# COURSE INFORMATION

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|---|---|---|---|
| **School/Faculty:** | Computing/Engineering | **Page:** | 1 of 6 |
| **Program name:** | Bachelor of Computer Science | | |
| **Course code:** | SECJ 1013 | **Academic Session/Semester:** | 2024/2025 - 1 |
| **Course name:** | Programming Technique I | **Pre/co requisite (course name and code, if applicable):** | - |
| **Credit hours:** | 3 | | |

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| **Course synopsis** | 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: 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. |
| **Course coordinator (if applicable)** | Alif Ridzuan Khairuddin |

**Course lecturer(s)**

| **Name / Section(s)** | **Office** | **Contact no.** | **E-mail (@utm.my)** |
|---|---|---|---|
| Alif Ridzuan Khairuddin | N28 | | alifridzuan |
| Goh Eg Su | N28A | | eg.su |
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**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 | Solve problems systematically using problem solving methods. | PLO1 (KW) | C3 | Lecture, Active Learning | T, LE, A |
| CLO2 | Construct or develop a C++ program using structured approach for the analysed problem from simple to moderate problem. | PLO1 (KW), PLO2 (AP) | C3, C6 | Lecture, Active Learning | T, LE, F |
| CLO3 | Solve problems in a given time frame using C++ programming language and tools. | PLO2 (AP), PLO5 (TH) | C3, TH3 | Lecture, Active Learning, Project-based Learning | A, T, F |

Refer *Taxonomies of Learning and **UTM's Graduate Attributes, where applicable for measurement of outcomes achievement

***T – Test; LE – Lab Exercise; F – Final Exam; ASG – Assignment;

| **Prepared by:** | **Certified by:** |
|---|---|
| Name: Lizawati Mi Yusuf | Name: Assoc. Prof. Dr. Radziah Mohamad |
| Signature: | Signature: |
| Date: 29/8/2020 | Date: |

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|---|---|---|---|
| **School/Faculty:** | Computing/Engineering | **Page:** | 2 of 6 |
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**Details on Innovative T&L practices:**

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

**Weekly Schedule:**

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| **Week 1**<br>(6/10 - 10/10 JB)<br>(7/10 - 11/10 KL) | **1 PROGRAMMING PROBLEM-SOLVING**<br>1.1 Problem-Solving Process<br>1.1.1 Input, Process, and Output<br>1.1.2 The Programming Process<br>1.1.3 Procedural and Object-Oriented Programming<br>1.2 Problem-Solving Techniques<br>1.2.1 Pseudo codes<br>1.2.2 Flowcharts<br>- Flowchart Symbols<br>- Flowchart Structures (Sequential, Selection, Repetition)<br>- Modular Flowcharting (Functions) |
| **Week 2**<br>(13/10 - 17/10 JB)<br>(14/10 - 18/10 KL)<br>**LE 1** | |
| **Week 3**<br>(20/10 - 24/10 JB)<br>(21/10 - 25/10 KL)<br>**ASG 1** | **2 ELEMENTARY PROGRAMMING**<br>2.1 Variables and Assignments<br>2.1.1 Variables<br>2.1.2 Identifiers<br>2.1.3 Assignment statements<br>2.2 Input and Output<br>2.2.1 Input using cin<br>2.2.2 Output using cout<br>2.3 Data Types and Constants<br>2.3.1 Numeric data types<br>2.3.2 Character data type<br>2.3.3 Boolean data type<br>2.3.4 Naming constants<br>2.4 Arithmetic Expressions<br>2.4.1 Arithmetic operators and expressions<br>2.4.1 Arithmetic operators and expressions<br>2.4.2 Type conversion<br>2.4.3 Overflow and underflow<br>2.4.4 Type Casting<br>2.4.5 Multiple assignments and combined assignments |
| **Week 4**<br>(27/10 - 31/10 JB)<br>(28/10 - 1/11 KL)<br>**Deepavali (31/10 - Thursday)* | |

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| **Week 5**<br>(3/11 - 7/11 JB)<br>(4/11 - 8/11 KL) | **3 CONTROL STRUCTURES**<br>3.1 Boolean and Logical Expressions<br>3.2 Selection/ Branch<br>3.2.1 The if statement<br>3.2.2 The if/else statement<br>3.2.3 The if/else if statement<br>3.2.4 The switch statement<br>3.2.5 The break, continue statement<br>3.3 Loop<br>3.3.1 The for loop<br>3.3.2 The while loop<br>3.3.3 The do-while loop<br>3.3.4 Nested loop |
| **Week 6**<br>(10/11 - 14/11 JB)<br>(11/11 - 15/11 KL)<br>**LE 2** | |
| **Week 7**<br>(17/11 - 21/11 JB)<br>(18/11 - 22/11 KL) | **4 FUNCTION**<br>4.1 Predefined/ Library Functions<br>4.1.1 Mathematical functions<br>4.1.2 Random generator<br>4.1.3 Character manipulations<br>4.1.4 String manipulations |
| **Week 8**<br>(24/11 - 28/11 JB)<br>(25/11 - 29/11 KL) | **MID SEMESTER BREAK** |
| **Week 9**<br>(1/12 - 5/12 JB)<br>(2/12 - 6/12 KL)<br>**TEST 1 (WRITTEN)**<br>**4/12/2024 (Wednesday) @ 8 PM** | 4.2 User-Defined Functions<br>4.2.1 Function definitions and prototypes<br>4.2.2 Sending data by value<br>4.2.3 Sending data by reference |
| **Week 10**<br>(8/12 - 12/12 JB)<br>(9/12 - 13/12 KL)<br>**TEST 2 (PRACTICAL)**<br>**11/12/2024 (Wednesday) @ 8 PM** | **5 ARRAY**<br>5.1 One Dimension<br>5.1.1 Declaration and definition<br>5.1.2 Accessing arrays<br>5.1.3 1-D Array in functions<br>5.2 Two Dimension<br>5.2.1 Declaration and definition<br>5.2.2 Accessing arrays<br>5.2.3 2-D Array in functions<br>5.3 Multidimensional Arrays |
| **Week 11**<br>(15/12 - 19/12 JB)<br>(16/12 - 20/12 KL)<br>**ASG 2**<br>**LE 3** | |
| **Week 12**<br>(22/12 - 26/12 JB)<br>(23/12 - 27/12 KL)<br>**Christmas (25/12 -Wednesday)*<br>**ASG 3** | **6 INPUT AND OUTPUT**<br>6.1 Formatting Output<br>6.2 Formatted Input<br>6.3 Introduction to Files |

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|---|---|---|---|
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| | |
|---|---|
| **Week 13**<br>(29/12 - 2/1 JB)<br>(30/12 - 3/1 KL)<br>**New Year (1/1 - Wednesday KL)* | **7 POINTERS**<br>7.1 Address of a Variable<br>7.2 Pointer Variable<br>7.3 The Relationship Between Arrays and Pointer<br>7.4 Pointer Arithmetic<br>7.5 Initializing Pointers<br>7.6 Comparing Pointers<br>7.7 Pointers as Function Parameters<br>7.8 Dynamic Memory Allocation<br>7.9 Returning Pointers from Functions |
| **Week 14**<br>(5/1 - 9/1 JB)<br>(6/1 - 10/1 KL)<br>**LE 4** | |
| **Week 15**<br>(12/1 - 16/1 JB)<br>(13/1 - 18/1 KL) | **8 STRUCTURED DATA**<br>8.1 Combining Data into Structures<br>8.2 Accessing Structure Members<br>8.3 Initializing the Structure<br>8.1 Arrays of structures<br>8.2 Unions a nd enumerated data types |
| **Week 16**<br>(19/1 – 23/1 JB)<br>(20/1 – 24/1 KL) | **REVISION WEEK** |

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

Thinking skills.
Programming 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** | | | |
| CLO1 | 5h | 3h | | | | 6h | **14h** |
| CLO2 | 11h | 6h | 6h | | | 26h | **49h** |
| CLO3 | 12h | 6h | 7h | | | 19h | **44h** |
| **Total SLT** | **28h** | **15h** | **13h** | | | **51h** | **107h** |

| | Continuous Assessment | PLO | Percentage | Total SLT |
|---|---|---|---|---|
| 1 | Lab 1 (CLO1) | KW | 4 | **1h** |
| 2 | Lab 2 - 4 (CLO2) | AP | 11 | **2h** |
| 3 | Test 1 - Written (CLO1 & CLO2) | KW | 15 | **2h** |
| 4 | Test 2 - Practical (CLO3) | AP, TH | 15 | **3h** |
| 5 | Assignment 1 (CLO1) | KW | 6 | As in CLO3 (14h) |
| 6 | Assignment 2 - 3 (CLO3) | AP, TH | 14 | As in CLO3 (44h) |

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|---|---|---|---|
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| Final Assessment | | | Percentage | Total SLT |
|---|---|---|---|---|
| 1 | Final Examination - Written (CLO2) | KW | 20 | **2h** |
| 2 | Final Examination - Practical (CLO3) | AP | 15 | **3h** |
| **Grand Total SLT** | | | | **120h** |

L: Lecture, T: Tutorial, P: Practical, O: Others

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

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

**Learning resources:**

**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 Edition. School of Computing.

**Main references**

Tony Gaddis (2016), Starting out with C++: From Control Structures through Objects, Brief Version, 8th edition. 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

**Academic honesty and plagiarism:**

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 (Course policy, any specific instruction etc.):**

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:**



| | | PLO1 (KW) | | PLO2 (AP) | | PLO5 (TH) | mark |
|---|---|---|---|---|---|---|---|
| **No.** | **Assessment** | **CLO 1** | **CLO 2** | **CLO 2** | **CLO 3** | **CLO3** | **Total** |
| **1** | **LAB 1** | > 4 | | | | | **4** |
| **2** | **LAB 2 - 4** | | | 11 | | | **11** |
| **3** | **TEST 1 - WRITTEN** w9w10 | 6 | 9 | | | | **15** |
| **4** | **TEST 2 - PRACTICAL** | | | | 12 | 3 | **15** |
| **5** | **ASSIGNMENT 1** Pair | 6 | | | | | **6** |
| **6** | **ASSIGNMENT 2 - 3** | | | | 10 | 4 | **14** |
| **7** | **FINAL EXAM (WRITTEN)** | | 20 | | | | **20** |
| **8** | **FINAL EXAM (PRACTICAL)** | | | | 15 | | **15** |
| **Total** | | **16** | **29** | **11** | **37** | **7** | **100** |
| **TOTAL PLO** | | **45** | | **48** | | **7** | |