COURSE OUTLINE

Course Code: SCSJ1013
Course Name : Programming Techniques I
Total Contact Hours: 56 hours
Course Pre-requisite: None

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, text files, control structures: sequential, selection and loop, built-in and user-defined functions, single and two dimensional arrays, and structured data types.

LEARNING OUTCOMES

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

No.	Course Learning Outcome	Programme Learning Outcome(s) Addressed	Assessment Methods
1.	Solve problems systematically using problem solving methods.	PO1 (C3, P2, A2)	LE
2.	Construct a C++ program correctly from the analyzed problems using structured approach.	PO2(C3, P2, A2)	LE, A
3.	Construct or develop complete C++ programs for simple to moderate problems individually.	PO2 (C3, P2, A2)	LE, A, T, F
4.	Solve problems in a given time frame using C++ programming language and tools.	PO5 (CTPS1, CTPS2,CTPS3)	Sbt, A
	(T – Test ; Q – Quiz; LE – Labexercise ; Sbt – Skill-Based Test ; A – Assignment; F – Final Exam)		

STUDENT LEARNING TIME

Teaching and Learning Activities			Student Learning Time (hours)	
Face to face Learning	• Lecturer Centered	Lecture	28	
	• Student Centered	- Practical/Lab/Tutorial	28	
	• Others		0	
Sub Total				56
Self Learning	• Non Face to face or Student Centered Learning (SCL)		24	
	• Revision		14	
	• Assessment Preparation		15	

	• Others	0	
	Sub Total		53
Formal Assessment	• Continuous Assessment	8	
	• Final Examination	3	
	• Others	0	
	Sub Total		11
TOTAL Student Learning Time			**120**

TEACHING METHODOLOGY

Lecture and Discussion, Co-operative Learning, Lab Activities

Continuous Assessment – 8 hrs = PST (1.5 hrs), SBT1 (1 hr), SBT2 (1 hr), Written Test (2 hrs), 4 lab ex. (2 hrs), Assignments (remaining- 0.5hr) also taken from Assessment Preparation (above).

WEEKLY SCHEDULE

Week	Topics	Activities/hours
Week 1	**1 INTRODUCTION TO COMPUTERS AND PROGRAMMING** 1.1 Introduction to a Program 1.2 Computer Systems: Hardware and Software 1.3 Programs and Programming Languages 1.4 Procedural and Object-Oriented Programming **2 PROBLEM-SOLVING PROCESS** 2.1 Input, Processing, and Output 2.2 The Programming Process 2.3 System Development	Lecture : 2 Lab: 2 Student Centered Learning : 0.5 – 1 hr

Weeks 2 - 3	**3 PROBLEM-SOLVING TECHNIQUES (emphasize module/decomposition of problem)**
	3.1 Pseudocode (soft introduction)
	3.2 Flowchart (emphasize)
	    3.2.1 Design (Read flowchart, Write flowchart)
	    3.2.2 Translate to Program
	3.3 Structured chart
		Lecture : 4
		Lab: 4
		
		Assessment:
		Lab Exercise 1

Week 4	**4 BASICS OF C++** 4.1 Variables 4.1 Identifiers 4.2 Assignment statements 4.3 Data types 4.4 Basic arithmetic operators 4.5 Mathematical Expressions 4.6 Mathematical Functions 4.7 Type Conversion 4.8 Overflow and Underflow 4.9 Type Casting 4.10 Named Constants 4.11 Multiple Assignments and Combined Assignment	Lecture : 2 Lab Activity: 2 **Assessment:** *Problem solving test*

Week 5	5 **INPUT AND OUTPUT** 5.1 The cin object 5.2 Formatting Output 5.3 Working with Characters and string Objects 5.4 Introduction to Files : Input and Output 5.5 Focus on Debugging: Hand Tracing a Program	Lecture : 2 Lab Activity: 2 **Assessment:** Lab Exercise 2 Assignment 1
Week 6	6 **BOOLEAN OPERATIONS** 6.1 Relational Operators 6.2 Logical Expressions 7 **CONTROL STRUCTURE 2: SELECTION/BRANCH** 7.1 The if statement 7.2 The if/else statement 7.3 The if/else if statement 7.4 The switch statement 7.5 The break, continue statement	Lecture : 2 Lab Activity: 2 **Assessment:** *Skill-based Test 1*
Weeks 7 - 8	8 **CONTROL STRUCTURE 3: LOOP** 8.1 The for loop 8.2 The while-do loop 8.3 The do-while loop 8.4 Nested loop	Lecture : 4 Lab Activity: 4 **Assessment:** Lab Exercise 3 (week 7)
Week 9	9 **FUNCTION:** 9.1 User-defined function 9.2 Sending data by value 9.3 Sending data by reference	Lecture : 2 Lab Activity: 2 **Assessment:** Assignment 2
Week 10	9 **FUNCTION (cont.):** 9.4 Predefined/library function	Lecture : 2 Lab Activity: 2 **Assessment:**
Week 11	10 **ARRAY: ONE DIMENSION** 10.1 Declaration and definition 10.2 Accessing arrays 10.3 1-D Array in functions	Lecture : 2 Lab Activity: 2 **Assessment:** Assignment 3
Week 12	11 **ARRAY: TWO and MULTI-DIMENSION** 11.1 Declaration and definition 11.2 Accessing arrays 11.3 2-D Array in functions 11.4 Multidimensional arrays	Lecture : 2 Lab Activity: 2 **Assessment:** *Skill-based Test 2*
Weeks 13	12 **STRUCTURED DATA** 12.1 Abstract Data Types 12.2 Combining Data into Structures 12.3 Accessing Structure Members 12.4 Initializing the Structure 12.5 Arrays of structures	Lecture : 2 Lab Activity: 2 **Assessment:** Lab Exercise 4
Weeks 14	12 **STRUCTURED DATA (cont.)** 12.6 Nested Structures 12.7 Structures as Function Arguments 12.8 Returning a Structure from a Function 12.9 Unions 12.10 Enumerated Data Types	Lecture : 2 Lab Activity: 2 **Assessment:**
	STUDY WEEK	
	EXAMINATION WEEKS	

REFERENCES :

Courses Notes:
Tony Gaddis and Barret Krupnow, (2012), *Starting out with C++: From Control Structures through Objects*, 7th edition update. Pearson Education.

Main Text:
D. S. Malik, (2012), *C++ Programming: From Problem Analysis to Program Design*, 6th edition. Cengage Learning.

Tony Gaddis and Barret Krupnow, (2012), *Starting out with C++: From Control Structures through Objects*, 7th edition update. Pearson Education..

Lab Book:
Faculty of Computing, *Programming Technique I – C++ Workbook (English – Malay)*, 6th edition, 2015.

Other References:
1. Walter Savitch, (2012), *Problem Solving with C++*. 8th edition. Addison-Wesley.
2. BehrouzA.Forouzan, Richard F.Gilberg, *Computer Science: A Structured Approach Using C++*, 2nd edition. 2004. Brooks/Cole Thomson Learning.
3. H.M. Deitel and P.J. Deitel, (2012), *C++ How to Program (Late Objects)*. 8th edition. Pearson Education.
4. Mohd. Aizaini Maarof, *Logik Pengaturcaraan Komputer*, 2006. Penerbit Universiti Teknologi Malaysia.

GRADING

No.	Assessment	Number	% each	% total
1	Assignments (individual – 1 week *Asg 1: Basics, I/O; Asg 2: Branch, Loop, Files, Fn; Asg 3: Files, 1DArr, 2Darr, SD)*	3	Asg1 - 5%, Asg2 - 8%, Asg3 - 7%	20
2	Lab Exercises – 30 min. Each *L1(F/chart+P/code), L2(I/O), L3(Loop), L4(SD)*	4	2.5%	10
3	Skill-Based Test – 1 hour *(SBT1 – selection, SBT2 – loops+fn)*	2	5%	10
4	Problem solving test – 1.5 to 2 hours *(F/chart+P/code)*	1	10%	10
5	Test *(Pt. 1: Written – 1 hrs, (Pt. 2: Practical - 2 hrs)*	1	Pt. 1 - 10%, Pt. 2 – 10%	20
6	Final Exam (Written – 3 hours)	1	30%	30
	Overall Total			**100**