class and Object Manipulations</i>

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	4.3 Arrays of Objects 4.4 Objects and Functions <ul style="list-style-type: none"> Objects as Function Parameters Returning Objects from Functions 4.5 Operator Overloading 4.6 Object Conversions	
Week 6 21/4-25/4	5.0 String Manipulations 5.1 The string Class 5.2 String Comparisons 5.3 String Operators 5.4 String Member Functions	Exercise 3 <i>String Manipulations</i> Project Deliverable 2 (Problem Analysis and Design), Week 6 - 9
Week 7 28/4-2/5 <i>*Labour Day (1/5 - Thursday)</i>	6.0 Associations, Aggregations and Compositions 6.1 Introduction to Associations 6.2 Introduction to Aggregations 6.3 Aggregation Implementations	Mid-Term Test Part 1 - Theory Topic 1 – Topic 5 Tue 29 April 2025, 8-10pm
Week 8 5/5-9/5	MID-SEMESTER BREAK	
Week 9 12/5-16/5 <i>*Wesak Day (12/5 - Monday)</i>	6.4 Introduction to Compositions 6.5 Composition Implementations	Exercise 4 <i>Association, Aggregations and Compositions</i> Mid-Term Test Part 2- Practical Topic 1 – Topic 5 Wed 14 May 2025, 8-10pm
Week 10 - 11 19/5-23/5 26/5-30/5	7.0 Inheritance 7.1 Introduction to Inheritance 7.2 Protected Members and Class Access 7.3 Constructors and Destructors in Base and Derived Classes 7.4 Redefining Base Class Functions 7.5 Class Hierarchies 7.6 Multiple Inheritances	Project Deliverable 3 (Interim Progress), Week 10 - 12
Week 12 - 13 2/6-6/6 9/6-13/6 <i>*Agong's Birthday (2/6 - Monday)</i> <i>*Hari Raya Haji (7/6 – Saturday)</i>	8.0 Polymorphisms 8.1 Introduction to Polymorphisms 8.2 Polymorphism and Virtual Member Functions 8.3 Abstract Base Classes and Pure Virtual Functions	Exercise 5 <i>Inheritance & Polymorphism</i> Project Deliverable 4 (Complete Project), Week 13 - 15

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Week 14 - 15 16/6-20/6 23/6-27/6 <i>*Awal Muharram (27/6 – Friday)</i>	9.0 Overview of Advanced Features 9.1 Exceptions 9.2 Templates 9.3 Containers 9.4 Iterators	
30/6-6/7	REVISION WEEK SEM 2 (WEEK 16)	
7/7-27/7	EXAM WEEKS SEM 2 (3 WEEKS: WEEK 17 - 19)	

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

Team working Skills.

Student learning time (SLT) details:

Distribution of student Learning Time (SLT) Course content outline	Teaching and Learning Activities						TOTAL SLT
	Guided Learning (Face to Face)				Guided Learning Non-Face to Face	Independent Learning Non-Face to face	
CLO	L	T	P	O			
CLO 1	15h	7h				22h	44h
CLO 2	13h	7h	12h			31h	63h
CLO 3				2h		2h	4h
Total SLT	28h	14h	12h	2h		55h	111h

L – Lecture; T-Tutorial; P-Practical; O-Others

Continuous Assessment (Count)		PLO	Percentage	Total SLT
1	Exercises (5)	AP	15	As in CLO2 (13h)
2	Project Design: (Proposal and Problem Analysis and Design)	KW	10	As in CLO1 (6h)
3	Project Implementation: (Interim Progress and Final Outcome)	AP	10	As in CLO2 (10h)
5	Teamworking (4)	TW	5	As in CLO3 (4h)
Summative and Final Assessments		PLO	Percentage	Total SLT
1	Mid Term Test Part 1 (Theory)	KW	15	2h
2	Mid Term Test Part 2 (Practical)	AP	10	2h
3	Final Exam Part 1 (Theory)	KW	15	2h
4	Final Exam Part 2 (Practical)	AP	20	3h
Grand Total SLT				120h

Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):

Computer Lab (with internet connections): For Lab Exercises and practical tests Software: C++ IDE such as Microsoft Visual Studio Code, Dev C++, etc.
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Learning resources:

<p>Main references: Tony Gaddis and Barret Krupnow, (2016), Starting out with C++: From Control Structures through Objects, 8th edition update. Pearson Education.</p> <p>Lab Exercise Book: Faculty of Computing, Programming Technique II – C++ Workbook, 5th edition, 2018.</p> <p>Other references:</p> <ol style="list-style-type: none"> 1. D. S. Malik, (2015), C++ Programming: From Problem Analysis to Program Design, 7th edition. Cengage Learning. 2. Walter Savitch, (2015), Problem Solving with C++. 9th edition. Pearson Education. <p>Online http://elearning.utm.my http://www.cplusplus.com/ https://www.tutorialspoint.com/cplusplus/</p>

Academic honesty and plagiarism:

Copying of work (texts, lab results etc.) from other students/groups or from other sources is strictly prohibited. Be warned: students who submit copied work will obtain a mark of zero for the exercises, tests and exams; 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 (Course policy, any specific instruction etc.):

<ol style="list-style-type: none"> 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. Exercises must be submitted on the due dates. Some points will be deducted for late submissions. Exercises 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 confirmed by UTM panel doctors. Make up exam can only be given within one week of the initial date of exam.

No	Assessment	KW	AP	TW	TOTAL
		CLO1	CLO2	CLO3	
1	Exercises: <ol style="list-style-type: none"> i. Topic 2: Introduction to Classes and Objects (3%) ii. Topic 4: Class and Object Manipulations (3%) iii. Topic 5: String Manipulations (3%) 		15		15

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	iv. Topic 6: Associations, Aggregations and Compositions (3%) v. Topic 8: Polymorphism (3%)				
2	Mid Term Test (Part 1) – Theory Topic 1 – Topic 5	15			15
3	Mid Term Test (Part 2) - Practical Topic 1 – Topic 5		10		10
4	Projects: i. Project Proposal (5%) ii. Problem Analysis and Design (5%) iii. Project Progress (5%) iv. Project Final Outcome (5%)	10	10		20
5	Teamworking: i. TW1 (1%) ii. TW2 (1%) iii. TW3 (1.5%) iv. TW4 (1.5%)			5	5
6	Final Exam (Part 1) - Theory Topic 6 – Topic 9	15			15
7	Final Exam (Part 2) - Practical Topic 6 – Topic 9		20		20
TOTAL PLO		40	55	5	100

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