

CSE1002	PROBLEM SOLVING AND OBJECT ORIENTED PROGRAMMING				L	T	P	J	C
					0	0	6	0	3
Pre-requisite	Nil				Syllabus version				
					1.0				
Course Objectives:									
1. To emphasize the benefits of object oriented concepts.									
2.To enable students to solve the real time applications using object oriented programming features									
3.To improve the skills of a logical thinking and to solve the problems using any processing elements									
Expected Course Outcome:									
1. Demonstrate the basics of procedural programming and to represent the real world entities as programming constructs.									
2.Enumerate object oriented concepts and translate real-world applications into graphical representations.									
3.Demonstrate the usage of classes and objects of the real world entities in applications.									
4.Discriminate the reusability and multiple interfaces with same functionality based features to solve complex computing problems.									
5.Illustrate possible error-handling constructs for unanticipated states/inputs and to use generic programming constructs to accommodate different datatypes.									
6.Validate the program against file inputs towards solving the problem..									
Student Learning Outcomes (SLO):					1,9,17				
List of Challenging Experiments (Indicative)									
1.	Postman Problem  A postman needs to walk down every street in his area in order to deliver the mail. Assume that the distances between the streets along the roads are given. The postman starts at the post office and returns back to the post office after delivering all the mails. Implement an algorithm to help the post man to walk minimum distance for the purpose.							10 hours	
2.	Budget Allocation for Marketing Campaign  A mobile manufacturing company has got several marketing options such as							15 hours	

	Radio advertisement campaign, TV non peak hours campaign, City top paper network, Viral marketing campaign, Web advertising. From their previous experience, they have got a statistics about paybacks for each marketing option. Given the marketing budget (rupees in crores) for the current year and details of paybacks for each option, implement an algorithm to determine the amount that shall spent on each marketing option so that the company attains the maximum profit.	
3.	<b>Missionaries and Cannibals</b>  Three missionaries and three cannibals are on one side of a river, along with a boat that can hold one or two people. Implement an algorithm to find a way to get everyone to the other side of the river, without ever leaving a group of missionaries in one place outnumbered by the cannibals in that place.	10 hours
4.	<b>Register Allocation Problem</b>  A register is a component of a computer processor that can hold any type of data and can be accessed faster. As registers are faster to access, it is desirable to use them to the maximum so that the code execution is faster. For each code submitted to the processor, a register interference graph (RIG) is constructed. In a RIG, a node represents a temporary variable and an edge is added between two nodes (variables) t1 and t2 if they are live simultaneously at some point in the program. During register allocation, two temporaries can be allocated to the same register if there is no edge connecting them. Given a RIG representing the dependencies between variables in a code, implement an algorithm to determine the number of registers required to store the variables and speed up the code execution	15 hours
5.	<b>Selective Job Scheduling Problem</b>  A server is a machine that waits for requests from other machines and responds to them. The purpose of a server is to share hardware and software resources among clients. All the clients submit the jobs to the server for execution and the server may get multiple requests at a time. In such a situation, the server schedule the jobs submitted to it based on some criteria and logic. Each job contains two values namely time and memory required for execution. Assume that there are two servers that schedules jobs based on time and memory. The servers are named as Time Schedule Server and memory Schedule Server respectively. Design a OOP model and implement the time Schedule Server and memory Schedule Server. The Time Schedule Server arranges jobs based on time required for execution in ascending order whereas memory Schedule Server arranges jobs based on memory required for execution in ascending order	15 hours
6.	<b>Fragment Assembly in DNA Sequencing</b>  DNA, or deoxyribonucleic acid, is the hereditary material in humans and	15 hours

	almost all other organisms. The information in DNA is stored as a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). In DNA sequencing, each DNA is sheared into millions of small fragments (reads) which assemble to form a single genomic sequence (superstring). Each read is a small string. In such a fragment assembly, given a set of reads, the objective is to determine the shortest superstring that contains all the reads. For example, given a set of strings, 000, 001, 010, 011, 100, 101, 110, 111 the shortest superstring is 0001110100. Given a set of reads, implement an algorithm to find the shortest superstring that contains all the given reads.			
7.	<b>House Wiring</b>  An electrician is wiring a house which has many rooms. Each room has many power points in different locations. Given a set of power points and the distances between them, implement an algorithm to find the minimum cable required.			10 hours
<b>Total Laboratory Hours</b>				<b>90 hours</b>
<b>Text Book(s)</b>				
1.	Stanley B Lippman, Josee Lajoie, Barbara E, Moo, C++ primer, Fifth edition, Addison-Wesley, 2012.			
2	Ali Bahrami, Object oriented Systems development, Tata McGraw - Hill Education, 1999.			
3	Brian W. Kernighan, Dennis M. Ritchie , The C programming Language, 2nd edition, Prentice Hall Inc., 1988.			
<b>Reference Books</b>				
1.	Bjarne stroustrup, The C++ programming Language, Addison Wesley, 4th edition, 2013			
2.	Harvey M. Deitel and Paul J. Deitel, C++ How to Program, 7th edition, Prentice Hall, 2010			
3.	Maureen Sprankle and Jim Hubbard, Problem solving and Programming concepts, 9th edition, Pearson Education, 2014.			
Mode of assessment: <b>PAT / CAT / FAT</b>				
Recommended by Board of Studies			04-04-2014	
Approved by Academic Council			No. 37	Date 16-06-2015