GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

COURSE CURRICULUM

PROGRAMME	**:**	**DIPLOMA IN CM/IT**
LEVEL NAME	**:**	**PROFESSIONAL COURSES**
COURSE CODE	**:**	**CM402E$**
COURSE TITLE	**:**	**OBJECT ORIENTED PROGRAMMING**
PREREQUISITE	**:**	**CM401E**
TEACHING SCHEME	**:**	**TH: 03; TU: 00; PR: 04(CLOCK HRs.)**
TOTAL CREDITS	**:**	**05** (1 TH/TU CREDIT = 1 CLOCK HR., 1 PR CREDIT = 2 CLOCK HR.)
TH. TEE	**:**	**03 HRs**
PR. TEE	**:**	**02 HRs (External)**
PT	**:**	**01 HRs**

❖ RATIONALE:

Engineering students must be able to use basics of programming in real time environment. This course increases student's ability towards problem solving and logic development for real world problems. It also describes basics of programming using C++ programming language. C++ is the most commonly used object oriented language. It is very important course for understanding and acquires higher level knowledge in the field of software engineering and learning advanced object oriented languages.

❖ COURSE OUTCOMES:

After completing this course students will be able to–

1. Design the solutions for real world problems.
2. Select and apply appropriate statements, functions, and data structures available in C++, as required
3. Apply various concepts available in C++ to various defined problems.
4. Develop object oriented programs in C++.
5. Debug and test programs in C++.
6. Execute the programs in C++.

❖ **COURSE DETAILS:**

A. THEORY :

Units	**Specific Learning Outcomes (Cognitive Domain)**	**Topics and subtopics**	**Hrs.**
1. Fundamentals of programming	1. Define various OOP's basic concepts. 2. Differentiate between OOP and POP 3. Describe structure of C++ program.	1.1 Its need & requirement, Procedure Oriented Programming (POP) verses Object Oriented Programming (OOP), 1.2 Basic concepts of Object Oriented Programming, Object Oriented Languages, Applications of OOP. 1.3 Beginning with C++: What is C++? , keywords, variables, constants, basic data types, 1.4 Operators, scope resolution operator, memory management operators, console input/output, structure of C++ program.	**6**
2. Basic of Classes & Objects	1. Define classes and objects 2. Declare and define static data members, member functions 3. Write programs on classes and objects 4. Define friend function. 5. Devlop programs on friend function.	2.1 Structures in C++. 2.2 Class & Object: Introduction, specifying a class, access specifiers, defining member functions, creating Objects, memory allocation for objects. 2.3 Array of Objects, Object as function arguments. 2.4 Static data members, static member function, friend Function	**8**
3. Constructor , Destructor, Inheritance	1.Define constructors and destructors. 2.Describe types of constructors. 3. Write programs based on constructors and destructors. 4. Define inheritance and state its types. 5. State visibility modes. 6. Devlop program based on inheritance.	3.1 Concepts of Constructors, Types of constructors: Default, Parameterized, Copy. 3.2 Overloaded Constructors: Multiple Constructors in a Class, Constructors with default arguments. 3.3 Destructors. 3.4 Introduction to derived class, visibility modes & effects 3.5 Types of Inheritance : single, multilevel, multiple, hierarchical , hybrid 3.6 Constructors in derived class	**12**

4. Pointers in C++	1. Define pointer 2. Enlist pointer arithmetic statements 3. State pointer to array, string and objects. 4. Describe this pointer 5. Develop program over pointers.	4.1 Concepts of Pointer: Pointer declaration, Pointer operator, address operator, Pointer arithmetic. 4.2 Pointer to Array: Searching, Insertion, deletion 4.3 Pointer to String: Searching, finding length, comparisons, concatenation, reverse 4.4 Pointer to Object: Pointer to Object, this pointer, Pointer to derived class.	**6**
5.Polymorphism	1. Define polymorphism. 2. State types of polymorphism. 3. Describe Run time polymorphism. 4. Devlop programs over polymorphism.	5.1 Introduction, Types of polymorphism: Compile time, Run time 5.2 Compile time Polymorphism: Function overloading, operator overloading: Overloading unary and binary operators, Rules for Operator overloading. 5.3 Run time polymorphism: Virtual functions, rules for virtual Functions, pure virtual function.	**8**
6. Working with files	1. Define various file operations 2. Describe various files opening modes 3. State movement of pointer throughout file 4. Develop program over files	6.1 Introduction 6.2 Classes for File Stream Operations 6.3 Opening and closing a file, detecting end of file 6.4 File Modes 6.5 File pointers and their manipulations 6.6 Sequential input and output operation 6.7 Updating a File: Random Access 6.8 Error handling during file operations 6.9 Command Line Arguments	**8**
		Total Hrs.	**48**

B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:

Practical	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
Note: Perform all practical in Windows/LINUX environment			
1.	Develop & Execute two simple C++ programs based on object and classes.	Fundamental of programming	**4**
2	Develop & Execute two programs based on default argument concept in function.	Classes and objects,	**2**
3	Develop & Execute two programs based on function overloading.		**2**
4	Develop & Execute two programs on static member function.		**2**
5	Develop & Execute two programs using friend function		**2**
6	Develop two programs based on constructor, destructor and dynamic constructor.	Constructor and destructor	**4**
7	Develop & Execute two programs over constructor overloading		**2**
8	Develop & Execute five programs for all types inheritance	Inheritance	**6**
9	Develop & Execute a program to pass parameters from derived class constructor to base class constructor		**2**
10	Develop & Execute two programs to create a pointer for object and array of objects.	Pointer	**2**
11	Develop & Execute program for virtual function.		**2**
12	Develop & Execute two simple programs on unary operator overloading.	Polymorphism	**4**
13	Develop & Execute two simple programs on binary operator overloading.		**4**
14	Develop & Execute two simple programs to perform various operations over files	Working with files	**4**
15	Develop & Execute two simple programs to randomly access contents of file		**2**
16	Develop & Execute a simple program using command line argument		**2**
17	Develop & Execute Mini project based on above concepts		**14**
		Skill Assessment	**4**
		TOTAL	**64**

❖ SPECIFICATION TABLE FOR THEORY PAPER:

Unit No.	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	Fundamentals of programming	02(04)	04(00)	00(00)	**06(04)**
02	Basic of classes and objects	02(02)	04(04)	06(00)	**12(06)**
03	Constructor , Destructor and Inheritance	02(00)	08(04)	06(06)	**16(10)**
04	Pointers in C++	02(00)	08(08)	00(00)	**10(08)**
05	Polymorphism	04(00)	04(00)	06(06)	**14(06)**
06	Working with files	02(02)	04(04)	06(00)	**12(06)**
	Total	**14(08)**	**32(20)**	**24 (12)**	**70 (40)**

R – Remember U – Understand A – Analyze / Apply

❖ QUESTION PAPER PROFILE FOR THEORY PAPER:

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	2	R	2	3	R	2	6	R	2	4	R	2	2	R	2	**5/7**
	6	R	2																
02	1	U	4	4	U	4	6	U	4	2	U	4	3	U	4				**3/5**
03	2	U	4	3	U	4	4	U	4	1	R	4	4	U	4				**3/5**
04	5	R	4	3	U	4	5	U	4	4	U	4	6	U	4				**3/5**
05	3	A	6	6	A	6	3	A	6										**2/3**
06	5	A	6	2	A	6	5	A	6										**2/3**

T= Unit/Topic Number L= Level of Question M= Marks

R-Remember U-Understand A-Analyze/ Apply

❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	**CA** (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**70**	**28**	Theory Answer Sheets	1, 2, 3
				Total	**100**	**40**		
Direct Assessment Practical	**CA** (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	**25**	**10**		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	**50**	**20**	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ SCHEME OF PRACTICAL EVALUATION:

S.N.	Description	Max. Marks
1	Writing program for defined problem.	10
2	Draw flowchart for defined problem.	10
3	Execution of program	10
4	Viva voce	20
	TOTAL	**50**

❖ MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:

1. Computer Engineering:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	3	-
2	-	3	-	-	-	-	-	-	-	3	3	-
3	-	3	-	-	-	-	-	-	-	3	3	-
4	-	3	3	3	-	-	-	3	3	3	3	-
5	-	3	3	3	-	-	-	3	3	3	3	-
6	-	3	3	3	-	-	-	3	3	3	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

2. Information Technology:-

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ REFERENCE & TEXT BOOKS:

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1	Object oriented programming with c++	E. Balagurusamy , Mc Graw Hill Education , 4th Edition, 2008	13: 9789383286508
2	Let us C++	Yashwant Kanetkar , BPB , 2th Edition, 2003	13: 9788183331630
3	Object oriented programming in c++	Robert Lafore, SAMS, 4th Edition, 2008	13: 9788131722824

❖ E-REFERENCES:

- www.cprogramming.com/**tutorial/c++-tutorial**.html *Accessed on 14 sept. 2016*
- www.**tutorials**point.com/cplusplus/cpp_**tutorial.pdf** *Accessed on 14 sept. 2016*
- www.**tutorials**point.com/cplusplus/cpp_**pdf**_version.htm *Accessed on 14 sept. 2016*
- **http://www.w3schools.org.in** *Accessed on 14 sept. 2016*

❖ LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION

1. Computer (Dual Core or above)
2. Network printer.
3. TCP/GCC compiler

❖ LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:

S.N.	Name	Designation	Institute / Industry
1	Mr. S.P. Lambhade	Head of Computer Engineering	Government Polytechnic, Nagpur.
2	Dr. Mrs. A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3	Mr.Lekhraj D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
4	Ms.S. N. Chaudhary	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Ms.G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
6	Mr. Atul Upadhyay	CEO	Vista Computers , Ram Nagar, Nagpur
7	Prof. N. V. Chaudhari	Asst. Professor (CSE)	DBACEO, Wanadongri, Nagpur
8	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur

(Member Secretary PBOS) **(Chairman PBOS)**