PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

PROGRAM SCHEME

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
			SEMESTER I						**MARKS**	
ENGL0103	P	AE	ENGLISH COMMUNICATION	2	0	0	2	40	60	100
CSEN0112		PC	PROGRAMMING FUNDAMENTALS USING C/C++	4	0	0	4	40	60	100
CSEN0113		PC	PROGRAMMING FUNDAMENTALS USING C/C++ LAB	0	0	4	2	15	35	50
CSEN0110		PC	COMPUTER SYSTEM ARCHITECTURE	4	0	0	4	40	60	100
CSEN0111		PC	COMPUTER SYSTEM ARCHITECTURE LAB	0	0	4	2	15	35	50
		GE	GE-I	4	0	0	4	40	60	100
		GE	GE-I LAB	0	0	4	2	15	35	50
	G		FOREIGN LANGUAGE PART-I #	2	0	0	2	25	50	75
TOTAL CREDITS				**16**	**0**	**12**	**22**	**TOTAL MARKS**		**550**

 # FOREIGN LANGUAGE
One foreign language out of the following

MODULE CODE	MODULE NAME
LANF0101	French
LANG0102	German
LANS0103	Spanish

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ENGLISH COMMUNICATION   **L   T   P**

                                                            2   0   0

MODULE CODE	**ENGL0103**
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to vocabulary, synonyms, anatomize and to enhance English language skills as mentioned below**:**

1. To achieve knowledge and understanding on fundamentals of English Language and various aspects of it.
2. To get familiar with the rules of Grammar and their correct usage.
3. To enhance the creativity of the students related to verbal ability and reasoning or fluency of language.
4. To acquire knowledge and understanding the basic concepts of English language and its application in Science and & Engineering.
5. To acquire knowledge for the correct usage of technical English.

LEARNING OUTCOMES:

1. Able to achieve knowledge and understanding on fundamentals of English Language.
2. Able to get familiar with the rules of Grammar and their correct usage.
3. Enhance the creativity of the students related to verbal ability and reasoning or fluency of English.
4. Ability to acquire knowledge for the correct usage of technical English.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS:

Unit I: Communicative Grammar
Communicative Grammar: Spotting the errors pertaining to parts of speech, nouns, pronouns, adjective, adverbs, preposition, conjunction, genders, infinitives, participles, form of Tenses, use of articles ;Concord - grammatical concord, notional Concord and the principle of proximity between subject and verb and other exceptional usages.
Unit II: Lexis
Lexis: Words often confused; One-Word Substitutes; Foreign Words (A selected list may be included for all the above components); Formation of Words (suffixes, prefixes and derivatives)..
Unit III: Introduction to principal components of spoken English
Introduction to principal components of spoken English – Phonetics, Word-stress patterns, Intonation, Weak forms in English.
Unit IV: Developing listening and speaking skills through various activities
Developing listening and speaking skills through various activities, such As: Role play activities Practicing short dialogues Group discussion Debates Speeches Listening to news bulletins Viewing and reviewing T.V. programs etc.
Unit V: Written Communication
Written Communication: Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises. Reading verbal and non-verbal texts like cartoons, Graphs and tabulated data etc.
Unit VI: Technical Writing
Business Letters, Format of Business letters and Business letter writing-Fully- blocked layout may be used-mail writing; Reports, Types of Reports and Format of Formal Reports; Press Report Writing.

RECOMMENDED BOOKS:

TEXT BOOKS	1. Basic Business Communication: Raymond V Lesikar Mc A 2. Graw Hill publications. Communication Skills: D G Saxena, Kuntal Tamang Top Quark,New Delhi. 3. A textbook of English Phonetics for Indian Students: T Balasubramanian Macmillan India Limited, New Delhi.
REFERENCE BOOKS	1. Living English Structures:W S Allen Pearson Publications, 2. New Delhi. High School English Grammar and Composition: P C Wren and H Martin S.Chand Publications, New Delhi. 3. Essentials of Communication: B R Sharma and Sanjeev Gandhi Bharat publications, Yamuna Nagar

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	G	H	i	J	k
Course Learning Outcomes	1,2,3,4	1,2,3,4	1,2,3	1,2,3	2,4	3,4	1,4	3,4	2,5	1,2,3,5	1,5

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed.

Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 150 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x		X	
Quiz			X	
Assignment	x	x		x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;

- Suggested remedies / corrective measures;

- Approved refinement decisions due for implementation;

- Actions taken based on previous course review; and

- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

PROGRAMMING FUNDAMENTALS USING C/C++   **L   T   P**

                                                                 4   0   0

MODULE CODE	CSEN0112
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

This course aims to familiarize the trainee with basic concepts of computer programming and developer tools and teach students how to design, write and Execute a Program in 'C'.

1. To teach the behavior of basic Data types, Control Structures and Various Programming techniques.

2. To understand and analyze a Problem and then try to write the C-Codes to solve the problem.

3. To make students familiar with basic Computer Programming Array, Pointers, Functions & File Handling in C and C++.

4. To present the syntax and semantics of the "C" language as well as data types offered by the language help the students to write their own programs using standard language infrastructure regardless of the hardware or software platform

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LEARNING OUTCOMES:

1. Design an algorithmic solution for a given problem
2. Write a maintainable C program for a given algorithm.
3. Trace the given C and C++ program manually and Write C and C++ program for simple applications of real life using Functions, Arrays, Pointers, Structures and Files.
4. Trace out the error and resolve it using debugging and develop the logical and analytical thinking.

MODULE CONTENT:

Unit-I: Introduction to C and C++

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++. Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

Unit-II: Expressions, Conditional Statements and Iterative Statements

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switchcase construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops

Unit-III: Functions and Arrays

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments. Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Unit-IV: Memory Allocation and Pointers in C++

Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memory allocation. Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Pointers to Pointers, Pointers to structures, Problems with Pointers, Passing pointers as function arguments, Returning a pointer from a function, using arrays as pointers, Passing arrays to functions. Pointers vs. References, Declaring and initializing references, Using references as function arguments and function return values.

Unit-V: Using Classes in C++

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors,Overview of Template classes and their use. Need of Overloading functions and operators, Overloading functions by number and type of arguments, Looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators)

Unit-VI: Inheritance, Polymorphism and Exception Handling

Introduction to Inheritance (Multi-Level Inheritance, Multiple Inheritance), Polymorphism (Virtual Functions, Pure Virtual Functions), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

RECOMMENDED BOOKS:

TEXT BOOKS	1. Peter Norton, 2006, "Introduction to Computers", Sixth Edition, Tata McGraw Hill Publication, 2. E. Balaguruswamy, 2002, "Programming in ANSI C", Third edition, Tata McGraw Hill Publications, 3. Yaswant Kanetkar, "Let us C ", BPB Publications: 14th edition. 4. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

REFERENCEBOOKS	1. Programming with C by Bryon's Gottfried, Tata Mcgraw Hill. 2. The C Programming 2nd Edition, By Brian W Kernigham and Dennis M Ritchie", PHI. 3. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	x
Quiz	x	x		
Assignment	x	x	x	x

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

PROGRAMMING FUNDAMENTALS USING C/C++ LAB   **L T P**

                                                                      0 0 4

MODULE CODE	CSEN0113
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

1. To understand the Programming skills and develop the Program.
2. To understand the Structure, flow and Working of a C and C++Program.
3. To develop analyzing and problem solving skills and use the same for writing programs in C and C++.
4. To familiarize the trainee with basic concepts of computer programming and developer tools.
5. To present the syntax and semantics of the "C" and C++ language as well as data types offered by the language.
6. To allow the trainee to write their own programs using standard language infrastructure regardless of the hardware or software platform

LEARNING OUTCOMES

Following this course, students will be able to:

1. Do the Compilation and develop the Software using C and C++ Program.
2. Deal with the basic scalar data types and their operators.
3. Know and Implement the Flow control.
4. Understand and Implement the Complex data types: arrays, structures and pointers.
5. Structuring the code: functions and modules.
6. Do the Preprocessing of Source Code.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Write a C Program to check if a given number is Odd or even.
2.	Write a C Program to reverse a number and check whether it is palindrome or not.
3.	Write a C Program to compute Sum of Digit in a given Number.
4.	Write a C Program to find whether a given number is Prime or Not.
5.	WAP to print the sum and product of digits of an integer using C++.
6.	WAP to compute the factors of a given number using C++.
7.	Write a program that swaps two numbers using pointer using C++.
8.	Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator .
9.	Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
10.	Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
11.	Copy the contents of one text file to another file, after removing all whitespaces
12.	Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.
13.	Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.
14.	WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion
15.	Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
Experiments based on advanced topics:	

16.	To implement all the above concept: 1. Develop a Minor Project for Hotel Management System 2. Least Recently Used (LRU)
17.	To implement all the above concept: 1. Develop a Minor Project for Library Management System 2. Least Recently Used (LRU)

Note: At least 12 Experiments out of the list must be done in the semester.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4		4,6	5

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

COMPUTER SYSTEM ARCHITECTURE   **L   T   P**

           4   0   0

MODULE CODE	CSEN0110
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:
1. Boolean algebra and number system
2. Basic Computer Organization**.**
3. Advanced pipelining techniques.
4. Input-Output and Memory Organization.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:
1. Working of DMA.
2. Know about the various addressing modes used by any instruction.
3. Pipelining and vector processing.
4. Register transfer and instruction execution cycle.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENT:

Unit I :Introduction   Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.
Unit II :Data Representation and Basic Computer Arithmetic   Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, multiplication and division algorithms for integers
Unit III: Basic Computer Organization and Design :   Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.
Unit IV: Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, RISC, CISC architectures, pipelining and parallel architecture.
Unit IV: Memory Organization   Cache memory, Associative memory, mapping.
Unit VI: Input-Output Organization   Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

RECOMMENDED BOOKS:

TEXT BOOKS	1.Computer System and Architecture :Mano M Pearson, New Delhi 2.Computer Organization and Architecture :Stallings W Prentice Hall of India, New Delhi 3., Assembly Language and Computer Architecture using C++ and JAVA :A. J. Dos Reis Course Technology, 2004

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

REFERENCEBOOKS	1.Digital Computer Electronics: An Introduction to Microcomputers :Malvino McGraw Hill, New York
	2. Digital Design: M.M. Mano, Pearson Education Asia

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x			x
Assignment	x	x	x	x

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			4

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

COMPUTER SYSTEM ARCHITECTURE LAB   **L   T   P**

                                                        0   0   4

MODULE CODE	CSEN0111
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	15
SUMMATIVE ASSESMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

1. To understand the Programming skills and develop the Program.
2. To understand the Structure, flow and Working of an Assembly Program.
3. To develop analyzing and problem solving skills and use the same for writing programs in Assembly language.
4. To familiarize the trainee with basic concepts of computer programming and developer tools.
5. To present the syntax and semantics of the "Assembly of 8086" language as well as data types offered by the language.
6. To allow the trainee to write their own programs using standard language infrastructure regardless of the hardware or software platform

LEARNING OUTCOMES:

Following this course, students will be able to:

1. Do the Compilation and develop the Software using MASM.

2. Deal with the basic scalar data types and their operators.
3. Know and Implement the Flow control.
4. Understand and Implement the Addressing modes
5. Structuring the code: Segmentation.

6. Do the Preprocessing of Source Code.

LIST OF EXPERIMENTS

1.	Write a program to print "Hello World"
2.	Write a program to print a number.
3.	Write a program to sum of two numbers.
4.	Write a program to multiply two numbers.
5.	Write a program to subtraction of two numbers.
6.	Write a program to find out the greatest among 2 numbers.
7.	Write a program to find factorial of a number.
8.	Write a program to find largest among a list
9.	Write a program to concate two strings .
10.	Write a program to find out the greatest among 3 numbers.
11.	Write a program to find the average of the list values.
12.	Write a program to compute the simple interest .
Experiments based on advanced topics:	
13.	Write a program to make arithmetic calculator
14.	Write a program to create a file and copy it with new file

Note: At least 12 Experiments out of the list must be done in the semester.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Internal Assessment	1	15
2.	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,6	3,4		1,3	6	4		5	4

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Module: Physics: Mechanics (G1)	**Sessional Marks: 40**
	Theory Paper Marks: 60
Module Code: PHYS1301	**Total Marks: 100**
Credits: 04	**Duration of Examination: 03 hrs**

Vectors: Vector algebra. Scalar and vector products. Derivatives of a vector with respect to a parameter.

Ordinary Differential Equations: 1_{st} order homogeneous differential equations. 2_{nd} order homogeneous differential equations with constant coefficients.

Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass.

Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets.

Rotational Motion: Angular velocity and angular momentum. Torque. Conservation of angular momentum.

Gravitation: Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS).

Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations.

Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants - Work done in stretching and work done in twisting a wire - Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion - Torsional pendulum-Determination of Rigidity modulus and moment of inertia - q, η and by Searles method

Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity.

Length contraction. Time dilation. Relativistic addition of velocities.

Note: Students are not familiar with vector calculus. Hence all examples involve differentiation either in one dimension or with respect to the radial coordinate.

Reference Books:

- University Physics. FW Sears, MW Zemansky and HD Young13/e, 1986. AddisonWesley

- Mechanics Berkeley Physics course,v.1: Charles Kittel, et. Al. 2007, Tata McGraw-Hill.
- Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley

- Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Module: Mechanics Lab(G1 Lab)	**Sessional Marks: 15**
	Practical Marks: 35
Module Code: PHYS1302	**Total Marks: 50**
Credits: 02	

Practical

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To determine the Height of a Building using a Sextant.
3. To determine the Moment of Inertia of a Flywheel.
4. To determine the Young's Modulus of a Wire by Optical Lever Method.
5. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
6. To determine the Elastic Constants of a Wire by Searle's method.
7. To determine g by Bar Pendulum.
8. To determine g by Kater's Pendulum.
9. To determine **g** and velocity for a freely falling body using Digital Timing Technique
10. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of g

Reference Books:

- Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.

- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

- Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.

- A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

FRENCH LANGUAGE – PART 1   **L   T   P**

                                                                2   0   0

MODULE CODE	LANF0101
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	75 (Written – 50, Oral – 25)
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in French language and to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on French language.
2. To acquire knowledge on French grammar.
3. To understand syntax and semantics of language.
4. To achieve an understanding on basic communication in French language.
5. To understand a dialogue between two native speakers and also take part in short, simple conversations using the skills acquired.

LEARNING OUTCOMES:

1. Able to understand the basic grammar of French language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the basics of French language.
4. Able to understand the French history.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS

UNIT I:- BASIC COMMUNICATION – This module will develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -

• Establish contact with someone

• Introduce self and others

• Greet, congratulate, and express condolences

• Spell

• Count

• Exchange simple information on self, preferences, feelings, plans, dreams

• Ask for information

• Tell the time

• Advice, order, suggest

• Buy, sell

• Make a reservation

• Order food or any article

• Invite, accept or refuse invitation

• Fix an appointment

• Locate a place

• Give directions

• Give chronological order of events

• Prepare an itinerary

• Ask for / Give explanations

• Describe a person, an object, an event, a place

• Describe the weather

• Compare

UNIT II: BASIC PHONETICS – This module will develop the ability in the students: -

• To pronounce words, say sentences, questions and give orders using the right accent and intonation.

• To express surprise, doubt, fear, displeasure and all positive or negative feelings using the right intonation

• To use 'liaison' and 'enchainment'

• To distinguish voiced and unvoiced consonants

• To distinguish between vowel sounds

UNIT III: BASIC GRAMMAR & FORMATION OF SENTENCES – This module will develops the ability in the students to construct sentences and frame questions using: -

• Nouns – gender and number

• Articles – definite and indefinite, partitif, articles contractés

• Pronouns – personal, relative (qui, que,où), y, en

• Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – present, present continuous, simple future, immediate future, recent past, simple past, past continuous
• Verbs – the imperative mood
• Adjectives – numeric, qualitative, possessive, demonstrative, interrogative – gender and number
• Adverbs – simple adverbs of time, place, quantity
• Prepositions – simple prepositions (place, time)
• Interrogation – interrogative words, interrogative phrases, inversion

RECOMMENDED BOOKS:

TEXT BOOKS	1. Nouveau Sans Frontières 1 by Philippe Dominique & Jacky Girardet 2. "CONNEXIONS-1" by Regine Merieux & Yves Loiseau Published by Didier.
REFERENCE BOOKS	1. Five in one Multilingual Glossary, published by Saraswati House Pvt. Ltd. New Delhi 2011.

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes										1,2	3,4

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50
4.	End Semester Oral Exam	1	25

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x	x	x	
Assignment			x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

GERMAN LANGUAGE – PART 1
       L   **T**   **P**
       2   **0**   **0**

MODULE CODE	LANG0102
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	75 (Written – 50, Oral – 25)
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in German language and to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on German language.
2. To acquire knowledge on German grammar.
3. To understand syntax and semantics of language.
4. To achieve an understanding on basic communication in German language.
5. To understand a dialogue between two native speakers and also take part in short, simple conversations using the skills acquired.

LEARNING OUTCOMES:

1. Able to understand the basic grammar of German language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the basics of German language.
4. Able to understand the German history.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS

UNIT I:- BASIC COMMUNICATION – This module will develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -
• Establish contact with someone
• Introduce self and others
• Greet, congratulate, and express condolences
• Spell
• Count
• Exchange simple information on self, preferences, feelings, plans, dreams
• Ask for information
• Tell the time
• Advice, order, suggest
• Buy, sell
• Make a reservation
• Order food or any article
• Invite, accept or refuse invitation
• Fix an appointment
• Locate a place
• Give directions
• Give chronological order of events
• Prepare an itinerary
• Ask for / Give explanations
• Describe a person, an object, an event, a place
• Describe the weather
• Compare

UNIT II: BASIC PHONETICS – This module will develop the ability in the students: -
• To pronounce words, say sentences, questions and give orders using the right accent and intonation.
• To express surprise, doubt, fear, displeasure and all positive or negative feelings using the right intonation
• To use 'liaison' and 'enchainment'
• To distinguish voiced and unvoiced consonants
• To distinguish between vowel sounds

UNIT III: BASIC GRAMMAR & FORMATION OF SENTENCES – This module will develops the ability in the students to construct sentences and frame questions using: -
• Nouns – gender and number
• Articles – definite and indefinite, articles
• Pronouns – personal, relative

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

• Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – present, present continuous, simple future, immediate future, recent past, simple past, past continuous
• Verbs – the imperative mood
• Adjectives – numeric, qualitative, possessive, demonstrative, interrogative – gender and number
• Adverbs – simple adverbs of time, place, quantity
• Prepositions – simple prepositions (place, time)
• Interrogation – interrogative words, interrogative phrases, inversion

RECOMMENDED BOOKS:

TEXT BOOKS	3. Tangram, Kursbuch und Arbeitsbuch, 1A, 1B & 2A, Max Hueber Verlag 4. Tangram, Kursbuch und Arbeitsbuch, 2B, 3A & 3B, Max Hueber Verlag
REFERENCE BOOKS	2. em Abschlusskurs, Kursbuch und Arbeitsbuch, Max Hueber Verlag

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes										1,2	3,4

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50
4.	End Semester Oral Exam	1	25

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x	x	x	
Assignment			x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;

- Suggested remedies / corrective measures;

- Approved refinement decisions due for implementation;

- Actions taken based on previous course review; and

- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

SPANISH LANGUAGE – PART 1
        L   **T**   **P**
        2   **0**   **0**

MODULE CODE	LANS0103
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	75 (Written – 50, Oral – 25)
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in Spanish language and to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on Spanish language.
2. To acquire knowledge on Spanish grammar.
3. To understand syntax and semantics of language.
4. To achieve an understanding on basic communication in Spanish language.
5. To understand a dialogue between two native speakers and also take part in short, simple conversations using the skills acquired.

LEARNING OUTCOMES:

1. Able to understand the basic grammar of Spanish language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the basics of Spanish language.
4. Able to understand the Spanish history.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS

UNIT I:- BASIC COMMUNICATION – This module will develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -
• Establish contact with someone
• Introduce self and others
• Greet, congratulate, and express condolences
• Spell
• Count
• Exchange simple information on self, preferences, feelings, plans, dreams
• Ask for information
• Tell the time
• Advice, order, suggest
• Buy, sell
• Make a reservation
• Order food or any article
• Invite, accept or refuse invitation
• Fix an appointment
• Locate a place
• Give directions
• Give chronological order of events
• Prepare an itinerary
• Ask for / Give explanations
• Describe a person, an object, an event, a place
• Describe the weather
• Compare

UNIT II: BASIC PHONETICS – This module will develop the ability in the students: -
• To pronounce words, say sentences, questions and give orders using the right accent and intonation.
• To express surprise, doubt, fear, displeasure and all positive or negative feelings using the right intonation
• To use 'liaison' and 'enchainment'
• To distinguish voiced and unvoiced consonants
• To distinguish between vowel sounds

UNIT III: BASIC GRAMMAR & FORMATION OF SENTENCES – This module will develops the ability in the students to construct sentences and frame questions using: -
• Nouns – gender and number
• Articles – definite and indefinite, articles

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

• Pronouns – personal, relative
• Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – present, present continuous, simple future, immediate future, recent past, simple past, past continuous
• Verbs – the imperative mood
• Adjectives – numeric, qualitative, possessive, demonstrative, interrogative – gender and number
• Adverbs – simple adverbs of time, place, quantity
• Prepositions – simple prepositions (place, time)
• Interrogation – interrogative words, interrogative phrases, inversion

RECOMMENDED BOOKS:

TEXT BOOKS	5. Aula Internacional 1 and 2, Novellas and short stories 6. Aula Internacional 3, España and Latinoamérica: Historia y Cultura, Novellas
REFERENCE BOOKS	3. Español sin fronteras, I, SGEL, 1997 4. Nuevo Ven I, Edelsa 2004

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes										1,2	3,4

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50
4.	End Semester Oral Exam	1	25

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x	x	x	
Assignment			x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
			SEMESTER II						**MARKS**	
ENVS0102	P	AE	ENVIRONMENTAL SCIENCE	2	0	0	2	40	60	100
CSEN0133		PC	PROGRAMMING IN JAVA	4	0	0	4	40	60	100
CSEN0134		PC	PROGRAMMING IN JAVA LAB	0	0	4	2	15	35	50
CSEN0132		PC	DISCRETE MATHMATICS	4	2	0	6	50	100	150
PHYS1303		GE	ELECTRICITY & MAGNETISM	4	0	0	4	40	60	100
PHYS1304		GE	ELECTRICITY & MAGNETISM LAB	0	0	4	2	15	35	50
	G		FOREIGN LANGUAGE PART-II#	2	0	0	2	25	50	75
TOTAL CREDITS				16	2	8	22	**TOTAL MARKS**		550

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

 # FOREIGN LANGUAGE

One foreign language out of the following

MODULE CODE	MODULE NAME
LANF0101	FRENCH
LANG0102	GERMAN
LANS0103	SPANISH

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ENVIRONMENTAL SCIENCE   **L   T   P**

                                                       2   0   0

MODULE CODE	ENVS0102
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the student to become familiar with:

1. To recognize the physical, chemical, and biological components of the earth's systems and how they function.

2. Critically examine all sides of environmental issues and apply understanding from science, law, history, and policy to create informed opinions about how to interact with the environment both personally and societally.
3. Understand probabilistic aspects of human interactions with the environment.
4. Independent research on human interactions with the environment.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes.
2. Understand the transnational character of environmental problems and ways of addressing them, including interactions across local to global scales.

3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

4. Demonstrate proficiency in quantitative methods, qualitative analysis, critical thinking, and written and oral communication needed to conduct high-level work as interdisciplinary scholars and/or practitioners.

MODULE CONTENT:

Unit-I: Introduction

Multidisciplinary nature of environmental studies; • Scope and importance; Concept of sustainability and sustainable development

Ecosystems: What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession.

Case studies of the following ecosystems :

a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit-II: Natural Resources

Renewable and Non-renewable Resources, Land resources and land use change; Land degradation, soil erosion and desertification.

Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.

Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).

Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit-III: Biodiversity and Conservation

Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots ,India as a mega-biodiversity nation; Endangered and endemic species of India

Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Unit-IV: Environmental Pollution	

Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution , Nuclear hazards and human health risks

Solid waste management: Control measures of urban and industrial waste. • Pollution case studies.

Unit-V: Environmental Policies & Practices

Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture

Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act.

International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD),Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context

Unit-VI: Human Communities and the Environment

Human population growth: Impacts on environment, human health and welfare.

Resettlement and rehabilitation of project affected persons; case studies.

Disaster management: floods, earthquake, cyclones and landslides.

Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.

Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.

Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi)

RECOMMENDED BOOKS:

TEXT BOOK	1. Silent Spring -Carson, R. 2002.. Houghton Mifflin Harcourt. 2. This Fissured Land: An Ecological History of India, Gadgil, M., & Guha, R. 1993Univ. of California Press.
REFERENCE	1. Global Ethics and Environment ,Gleeson, B. and Low, N. (eds.) 1999., London, Routledge. 2. Fundamentals of Ecology.,Odum, E.P., Odum, H.T. & Andrews, J. 1971Philadelphia: Saunders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	x
Quiz	x	x		
Assignment	x	x	x	x

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

PROGRAMMING IN JAVA

L T P
4 0 0

MODULE CODE	CSEN0133
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study in detail about the Object oriented programming in JAVA

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
3. Understand the principles of inheritance, packages and interfaces

LEARNING OUTCOMES

Following this course, students will be able to:
1. Identify classes, objects, members of a class and relationships among them needed for a specific problem
2. Write Java application programs using OOP principles and proper program structuring
3. Demonstrate the concepts of polymorphism and inheritance
4. Write Java programs to implement error handling techniques using exception handling

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENT:

Unit-I: Introduction to Java   Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods)
Unit-II: Arrays, Strings and I/O   Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods, String Buffer Classes. Simple I/O using System.out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.
Unit-III: Object-Oriented Programming Overview   Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection.
Unit-IV: Inheritance, Interfaces, Packages, Enumerations, Autoboxing and Metadata   Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations and Metadata.
Unit-V: Exception Handling, Threading, Networking and Database Connectivity   Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads. Using java.net package, Overview of TCP/IP and Datagram programming. Accessing and manipulating databases using JDBC.
Unit-VI: Applets and Event Handling   Java Applets:Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms,Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls, Swing components of Java Foundation Classes such as labels, buttons, textfields, layout managers, menus, events and listeners; Graphic objects for drawing figures such as lines, rectangles, ovals, using different fonts. Overview of servlets.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS

TEXT BOOK	1. Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005. 2. James Gosling, Bill Joy, Guy L Steele Jr, GiladBracha, Alex Buckley"The Java Language Specification, Java SE 8 Edition (Java Series)", Published by Addison Wesley, 2014.
REFERENCES	1. Cay S. Horstmann, Gary Corness, "Core Java 2 Volume 1 - Fundamentals)", 9th Edition, Prentice Hall. 2. Cay S. Horstmann, Gary Corness, "Core Java 2 Volume 2 - Advanced Features)", 9th Edition, Prentice Hall.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	x
Quiz	x	x		
Assignment	x	x	x	x

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		3,4			1,2		4		3		

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

PROGRAMMING IN JAVA LAB   **L T P**
                                                       0 0 4

MODULE CODE	CSEN0134
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.

2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.

3. Understand the principles of inheritance, packages and interfaces

LEARNING OUTCOMES

On successful completion of this course the student should be able to:

1.   Create Java programs that solve simple business problems.

2.   Validate user input.

3.   Construct a Java class based on a UML class diagram.

4.   Perform a test plan to validate a Java program.

5.   Document a Java program.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	To find the sum of any number of integers entered as command line arguments
2.	To find the factorial of a given number
3.	To learn use of single dimensional array by defining the array dynamically.
4.	To learn use of in case of a two dimensional array
5.	To convert a decimal to binary number
6.	To check if a number is prime or not, by taking the number as input from the keyboard
Experiments based on advanced topics:	
7.	To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8.	Write a program that show working of different functions of String and StringBufferclasss like setCharAt(, setLength(), append(), insert(), concat()and equals().
9.	Write a program to create a "distance" class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
10.	Modify the "distance" class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
11.	Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions(from lower to higher data type)
12.	Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword

Note: At least 10 Experiments out of the list must be done in the semester.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4		4,5	

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

DISCRETE MATHMATICS
                                                    L T P
                                                    4 2 0

MODULE CODE	CSEN0132
CREDIT POINTS	6
FORMATIVE ASSESMENT MARKS	50
SUMMATIVE ASSESMENT MARKS	100
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the student to become familiar with:

1. Basic set theory, relations and functions.
2. Basis of Propositional calculus.
3. Trees and their traversal
4. Graph Theory and recurrence.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Students will understand how to solve a function.
2. Students will be able to utilize methods of proposition.
3. Students will become skilled in computations and applications of graphs and trees to solve industrial problems.
4. Solve problems using mathematics in unfamiliar settings.
5. Solve applied problems using mathematicalinduction.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENT:

UNIT-I: .Introduction

Sets - finite and Infinite sets, uncountable Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination; Mathematical Induction, Principle of Inclusion and Exclusion.

UNIT-II: propositional Calculus:

Basic operations: AND(^), OR(v), NOT(~), Truth value of a compound statement, Well framed formulas,propositions, tautologies, contradictions, Inference Theory

---

UNIT-III:Growth of Functions:

Asymptotic Notations, Summation formulas and properties, Bounding Summations, approximation by Integrals

---

UNIT-IV: .Recurrences

Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master Theorem

---

UNIT-V: Graph Theory

Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring,

---

UNIT-VI: Trees

Trees, Basic Terminology and properties of Trees, Introduction to Spanning Trees, binary trees and its traversal

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS

TEXT BOOK	1. Elements of Discrete mathematics ,C.L. Liu & Mahopatra, , 2nd Sub Edition 1985, Tata McGraw Hill
REFERENCE BOOK	2. Discrete Mathematics and Its Applications ,Rosen, Sixth Edition 2006 Data Structures and Program Design in C By Robert Kruse, PHI 3. Discrete Mathematics with Algorithms ,M. O. Albertson and J. P. Hutchinson, 1988 4. Schaums Outline series: Theory and problems of Probability by S. Lipshutz, 1982, McGraw-Hill

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 150 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	20
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	100

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test	x	x	x	x	
Quiz	x	x			x
Assignment	x	x		x	

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	3,5	2	1		4		3		4,5		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Module: Electricity and Magnetism (G-II)	**Sessional Marks: 40**
	Theory Paper Marks: 60
Module Code: PHYS1303	**Total Marks: 100**
Credits: 04	**Duration of Examination: 03 hrs**

Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors (statement only).

Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.

Magnetism:

Magnetostatics: Biot-Savart's law & its applications- straight conductor, circular coil, solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferro-magnetic materials.

Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field.

Maxwell`s equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.

Reference Books:

- Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education..
- Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press.
- Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.

- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
- D.J. Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Module: Electricity and Magnetism Lab (G-II Lab)   **Sessional Marks: 15**

Practical Marks: 35

Module Code: PHYS1304   **Total Marks: 50**

Credits: 02

Practical

1. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, and (d) checking electrical fuses.

2. Ballistic Galvanometer:
(i) Measurement of charge and current sensitivity
(ii) Measurement of CDR
(iii) Determine a high resistance by Leakage Method
(iv) To determine Self Inductance of a Coil by Rayleigh's Method.
3. To compare capacitances using De'Sauty's bridge.
4. Measurement of field strength B and its variation in a Solenoid (Determine dB/dx).
5. To study the Characteristics of a Series RC Circuit.
6. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
7. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor
Q

8. To determine a Low Resistance by Carey Foster's Bridge.
9. To verify the Thevenin and Norton theorem
10. To verify the Superposition, and Maximum Power Transfer Theorem

Reference Books

- Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.

- A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.

- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

FRENCH LANGUAGE – PART 2   **L   T   P**

Pre-requisite - French Language – Part 1   2   0   0

MODULE CODE	LANF0101
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	75 (Written – 50, Oral – 25)
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in French language and to enhance skills as mentioned below:

1. To prepare students to develop advance understanding on French language.
2. To acquire the command over the French grammar.
3. To read and write short, simple texts.
4. To enable learner to build logic in French language.
5. To make students aware of the French culture, customs & traditions.

LEARNING OUTCOMES:

1. Able to understand the advance grammar of French language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the advance of French language.
4. Able to understand the French history.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS

UNIT I: MODERATE COMMUNICATION – This module will sharpen the communicative skills already acquired in the **PART 1 - BASIC COMMUNICATION** and further builds on them. It develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -
• Describe in detail people, relationships, events, places, cultures of countries
• Compare people, relationships, events, places, cultures and the changes that they have undergone
• Apply for a job
• Exchange personal and professional information
• Express opinion on people, places, events encountered in one's personal life and on press articles, television programmes, multimedia, films, and books
• Argue, justify and substantiate a point of view
• Describe hypothetical or imaginary situations
• Express plans, dreams, aspirations of the future
• Paragraph writing
• Professional communication

UNIT II: MODERATE PHONETICS – This module will re-enforces all the notions introduced in the **PART 1- BASIC PHONETICS**.

UNIT III: MODERATE GRAMMAR – This module will sharpen the concepts introduced in the **PART 1 - BASIC GRAMMAR & FORMATION OF SENTENCES** and further develops the following linguistic skills: -
• Pronouns – relative (don't), possessive, indefinite, demonstrative and the use of double pronouns
• Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – past perfect, future perfect
• Verbs – the subjunctive mood (past and present)
• Verbs – conditional (past and present) and gerund forms,
• Adverbs of time, place, quantity and indefinite adverbs
• Direct/indirect speech
• Comparative and superlative structures
• Active/passive structures
• Multiple clause sentences – independent clauses joined by co-ordinating conjunctions, dependant clause (subordinate clause)
• Phrases to express cause, consequence, and objective

RECOMMENDED BOOKS:

TEXT BOOKS	1. Nouveau Sans Frontières 1 by Philippe Dominique & Jacky Girardet 2. "CONNEXIONS-1" by Regine Merieux & Yves Loiseau Published by Didier.
REFERENCE BOOKS	1. Five in one Multilingual Glossary, published by Saraswati House Pvt. Ltd. New Delhi 2011.

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes										1,2	3,4

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50

4.	End Semester Oral Exam	1	25

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x	x	x	
Assignment			x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

GERMAN LANGUAGE – PART 2   **L   T   P**

Pre-requisite - German Language – Part 1   2   0   0

MODULE CODE	LANG0102
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	75 (Written – 50, Oral – 25)
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in German language and to enhance skills as mentioned below:

1. To prepare students to develop advance understanding on German language.
2. To acquire the command over the German grammar.
3. To read and write short, simple texts.
4. To enable learner to build logic in German language.
5. To make students aware of the German culture, customs & traditions.

LEARNING OUTCOMES:

1. Able to understand the advance grammar of German language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the advance of German language.
4. Able to understand the German history.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS

UNIT I: MODERATE COMMUNICATION – This module will sharpen the communicative skills already acquired in the **PART 1 - BASIC COMMUNICATION** and further builds on them. It develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -
• Describe in detail people, relationships, events, places, cultures of countries
• Compare people, relationships, events, places, cultures and the changes that they have undergone
• Apply for a job
• Exchange personal and professional information
• Express opinion on people, places, events encountered in one's personal life and on press articles, television programmes, multimedia, films, and books
• Argue, justify and substantiate a point of view
• Describe hypothetical or imaginary situations
• Express plans, dreams, aspirations of the future
• Paragraph writing
• Professional communication

UNIT II: MODERATE PHONETICS – This module will re-enforces all the notions introduced in the **PART 1- BASIC PHONETICS**.

UNIT III: MODERATE GRAMMAR – This module will sharpen the concepts introduced in the **PART 1 - BASIC GRAMMAR & FORMATION OF SENTENCES** and further develops the following linguistic skills: -
• Pronouns – relative (don't), possessive, indefinite, demonstrative and the use of double pronouns
• Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – past perfect, future perfect
• Verbs – the subjunctive mood (past and present)
• Verbs – conditional (past and present) and gerund forms,
• Adverbs of time, place, quantity and indefinite adverbs
• Direct/indirect speech
• Comparative and superlative structures
• Active/passive structures
• Multiple clause sentences – independent clauses joined by co-ordinating conjunctions, dependant clause (subordinate clause)
• Phrases to express cause, consequence, and objective

RECOMMENDED BOOKS:

TEXT BOOKS	3. Tangram, Kursbuch und Arbeitsbuch, 1A, 1B & 2A, Max Hueber Verlag 4. Tangram, Kursbuch und Arbeitsbuch, 2B, 3A & 3B, Max Hueber Verlag
REFERENCE BOOKS	2. em Abschlusskurs, Kursbuch und Arbeitsbuch, Max Hueber Verlag

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes										1,2	3,4

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50
4.	End Semester Oral Exam	1	25

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x	x	x	
Assignment			x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

SPANISH LANGUAGE – PART 2   **L   T   P**

Pre-requisite - Spanish Language – Part 1   2   0   0

MODULE CODE	LANS0103
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	75 (Written – 50, Oral – 25)
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in Spanish language and to enhance skills as mentioned below:

1. To prepare students to develop advance understanding on Spanish language.
2. To acquire the command over the Spanish grammar.
3. To read and write short, simple texts.
4. To enable learner to build logic in Spanish language.
5. To make students aware of the Spanish culture, customs & traditions.

LEARNING OUTCOMES:

1. Able to understand the advance grammar of Spanish language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the advance of Spanish language.
4. Able to understand the Spanish history.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENTS

UNIT I: MODERATE COMMUNICATION – This module will sharpen the communicative skills already acquired in the **PART 1 - BASIC COMMUNICATION** and further builds on them. It develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -
• Describe in detail people, relationships, events, places, cultures of countries
• Compare people, relationships, events, places, cultures and the changes that they have undergone
• Apply for a job
• Exchange personal and professional information
• Express opinion on people, places, events encountered in one's personal life and on press articles, television programmes, multimedia, films, and books
• Argue, justify and substantiate a point of view
• Describe hypothetical or imaginary situations
• Express plans, dreams, aspirations of the future
• Paragraph writing
• Professional communication

UNIT II: MODERATE PHONETICS – This module will re-enforces all the notions introduced in the **PART 1- BASIC PHONETICS**.

UNIT III: MODERATE GRAMMAR – This module will sharpen the concepts introduced in the **PART 1 - BASIC GRAMMAR & FORMATION OF SENTENCES** and further develops the following linguistic skills: -
• Pronouns – relative (don't), possessive, indefinite, demonstrative and the use of double pronouns
• Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – past perfect, future perfect
• Verbs – the subjunctive mood (past and present)
• Verbs – conditional (past and present) and gerund forms,
• Adverbs of time, place, quantity and indefinite adverbs
• Direct/indirect speech
• Comparative and superlative structures
• Active/passive structures
• Multiple clause sentences – independent clauses joined by co-ordinating conjunctions, dependant clause (subordinate clause)
• Phrases to express cause, consequence, and objective

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS:

TEXT BOOKS	5. Aula Internacional 1 and 2, Novellas and short stories 6. Aula Internacional 3, España and Latinoamérica: Historia y Cultura, Novellas
REFERENCE BOOKS	3. Español sin fronteras, I, SGEL, 1997 4. Nuevo Ven I, Edelsa 2004

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes										1,2	3,4

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50
4.	End Semester Oral Exam	1	25

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x	x	x	
Quiz	x	x	x	
Assignment			x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;

- Suggested remedies / corrective measures;

- Approved refinement decisions due for implementation;

- Actions taken based on previous course review; and

- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
			SEMESTER III					MARKS		
COAP2120		PC	DATA STRUCTURES	4	0	0	4	40	60	100
COAP2121		PC	DATA STRUCTURES LAB	0	0	4	2	15	35	50
COAP2122		PC	OPERATING SYSTEMS	4	0	0	4	40	60	100
COAP2123		PC	OPERATING SYSTEMS LAB	0	0	4	2	15	35	50
COAP2124		PC	COMPUTER NETWORKS	4	0	0	4	40	60	100
COAP2125		PC	COMPUTER NETWORKS LAB	0	0	4	2	15	35	50
		GE	GE-III	4	0	0	4	40	60	100
		GE	GE-III LAB	0	0	4	2	15	35	50
		PE	SEC-I	2	0	0	2	40	60	100
COAP2126		PD	SPECIALIZED MINOR PROJECT (GROUP)	0	0	2	1	50		50
VALU0118		AE	YOGA	0	0	2	1	25	50	75
TOTAL CREDITS				20	0	18	29	TOTAL MARKS		825

L = Lecture
T = Tutorial
P = Practical
C = Credit Point

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

DATA STRUCTURES   **L T P**

                                                                4   0   0

MODULE CODE	COAP2120
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

The aim of this subject is to teach students how to design, write, and analyse the performance of various data structures. It will also enable students to learn advanced data structure such as Tree, Graph, hash tables.

1. To teach the behavior of basic data structure (list, stack, queue, hash table, trees, graph)

2. To understand and analyze elementary algorithms: sorting, searching
3. To make students familiar with basic techniques of algorithm analysis including time and space complexity
4. To teach the implementation of linked data structures such as linked lists and binary trees
5. To make students familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure
6. To make students familiar with some graph algorithms such as shortest path and minimum spanning tree

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. To characterize the space and time complexity of algorithms
2. To understand different data structures including stack, queue, linked list, tree, heap, graph, and hash table
3. To implement insert, retrieve, and delete operations and traversals of binary search trees
4. Ability to understand traversals and algorithms on graphs
5. To implement hash tables along with insert and retrieve operations

MODULE CONTENT:

UNIT-I: Introduction   Basic Terminology, Elementary Data Organization, Data Structure Operations, Algorithm Complexity and time space trade off.
UNIT-II: Stacks and queues   Introduction and primitive operations on stack; Stack application: Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion from infix to postfix; Introduction and primitive operation on queues, D-queues and priority queues.
UNIT-III: Lists   Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, two way lists and use of headers
UNIT-IV: Trees   Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion.
UNIT-V: Multilevel indexing and B-Trees   Introduction: The invention of the B-tree; Statement of the problem; Indexing with binary search trees; Multilevel indexing, a better approach to tree indexes; B-trees: working up from the bottom; Example for creating a B-tree.
UNIT-VI: Sorting   Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Searching: Liner search, binary search, merging, Comparison of various sorting and searching algorithms on the basis of their complexity. File organization: Serial, Sequential, Indexed-sequential, Random-access/Direct, Inverted, Multilist file organization. Hashing: Introduction, Hashing functions and Collision resolution methods

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS

TEXT BOOK	1. Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub. Data Structures using C by A. K. Sharma, Pearson
REFERENCE BOOK	2. Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition. 3. Data Structures and Program Design in C By Robert Kruse, PHI, 4. Theory & Problems of Data Structures by Jr. SymourLipschetz, Schaum's outline by TMH 5. Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H. 6. Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test	x	x	x	x	
Quiz	x	x			x
Assignment	x	x		x	

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	3,5	2	1		4		3		4,5		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

DATA STRUCTURES LAB   **L T P**

                                                          0   0   4

MODULE CODE	COAP2121
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

The basic thrust of the course would be to learn programming language 'C' and implementing data structures.

1. To understand how various data structures work.
2. To understand some important applications of various data structures.
3. To familiarize how certain applications can benefit from the choice of data structures.
4. To understand how the choice of data structures can lead to efficient implementations of algorithms.

LEARNING OUTCOMES:

At the end of this lab session, the student will

1. Be able to design and analyse the time and space efficiency of the data structure.
2. Be capable to identity the appropriate data structure for given problem.
3. Have practical knowledge on the application of data structures.
4. Implement various sorting and searching techniques.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Program to insert an element in an array.
2.	Program to delete an element from array.
3.	Program to implement linear search.
4.	Program to implement bubble sort.
5.	Program to implement binary search.
6.	Program to implement matrix multiplication.
7.	Program to implement string operations.
8.	Program to implement linked list.
9.	Program to implement insertion in Linked list.
10.	Program to implement Deletion in Linked list.
11.	Program to implement searching in linked list.
12.	Program to implement sorting in linked list.
13.	Program to implement deletion in linked list.
14.	Program to implement stack using array with both of its operations.
15.	Program to implement queue.
16.	Program to implement insertion sort.
17.	Program to implement heap sort.
18.	Program to implement quick sort.

Note: At least 15 Experiments out of the list must be done in the semester.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

OPERATING SYSTEMS   **L   T   P**
                                                               4   0   0

MODULE CODE	COAP2122
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:

1. Basics of operating System
2. Multiprogramming
3. CPU Scheduling
4. Memory Management
5. Virtual Memory
6. Deadlocks
7. File System

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Know the functions, structures and history and design issues of operating systems

2. Understand various process management concepts including scheduling, synchronization, deadlocks, memory management and multithreading.

3. Know issues related to file system interface and implementation, disk management

4. Be familiar with protection and security mechanisms

5. Be familiar with various types of operating systems including Unix.

MODULE CONTENT:

UNIT-I: Introduction

Introduction to Operating System, Role of Operating System as resource manager, function of kernel and shell, operating system structures, views of an operating system.

UNIT-II: Process management

CPU scheduling, Scheduling Algorithms, PCB, Process synchronization, Deadlocks, Prevention, Detection and Recovery

---

UNIT-III: Memory Management

Overlays, Memory management policies, Fragmentation and its types, Partitioned memory managements, Paging, Segmentation, Need of Virtual memories, Page replacement Algorithms, Concept of Thrashing.

UNIT-IV: Device Management

I/O system and secondary storage structure, Device management policies, Role of I/O traffic controller, scheduler

---

UNIT-V: File Management

File System Architecture, Layered Architecture, Physical and Logical File Systems, Protection and Security:

UNIT-VI: Case Studies

LINUX / UNIX Operating System and Windows based operating systems. Recent trends in operating system.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS:

TEXT BOOKS	1. Operating System Concepts: Silbersachatz , Galvin Pearson Education, New Delhi
REFERENCEBOOKS	1. Operating Systems: Madnick E, Donovan J, Tata McGraw Hili 2. Operating Systems: Tannenbaum, Prentice Hall India, New Delhi.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4	5
Class Test	x		x		x
Quiz		x		x	
Assignment	x		x	x	

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	5		1,3			4			4		2,5

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

OPERATING SYSTEMS LAB   **L   T   P**
                                                                         0   0   4

MODULE CODE	COAP2123
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

This course will provide the students with good understanding of Operating System including its architecture and all its components. Good conceptions on all the subjects like processes, inter communication, semaphore, message passing, classical systems, security and protection mechanism, I/O hardware and software, deadlocks, etc. should be provided.

LEARNING OUTCOMES
This subject will help the students in following mentioned ways;

1. This course provides the student with an understanding of the basic components of a general-purpose operating system.
2. Topics include processes, process management, synchronization, input/output devices and their programming, interrupts, memory management, resource allocation, and an introduction to file systems.
3. It allow students to know how to write applications that leverage operating system resources or for those that wish to develop operating systems themselves.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Installation Process of various operating System
2.	Commands for files & directories: cd, ls, cp, md, rm, mkdir, rmdir.
3.	Creating and viewing files using cat. File comparisons. Disk related commands: checking disk free spaces.
4.	Processes in linux connecting processes with pipes, background processing, managing multiple processes
5.	Background process: changing process priority, scheduling of processes at command, Batch commands, kill, ps, who, sleep.
6.	Printing file. File related commands ws, sat, cut, grep
7.	Shell Programming: Basic of shell programming, various types of shell, Shell Programming in bash, conditional & looping statement, case statements, parameter passing and arguments shell variables, shell keywords, creating shell programs for automate system tasks, report printing.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1		3		2			1,3		

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

COMPUTER NETWORKS   **L   T   P**

                                                                        4   0   0

MODULE CODE	**COAP2124**
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:

• Communication between applications on different computers

• Must understand application needs/ demands

• Traffic data rate, pattern (bursty or constant bit rate), target (multipoint or single destination, mobile or fixed)

• Delay and loss sensitivity

• Other application-support services

• Overlays, Active Networks, Data-oriented,

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

describe the basis and structure of an abstract layered protocol model

describe, analyse and compare a number of datalink, network, and transport layer protocols

design and implement datalink or network layer protocols within a simulated networking environment

describe and analyse various related technical, administrative and social aspects of specific computer network protocols from standards documents and other primary materials found through research

identify and apply basic theorems and formulae for the information-theoretic basis of communication and the performance of physical, datalink and network protocols

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENT:

UNIT-I: . Introduction to Computer Networks . Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.
UNIT-II: Data Communication Fundamentals and Techniques Analog and digital signal; data-ratelimits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.
UNIT-III: Networks Switching Techniques and Access mechanisms Circuit switching; packetswitching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer. Error detection and error correction techniques;data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet
UNIT-IV: . Data Link Layer & Network Layer Functions and Protocol CSMA/CD protocols; Ethernet LANS; connectingLAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways; Routing; routing algorithms; network layer protocolof Internet- IP protocol, Internet control protocols.
UNIT-V: Transport Layer Functions and Protocols Transport services- error and flow control,Connection establishment and release- three way handshake
UNIT-VI: Overview of Application layer protocol Overview of DNS protocol; overview of WWW &HTTP protocol..

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS:

TEXT BOOKS	B. A. Forouzan: Data Communications and Networking, Fourth edition, THM Publishing Company Ltd 2007.
REFERENCEBOOKS	A. S. Tanenbaum: Computer Networks, Fourth edition, PHI Pvt. Ltd 2002

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4	5
Class Test	x		x		x
Quiz		x		x	
Assignment	x		x	x	

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	5		1,3			4			4		2,5

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

Problems encountered in the content delivery;

Suggested remedies / corrective measures;

Approved refinement decisions due for implementation;

Actions taken based on previous course review; and

Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

COMPUTER NETWORKS LAB

L T P

0   0   4

MODULE CODE	**COAP2125**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

The course is organized as an introduction into computer networks. The learning objectives of the course are the following: i) The students understand the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks. ii) The students understand the Internet structure and can see how standard problems are solved in that context. iii) The students can analyze simple protocols and can independently study literature concerning computer networks.

LEARNING OUTCOMES

This subject will help the students in following mentioned ways;

- be familiar with the basics of data communication;

- be familiar with various types of computer networks;

- have experience in designing communication protocols;

- be exposed to the TCP/IP protocol suite.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Write specifications of latest desktops and laptops.
2.	Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, routers, etc.
3.	Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Crimping Tool, Connectors etc.
4.	Preparing straight and cross cables.
5.	Study of various LAN topologies and their creation using network devices, cables and computers.
6.	Configuration of TCP/IP Protocols in Windows and Linux.
7.	Implementation of file and printer sharing.
8.	Designing and implementing Class A, B, C Networks
9.	Subnet planning and its implementation
10.	Installation of ftp server and client

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1		3		2	3,4		1,3		

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

Approved refinement decisions due for implementation,

Actions taken based on previous subject review,

Problems encountered in the subject delivery,

Suggested remedies / corrective measures, and

Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Module: Thermal Physics & Statistical Mechanics (G-III)	**Sessional Marks: 40**
	Theory Paper Marks: 60
Module Code: PHYS2301	**Total Marks: 100**
Credits: 04	**Duration of Examination: 03 hrs**

Laws of Thermodynamics:

Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between C_P & C_V, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.

Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations & applications - Joule-Thompson Effect, ClausiusClapeyron Equation, Expression for ($C_P - C_V$), C_P/C_V, TdS equations.

Kinetic Theory of Gases: Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases.

Theory of Radiation: Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh-Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law.

Statistical Mechanics: Phase space, Macrostate and Microstate, Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity - Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law - photon gas - comparison of three statistics.

Reference Books:

- Thermal Physics, S. Garg, R. Bansal and C. Ghosh, 1993, Tata McGraw-Hill.

- A Treatise on Heat, Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
- Thermodynamics, Enrico Fermi, 1956, Courier Dover Publications.
- Heat and Thermodynamics, M.W.Zemasky and R. Dittman, 1981, McGraw Hill

- Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears & G.L.Salinger. 1988, Narosa
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
- Thermal Physics, A. Kumar and S.P. Taneja, 2014, R. chand Publications.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

Module: Thermal Physics & Statistical Mechanics (G-III Lab)	**Sessional Marks: 15**
	Practical Marks: 35
Module Code: PHYS2302	**Total Marks: 50**
Credits: 02	

Practical

1. To determine Mechanical Equivalent of Heat, J, by Callender and Barne's constant flow method.
2. Measurement of Planck's constant using black body radiation.
3. To determine Stefan's Constant.
4. To determine the coefficient of thermal conductivity of copper by Searle's Apparatus.
5. To determine the Coefficient of Thermal Conductivity of Cu by Angstrom's Method.
6. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method.
7. To determine the temperature co-efficient of resistance by Platinum resistance thermometer.
8. To study the variation of thermo emf across two junctions of a thermocouple with temperature.
9. To record and analyze the cooling temperature of an hot object as a function of time using a thermocouple and suitable data acquisition system
10. To calibrate Resistance Temperature Device (RTD) using Null Method/Off-Balance Bridge

Reference Books:

- Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.
- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
- A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.
- A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

SPECIALIZED MINOR PROJECT (GROUP)   **L   T   P**

                                                          0   0   4

MODULE CODE	COAP2128
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	50
SUMMATIVE ASSESSMENT MARKS	
END SEMESTER EXAM DURATION	
LAST REVISION DATE	

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
COAP2127		PC	DESIGN AND ANALYSIS OF ALGORITHMS	4	0	0	4	40	60	100
COAP2128		PC	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0	0	4	2	15	35	50
COAP2129		PC	SOFTWARE ENGINEERING	4	0	0	4	40	60	100
COAP2130		PC	SOFTWARE ENGINEERING LAB	0	0	4	2	15	35	50
COAP2131		PC	DATABASE MANAGEMENT SYSTEM	4	0	0	4	40	60	100
COAP2132		PC	DATABASE MANAGEMENT SYSTEM LAB	0	0	4	2	15	35	50
		GE	GE IV	4	0	0	4	40	60	100
		GE	GE IV LAB	0	0	4	2	15	35	50
		PE	SEC-II	2	0	0	2	40	60	100
VALU0123		SE	PROFESSIONAL COMMUNICATION-I	2	0	0	2	25	50	75
ENGL0109		AE	ACADEMIC WRITING	0	0	2	1	25		25
TOTAL CREDITS				20	0	18	29	TOTAL MARKS		800

BSC(H) CS SEMESTER IV — MARKS

DESIGN AND ANALYSIS OF ALGORITHMS
                                                                          L   T   P
                                                                           4   0   0

MODULE CODE	**COAP2127**
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVE

The aim of this subject is to teach students how to design, write, and analyse the performance of various data structures.

1. To teach the behaviour of basic data structure (list, stack, queue, hash table, trees, and graph).

2. To understand and analyse elementary algorithms: sorting, searching.

3. To make students familiar with basic techniques of algorithm analysis including time and space complexity.

4. To teach the implementation of linked data structures such as linked lists and binary trees.

5. To make students familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure.

6. To make students familiar with some graph algorithms such as shortest path and minimum spanning tree.

LEARNING OUTCOMES:

Following this course, students will be able to:

1. Students will be able to characterize the space and time complexity of algorithms.

2. Students will understand different data structures including stack, queue, linked list, tree, heap, graph, and hash table.

3. Students will be able to implement insert, retrieve, and delete operations and traversals of binary search trees.

4. Ability to understand traversals and algorithms on graphs.

5. Student will be able to implement hash tables along with insert and retrieve operations.

MODULE CONTENT:

UNIT-I:

Introduction: Algorithm, Psuedo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

UNIT-II:

Divide and conquer: General method , applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT-III:

Searching and Traversal Techniques: Efficient non - recursive binary tree traversal algorithm, Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals - Breadth first search and Depth first search, AND / OR graphs, game trees, Connected Components, Bi - connected components. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components.

UNIT-IV:

Greedy method: General method, applications - Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem,Travelling sales person problem, Reliability design.

UNIT-V:

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.
Branch and Bound: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT-VI:

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NPComplete classes, Cook's theorem.

RECOMMENDED BOOKS

TEXT BOOK	1. Computer Algorithms, Introduction to Design and Analysis, 3rd Edition, Sara Baase, Allen, Van, Gelder, Pearson Education. 2. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John Wiley and sons. 3. Fundamentals of Sequential and Parallel Algorithm, K. A. Berman and J. L. Paul, Cengage Learning. 4. Introducation to the Design and Analysis of Algorithms, A. Levitin, Pearson Education. 5. Introduction to Algorithms, 3rd Edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd. 6. Design and Analysis of algorithm, Aho, Ullman and Hopcroft, Pearson Education, 2004.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test					
Quiz					
Assignment					

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes											

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

DESIGN AND ANALYSIS OF ALGORITHMS LAB

L T P

0 0 4

MODULE CODE	**COAP2128**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

The aim of this subject is to teach students how to design, write, and analyse the performance of various data structures.

1. To teach the behaviour of basic data structure (list, stack, queue, hash table, trees, and graph).

2. To understand and analyse elementary algorithms: sorting, searching.

3. To make students familiar with basic techniques of algorithm analysis including time and space complexity.

4. To teach the implementation of linked data structures such as linked lists and binary trees.

5. To make students familiar with advanced data structures such as balanced search trees, hash tables, priority queues and the disjoint set union/find data structure.

6. To make students familiar with some graph algorithms such as shortest path and minimum spanning tree.

LEARNING OUTCOMES:

Following this course, students will be able to:

1. Students will be able to characterize the space and time complexity of algorithms.

2. Students will understand different data structures including stack, queue, linked list, tree, heap, graph, and hash table.

3. Students will be able to implement insert, retrieve, and delete operations and traversals of binary search trees.

4. Ability to understand traversals and algorithms on graphs.

5. Student will be able to implement hash tables along with insert and retrieve operations.

LIST OF EXPERIMENTS

1.	i. Implement Insertion Sort (The program should report the number of comparisons) ii. ii. Implement Merge Sort(The program should report the number of comparisons)
2.	Implement Heap Sort(The program should report the number of comparisons)
3.	Implement Randomized Quick sort (The program should report the number of comparisons)
4.	Implement Radix Sort
5.	Create a Red-Black Tree and perform following operations on it: i. Insert a node ii. Delete a node iii. Search for a number & also report the color of the node containing this number.
6.	Write a program to determine the LCS of two given sequences
7.	Implement Breadth-First Search in a graph
8.	Implement Depth-First Search in a graph
9.	Write a program to determine the minimum spanning tree of a graph

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes											

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

SOFTWARE ENGINEERING   **L   T   P**
                                                                   4   0   0

MODULE CODE	**COAP2129**
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with :

 1. Basic aspect of business model in software.

2. Software qualitative and quantitative analysis.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Understand and analyze how SDLC play a huge role in developing a Software.

 2. Able to analyze various risk issues and how it can be resolved by using Software Project Management.

 3. Understand various Qualities & Maintenance issues in Software Development

 4. Deal with Software Matrices and Software Testing & how debugging will be carried out.

 5. Know the Recognition of the need for, and an ability to engage in, life-long learning

MODULE CONTENT:

UNIT-I: **Introduction**   The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI).
UNIT-II: **Requirement Analysis**   Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.
UNIT-III: **Software Project Management**   Estimation in Project Planning Process, Project Scheduling.   **Risk Management**   Software Risks, Risk Identification, Risk Projection and Risk Refinement, RMMM Plan.
UNIT-IV: **Quality Management**   Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.
UNIT-V: **Design Engineering**   Design Concepts, Architectural Design Elements, Software Architecture,Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture, Modeling Component Level Design.
UNIT-VI: **Testing Strategies & Tactics**   Software Testing Fundamentals, Strategic Approach to SoftwareTesting, Test Strategies for Conventional Software, Validation Testing, System testing, Black-Box Testing, White-Box Testing and their type, Basis Path Testing.

RECOMMENDED BOOKS

TEXT BOOK	1. R.S. Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGraw-Hill, 2009. 2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House, 2003. 3. K.K. Aggarwal and Y. Singh, Software Engineering (2nd Edition), New Age International Publishers, 2008.
REFERENCE BOOK	1. I. Sommerville, Software Engineering (8th edition), Addison Wesley, 2006. 2. D. Bell, Software Engineering for Students (4th Edition), Addison-Wesley, 2005. 3. R. Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India, 2004.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test					
Quiz					
Assignment					

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes											

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

SOFTWARE ENGINEERING LAB   **L   T   P**

                                                                     0   0   4

MODULE CODE	**COAP2130**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with :

 1. Basic aspect of business model in software.

2. Software qualitative and quantitative analysis.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Understand and analyze how SDLC play a huge role in developing a Software.

 2. Able to analyze various risk issues and how it can be resolved by using Software Project Management.

 3. Understand various Qualities & Maintenance issues in Software Development

 4. Deal with Software Matrices and Software Testing & how debugging will be carried out.

 5. Know the Recognition of the need for, and an ability to engage in, life-long learning

LIST OF EXPERIMENTS

1.	☐ Problem Statement, ☐ Process Model
2.	Requirement Analysis: • Creating a Data Flow • Data Dictionary, Use Cases
3.	Project Management: ☐ Computing FP ☐ Effort ☐ Schedule, Risk Table, Timeline chart
4.	Design Engineering: • Architectural Design • Data Design, Component Level Design
5.	Testing: • Basis Path Testing
6.	**Sample Projects:** 1. **Criminal Record Management**: Implement a criminal record management system for jailers, police officers and CBI officers 2. **DTC Route Information**: Online information about the bus routes and their frequency and fares 3. **Car Pooling**: To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively. 4. Patient Appointment and Prescription Management System 5. Organized Retail Shopping Management Software 6. Online Hotel Reservation Service System 7. Examination and Result computation system 8. Automatic Internal Assessment System 9. Parking Allocation System 10. Wholesale Management System

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes											

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

DATABASE MANAGEMENT SYSTEM   **L   T   P**
                                                                  4   0   0

MODULE CODE	**COAP2131**
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study in detail about the Fundamentals of Database Management Systems, Various models of Database and its related application.

1. To teach the Data Base System Architecture along with Data Independence.

2. To understand and analyze Normalization and its different forms.

3. To make students familiar with basic Queries for Developing Data Base & do various Operations onto it.

4. To teach the implementation DBMS S/W so that they can work on Data Base for their needs.

5. To make students familiar with advanced data Base system for the use of Trigger, Procedure, and Cursors & Functions.

LEARNING OUTCOMES:

Upon successful completion of the course, a student will be able to:

1. Understand the database concepts, different database models, and database management systems & understand the database development processes and activities.

2. Understand relational database theory and be able to use a relational database management system.

3. Understand Data Modelling concepts and their application in design and development process.

4. Apply proper techniques, such as normalization, in designing a database and to use advanced SQL to create, manipulate, and query database of a typical enterprise

5. Use several commercially available database management systems such as Access and Oracle SQL Plus.

MODULE CONTENT:

UNIT-I:

Introduction: An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure. Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree. Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

UNIT-II:

Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus, Cursors in SQL. Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design.

UNIT-III:

Transaction Processing Concepts: Transaction system, Testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling

UNIT-IV:

Crash Recovery: Failure classification, recovery concepts based on deferred update, recovery concepts based on intermediate update, shadow paging, check points, on-line backup during database updates, case study from acontemporary database management software Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction.

UNIT-V:

Client/Server Databases: Client/Server concepts, approach, Client/Server environments, characterization of Client/Server computing, application partitioning, the two-layer, and the Three layer architecture, Client/Server communication, APIs in Client/Server computing, middleware technology, application developments, design concepts, Client application development tools, and database servers.

UNIT-VI:

Integrity, Security and Repositories: Needs for database integrity, integrity constraints, non-procedural integrity constraints, integrity constraints specifications in SQL, introduction to database security mechanism, security specification in SQL, system catalogues Case Studies: Oracle: Database Design and Querying Tools; SQL Variations and Extensions; Storage and Indexing; Query Processing and Optimization; Concurrency Control and Recovery; System Architecture; Replication, Distribution and External Data; Database Administration Tools.

RECOMMENDED BOOKS

TEXT BOOK	1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010. 2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
REFERENCE BOOK	1. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010. 2. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education,2013.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test					
Quiz					
Assignment					

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes											

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

DATABASE MANAGEMENT SYSTEM LAB   **L   T   P**

                                              0   0   4

MODULE CODE	**COAP2132**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

1. To understand the Programming skills and develop the Program.
2. To present SQL and procedural interfaces to SQL comprehensively.
3. To give an introduction to systematic database design approaches coveringconceptual design, logical design and an overview of physical design
4. To present the concepts and techniques relating to query processing by SQLengines

LEARNING OUTCOMES

Following this course, students will be able to:
1. Understand, appreciate and effectively explain the underlying concepts of database technologies.
2. Design and implement a database schema for a given problem-domain.
3. Normalize a database
4. Populate and query a database using SQL DML/DDL commands.
5. Programming PL/SQL including stored procedures, stored functions, cursors,packages.

LIST OF EXPERIMENTS

Create and use the following database schema to answer the given queries.

EMPLOYEE Schema

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

DEPARTMENT Schema

Field	Type	NULL	KEY	DEFAULT
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.

2. Query to display unique Jobs from the Employee Table.

3. Query to display the Employee Name concatenated by a Job separated by a comma.

4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.

5. Query to display the Employee Name and Salary of all the employees earning more than $2850.

6. Query to display Employee Name and Department Number for the Employee No= 7900.

7. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.

8. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.

9. Query to display Name and Hire Date of every Employee who was hired in 1981.

10. Query to display Name and Job of all employees who don't have a current Manager.

11. Query to display the Name, Salary and Commission for all the employees who earn commission.

12. Sort the data in descending order of Salary and Commission.

13. Query to display Name of all the employees where the third letter of their name is 'A'.

14. Query to display Name of all employees either have two 'R's or have two 'A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.

15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.

16. Query to display the Current Date.

17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.

18. Query to display Name and calculate the number of months between today and the date each employee was hired.

19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.

20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.

21. Query to display Name, Hire Date and Day of the week on which the employee started.

22. Query to display Name, Department Name and Department No for all the employees.

23. Query to display Unique Listing of all Jobs that are in Department # 30.

24. Query to display Name, Dept Name of all employees who have an 'A' in their name.

25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.

26. Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.

27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. And the salary of any employee who earns a commission.

28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies $100.

29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees

30. Query to display the number of employees performing the same Job type functions.

31. Query to display the no. of managers without listing their names.

32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.

33. Query to display Name and Hire Date for all employees in the same dept. as Blake.

34. Query to display the Employee No. And Name for all employees who earn more than the average salary.

35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T'.

36. Query to display the names and salaries of all employees who report to King.

37. Query to display the department no, name and job for all employees in the Sales department.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:
This subject will be evaluated for a total of 50 marks for practical.
Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes											

EVALUATION
At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

Module: Waves and Optics (G-IV)	**Sessional Marks: 40**
	Theory Paper Marks: 60
Module Code: PHYS2303	**Total Marks: 100**
Credits: 04	**Duration of Examination: 03 hrs**

Superposition of Two Collinear Harmonic oscillations: Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats).

Superposition of Two Perpendicular Harmonic Oscillations: Graphical and Analytical Methods.

Lissajous Figures with equal an unequal frequency and their uses.

Waves Motion- General: Transverse waves on a string. Travelling and standing waves on a string.

Normal Modes of a string. Group velocity, Phase velocity. Plane waves. Spherical waves, Wave intensity.

Fluids: Surface Tension: Synclastic and anticlastic surface - Excess of pressure - Application to spherical and cylindrical drops and bubbles - variation of surface tension with temperature - Jaegar's method. Viscosity: Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula - Determination of coefficient of viscosity of a liquid - Variations of viscosity of a liquid with temperature lubrication. Physics of low pressure - production and measurement of low pressure - Rotary pump - Diffusion pump - Molecular pump - Knudsen absolute gauge - penning and pirani gauge – Detection of leakage.

Sound: Simple harmonic motion - forced vibrations and resonance - Fourier's Theorem - Application to saw tooth wave and square wave - Intensity and loudness of sound - Decibels - Intensity levels - musical notes - musical scale. Acoustics of buildings: Reverberation and time of reverberation - Absorption coefficient - Sabine's formula - measurement of reverberation time - Acoustic aspects of halls and auditoria.

Wave Optics: Electromagnetic nature of light. Definition and Properties of wave front. Huygens Principle.

Interference: Interference: Division of amplitude and division of wavefront. Young's Double Slit

experiment. Lloyd's Mirror and Fresnel's Biprism.   Phase change on reflection: Stokes' treatment.

Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: measurement of wavelength and refractive index.

Michelson's Interferometer: Idea of form of fringes (no theory needed), Determination of wavelength, Wavelength difference, Refractive index and Visibility of fringes.

Diffraction: Fraunhofer diffraction: Single slit; Double Slit. Multiple slits & Diffraction grating. Fresnel Diffraction: Half- period zones. Zone plate. Fresnel Diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis.

Polarization: Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization.

Reference Books:

- Fundamentals of Optics, F A Jenkins and H E White, 1976, McGraw-Hill
- Principles of Optics, B.K. Mathur, 1995, Gopal Printing

- Fundamentals of Optics, H.R. Gulati and D.R. Khanna, 1991, R. Chand Publication
- University Physics. FW Sears, MW Zemansky and HD Young 13/e, 1986. Addison-Wesley

B.Sc (H) Computer Science-4th Sem.

Module: Waves and Optics Lab (G-IV Lab)	**Sessional Marks: 15**
	Practical Marks: 35
Paper Code: PHYS2304	**Total Marks: 50**
Credits: 02	

Practical

1. To investigate the motion of coupled oscillators

2. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's Experiment and to verify λ_2 – T Law.
3. To study Lissajous Figures
4. Familiarization with Schuster`s focussing; determination of angle of prism.
5. To determine the Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
6. To determine the Refractive Index of the Material of a given Prism using Sodium Light.
7. To determine Dispersive Power of the Material of a given Prism using Mercury Light
8. To determine the value of Cauchy Constants of a material of a prism.
9. To determine the Resolving Power of a Prism.
10. To determine wavelength of sodium light using Fresnel Biprism.
11. To determine wavelength of sodium light using Newton's Rings.
12. To determine the wavelength of Laser light using Diffraction of Single Slit.

13. To determine wavelength of (1) Sodium & (2) spectrum of Mercury light using plane diffraction Grating

14. To determine the Resolving Power of a Plane Diffraction Grating.
15. To measure the intensity using photosensor and laser in diffraction patterns of single and double slits.

Reference Books:

- Advanced Practical Physics for students, B.L. Flint & H.T. Worsnop, 1971, Asia Publishing House.

- Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

- A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

BASICS OF INFORMATION TECHNOLOGY

L	T	P
2	0	0

MAX MARKS:100

SECTION A

Information Technology – its concept and scope, applications of IT, ethics and future with information technology

Impact of computer and IT in society.– Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more

SECTION B

Generations of computer, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data, processing of data.

SECTION C

Computers for information storage, information seeking, information processing and information transmission, computer organization, computer hardware and software; primary and secondary memory: RAM, ROM, PROM etc. Input devices; keyboard, mouse, scanner, etc; output devices; VDU and Printer(Impact and non-Impact printers), Plotter etc. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory)

SECTION D

Introduction to Operating Systems such as MS-DOS and Windows, difference between DOS and Windows

Basics of Networking – LAN, MAN, WAN

TEXT BOOKS

1. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi

REFERENCE BOOKS

1. Computers Today by SK Basandara, Galgotia publication Pvt ltd. Daryaganj, New Delhi.
2. MS-Office 2000 for Everyone by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., New Delhi
3. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura,New Delhi

5. Mastering Windows 95, BPB Publication, New Delhi

6. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

7. On Your Marks - Net…Set…Go… Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi

8. Learning MS Office XP by Ramesh Bangia, Khanna Book Publishing Co. (P) Ltd., New Delhi.

	L	**T**	**P**
	2	**0**	**0**

Professional Communication - 1

MODULE CODE	VALU0123
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	50
END SEMESTER EXAM DURATION	2 hrs
LAST REVISION DATE	

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written linguistic skills of expressing and exchanging information / interacting & communicative competencies to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on professional & corporate communication.
2. To acquire study skills and communication skills in formal and informal situations.
3. To understand fundamental syntax and semantics of communication.
4. To achieve an understanding & confidence in formal and informal contexts of communication.

LEARNING OUTCOMES:

1. Able to understand the Importance of professional & corporate communication.
2. Exposure to various principles, concepts, types, advantages and disadvantages of professional communication.
3. Improve the language proficiency with an emphasis on Speaking, Listening, Reading and Writing skills.
4. Communicate confidently in formal and informal contexts.

MODULE CONTENTS

UNIT I:- INTRODUCTION TO COMMUNICATION –
- Definition
- Types of Communication
- Language as a tool of communication
- Levels of communication – Interpersonal, Organizational, Mass communications
- The flow & Channels of Communication - Downward, Upward, Lateral or Horizontal (Peer group)
- Barriers to Communication

UNIT II: PRESENTATION STRATEGIES & LISTENING SKILLS –
- Defining Purpose
- Organizing Contents;
- Preparing Outline
- Audio-visual Aids

- Nuances of Delivery
- Body Language
- Dimensions of Speech - Syllable, Accent, Pitch, Rhythm, Intonation
- Paralinguistic features of voice
- Listening Skills - Active Listening, Passive Listening
- Methods for improving Listening Skills

UNIT III: BUSINESS COMMUNICATION–

- Letter Writing – formal & Informal
- Letters of inquiry & complaint
- Job application and Resumes
- Reports- Types, Significance, Structure, Style & Writing of Reports
- Technical Proposal – Parts, Types, Writing of Proposal
- Negotiation & Business Presentation skills

UNIT IV: VALUE BASED TEXT READING-

Value based critical reading of following Short Stories for making the Students acquaint with the styles of great Writers of World-

- O.H. Henry :   The Gift of the Magi
- R.N. Tagore :   The Renunciation
- Katherine Mansfield :   The Fly
- A.P. Chekhor :   The Lament
- M.R. Anand :   The Barber's Trade Union
- Ruskin Bond :   The Eyes Are Not Here
- D.H. Lawrence :   The Rocking Horse Winner

RECOMMENDED BOOKS:

TEXT BOOKS	1. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt.Ltd,2011, New Delhi. 2. Improve Your Writing ed. V.N.Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
REFERENCE BOOKS	1. Manual of Practical Communication by L.U.B.Pandey: A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1			4		6				

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	1	10
2.	Sessional Test	2	15
3.	End Semester Written Exam	1	50
4.	End Semester Oral Exam	1	25

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

Assessments	1	2	3	4
Class Test	x			
Quiz		x		
Assignment		x	x	x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

	L	**T**	**P**
	0	**0**	**2**

Academic Writing-I

MODULE CODE	ENGL0109
CREDIT POINTS	1
FORMATIVE ASSESMENT MARKS	25
SUMMATIVE ASSESMENT MARKS	
END SEMESTER EXAM DURATION	Viva-voice

MODULE CONTENTS

1. Notice/Business Letter/Memo
2. Idioms and Phrases
3. Role Play
4. Introduction and Presentation
5. Tenses
6. Quotes

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

INTERNET TECHNOLOGIES
      L T P
      4 0 0

MODULE CODE	COAP3120
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

The aim of this subject is to provide basic knowledge of Internet and will enable the student to become familiar with: Internet and its working, HTML, Style Sheets, PHP and Scripting Language and to make them understand:

1. The importance of the web as a medium of communication.

2. Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.

3. Become familiar with graphic design principles that relate to web design and learn how to implement these theories into practice.

4. Learn the language of the web: HTML and CSS.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Understand and analyse internet and their applications

2. Work with HTML & PHP.

3. Design websites, animation & web scripting.

4. Understand the need of WWW.

5. Working with scripting languages such as JAVASCRIPT.

6. Where , why and how to use style sheets such as CSS and JSS

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

MODULE CONTENT:

UNIT-I: Introduction to Internet   Overview, Network of Networks, Intranet, Extranet and Internet ,World Wide Web ,Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP, TCP/IP Model.
UNIT-II : Web Development   HTML: Internet Language, Understanding HTML, Create a Web Page, Linking to other Web Pages, Text Alignment and Lists, Text Formatting Fonts Control, E-mail Links and link within a Page.
UNIT-III: Text colours and background   Formatting text; Page layouts; Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes.
UNIT-IV : CSS   CSS-Introduction, Basic Syntax, CSS Colors, backgrounds, CSS Text , Fonts, lists, tables, insert style sheets.
UNIT-V : JavaScript Fundamentals   Data types and variables, functions, methods and events, controlling program flow, JavaScript object model, built-in objects and operators.
UNIT-VI : PHP   Exploring PHP: PHP and HTML Text, Coding Building Blocks, The Components of a PHP Application, PHP Decision-Making: Expressions, Operator Concepts, Conditionals, Looping. Functions: Calling Functions, Defining Functions.

RECOMMENDED BOOKS

TEXT BOOK	1. Internet and Web Technologies: Raj Kamal Tata McGraw Hill, New Delhi 2. Multimedia and Web Technology: Ramesh Bangia Firewall Media, New Delhi 3. Learning PHP , MYSQL books by 'O'riley Press
REFERENCE BOOK	1. Web Design: The Complete Reference; Thomas A. Powell Tata McGraw Hill, New Delhi 2. HTML Beginners Guide: Wendy Willard Tata McGraw Hill, New Delhi

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5	6
Class Test	x	x	x	x		x
Quiz	x	x			x	x
Assignment	x	x		x		

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	K
Course Learning Outcomes	3,5	2	1		4	2,4	3		4,6		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

INTERNET TECHNOLOGIES LAB   **L T P**
                                                                  0 0 4

MODULE CODE	**COAP3121**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

The objective of this lab is to

1. Dynamic Web pages creation.

2. The basics of sites creation using language HTML.

3. To develop an ability to design and implement static and dynamic website.

LEARNING OUTCOMES:

Following this course, students will be able to:

1. Knows basic internet technologies

2. Cascading Style Sheets.

3. Use internet technologies for building sites.

4. Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Create HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
2.	Create HTML document with Ordered and Unordered lists, Inserting Images.
3.	Create HTML form.
4.	Create HTML document to perform internal and external linking
5.	Design a HTML page to illustrate anchor tag for hyperlink for both image and text
6.	Design a HTML page to illustrate the span tag and quote tag
7.	Write a CSS program to repeat a background image only horizontally.
8.	Write a CSS program to show use of selectors.
9.	Write a CSS program to set fixed background of an element.
10.	Write a program to show use of function in JavaScript.
11.	Write a program to validate Email ID in JavaScript.
12.	Design a HTML page to make a Calculator using JAVASCRIPT.
13.	PHP program to find factorial of a number.
14.	Write a PHP program to print star triangle. **** *** ** *
15.	WRITE A PHP PROGRAM TO FIND AREA OF TRIANGLE USING FUNCTION.
16.	WRITE A PHP PROGRAM TO REVERSE GIVEN STRING.

Note: At least 14 Experiments out of the list must be done in the semester.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	G	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

THEORY OF COMPUTATION   **L   T   P**
                                                           4   2   0

MODULE CODE	COAP3122
CREDIT POINTS	5
FORMATIVE ASSESMENT MARKS	50
SUMMATIVE ASSESMENT MARKS	100
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:

1. Introduce the student to the concepts of theory of computation in computer science.
2. Acquire insights into the relationship among formal languages, formal grammars, and automata.
3. Learn to design automata and Turing machine.

LEARNING OUTCOMES:

1. Demonstrate an understanding of abstract models of computing, including deterministic (DFA), non-deterministic (NFA), and Turing (TM) machine models.
2. Demonstrate an understanding of regular expressions and grammars, including context-free and context-sensitive grammars.
3. Understand the relationships between language classes, including regular, context-free, context-sensitive, recursive, and recursively enumerable languages.
4. Able to design Turing Machine.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

MODULE CONTENT:

UNIT-I: Language   Alphabets, string, language, Basic Operations on language, Concatenation, Kleen Star   .
UNIT-II: Introduction   Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transit ion, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem.
UNIT-III: Regular expression (RE)   Regular expression (RE) Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to 39 Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma. Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.
UNIT-IV: Push Down Automata (PDA)   Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA.
UNIT-V: Context free grammar (CFG) & Context Free Languages CFL)   Definition, Examples, Derivation of CFG , Derivation trees, Ambiguity in Grammer, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.
UNIT-VI: Turing Machines and Models of Computations   RAM, Turing Machine as a model of computation, Universal Turing Machine, Language acceptability, decidability, halting problem, Recursively enumerable and recursive languages, unsolvability problems..

RECOMMENDED BOOKS

TEXT BOOK	1. Theory of Computer Science : Automata, Languages and Computation – K.L.P. Mishra and N.Chandrasekaran,", PHI 2. Introduction to Languages and Theory of Computations – Martin J. C., TMH

REFERENCE BOOK	3. Introduction to Automata Theory, Languages and Computation – Hopcroft, Ullman, Pearson Education 4. Elements of the Theory of Computation – Papadimitrou, C. and Lewis, C.L, PHI

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	05
2.	Sessional Test	2	30
3.	Group Discussion	2	05
4.	End Semester Exam	1	100

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4
Class Test	x	x	x	x
Quiz	x	x		
Assignment	x	x		x

MAPPING OF COURSE LEARNING OUTCOMES

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	3	2	1		4	2,4	3		4		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

PHYTHON PROGRAMMING   **L T P**
                                  4 0 0

MODULE CODE	COAP4217
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:

1. Its language constructs and object-oriented approach aims to help programmers write clear, logical code for small and large-scale projects.

2. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming.

LEARNING OUTCOMES:

1. To understand why Python is a useful scripting language for developers.
2. To learn how to design and program Python applications.
3. To learn how to use lists, tuples, and dictionaries in Python programs.
4. To learn how to identify Python object types.
5. To learn how to use indexing and slicing to access data in Python programs.
6. To define the structure and components of a Python program.
7. To learn how to build and package Python modules for reusability.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

MODULE CONTENT:

UNIT-I: Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. (2L) Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming
UNIT-II: Overview of Programming Structure of a Python Program, Elements of Python , Entering and Storing Data-Binding Values to Names- More Python Syntax Basics- Reading and Converting User Input. Making Decisions- Conditions in Python- Making Decisions:Simple if Statements.-Multiple Choice Decisions.
UNIT-III: Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators(Arithmetic operator, Relational operator, Logical or Boolean operatorAssignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).
UNIT-IV: Creating Python Programs Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.),Defining Functions, default arguments.
UNIT-V: Sets And Dicts Sets and Dicts- Creating Sets- Working With Sets- Working with Dicts- Applying Dicts: Counting Words.
UNIT-VI: Files Reading and Writing Files- Creating a New File- Writing to a File- Reading Files as Text .

RECOMMENDED BOOKS

TEXT BOOK	1. Introduction to Programming Using Python, First Edition by Y. Daniel Liang,©2013 Prentice Hall 2. Dawson, Michael. Python Programming for the Absolute Beginner (3rd ed.). Boston, MA: Course Technology,2010
REFERENCE BOOK	1. T. Budd, Exploring Python, TMH, 1st Ed, 2011 2. Python Tutorial/Documentation www.python.or 2015 3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely availabe online.2012 4. http://docs.python.org/3/tutorial/index.html 5. http://interactivepython.org/courselib/static/pythonds 6. http://www.ibiblio.org/g2swap/byteofpython/read/

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 150 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	05
2.	Sessional Test	2	30
3.	Group Discussion	2	05
4.	End Semester Exam	1	100

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5	6	7
Class Test	x	x	x	x			x
Quiz	x	x			x	x	
Assignment	x	x		x		x	

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	3,5	2	1	6,7	4	2,4	3	6	4,5		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

PYTHON PROGRAMMING LAB
           L T P
           0 0 4

MODULE CODE	COAP4218
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

The basic thrust of the course would be to learn programming language 'PYTHON'

1. To familiarize open source software that are easily available to use .

2. It supports multiple programming paradigms like functional programming, imperative and procedural as well.

LEARNING OUTCOMES:

At the end of this lab session, the student will

1. It has a large and robust standard library to use for developing the applications.
2. It feature helps in saving the development time of the developers.
3. It helps in building custom applications and clean code helps in maintaining and updating the software applications without putting extra effort on the same code.

LIST OF EXPERIMENTS

1.	Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon users choice.
2.	WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria : Grade A: Percentage >=80 Grade B: Percentage>=70 and <80 Grade C: Percentage>=60 and <70 Grade D: Percentage>=40 and <60 Grade E: Percentage<40
3.	WAP to display the first n terms of Fibonacci series.

4.	WAP to calculate the sum and product of two compatible matrices.
5.	Write a program to count frequency of characters in a given file
6.	Write a menu-driven program to create mathematical 3D objects I. curve II. sphere III. Cone IV. Arrow V. ring VI. cylinder
7.	WAP to read n integers and display them as a histogram.
8.	WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
9.	WAP to show a ball bouncing between 2 walls
10.	WAP to display sine, cosine, polynomial and exponential curves.
11.	Find mean, median, mode for the given set of numbers in a list.
12.	WAP to find factorial of the given number..
13.	Write a GUI for an Expression Calculator using tk.
14.	WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - - - - - n/n!$
15.	WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula $m=60/(t+2)$, where t is the time in hours. Sketch a graph for t vs. m, where $t>=0$.

Note: At least 10 Experiments out of the list must be done in the semester.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	30
2	External Assessment	1	70

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2	1,3	3		1,3		3		2	

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,

- Actions taken based on previous subject review,

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

ADVANCED JAVA   **L   T   P**
                                                                           4   0   0

MODULE CODE	COAP4205
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:

1. Familiar with advance technology

2. Learning Web site design using jsp.

LEARNING OUTCOMES:

1. Develop Swing-based GUI

2. Develop client/server applications and TCP/IP socket programming

3. Update and retrieve the data from the databases using SQL

4. Develop distributed applications using RMI

5. Develop component-based Java software using JavaBeans Develop server side programs in the form of servlets.

MODULE CONTENT:

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

UNIT-I: Introduction Introduction to Java, Data types, variables, operators, Arrays, Control Statements, Classes & Methods, Inheritance, Exception Handling, Multithreading, Collections, I/O streams, AWT & Applet Programming.
UNIT-II: Swing Introduction to Swing: JApplet, Handling Swing Controls like Icons – Labels – Buttons – Text Boxes – Combo – Boxes – Tabbed Pains – Scroll Pains – Trees – Tables Differences between AWT Controls & Swing Controls Developing a Home page using Applet & Swing.
UNIT-III: Searching and Knowledge Representation Adversarial search: Game Playing, Min-max Algorithm, Alpha beta pruning. Knowledge representation: Level of representation, Knowledge representation schemes, Formal logic, Inference Engine, Semantic net, Frame, Scripts.
UNIT-IV: Java Beans Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizers, Java Beans API.
UNIT-V: : Introduction to Servelets Lifecycle of a Serverlet;JSDK The Servelet API; The javax.servelet Package; Reading Servelet parameters; Reading Initialization parameters. The javax.servelet HTTP package; Handling Http Request & Responses; Using Cookies- Session Tracking; Security Issues Introduction to JSP; The Problem with Servelet. The Anatomy of a JSP Page; JSP Processing. JSP Application Design with MVC Setting Up and JSP Environment: Installing the Java Software Development Kit; Tomcat Server & Testing Tomcat.
UNIT-VI: SECURITY Class Loaders, Bytecode Verification, Security Managers and Permissions, Digital Signatures, Code Signing, Encryption

RECOMMENDED BOOKS

TEXT BOOK	1. "Complete Reference Java"; Herbert SchildtTMH Publication. 2. "Java Server Pages", Pekowsky Pearson publications
REFERENCE BOOK	5. 1. "Internet and World Wide Web – How to program?", Dietel and 6. Nieto; PHI/Pearson Education Asia. 7. 2. "Java Server Pages". Hans Bergsta 8. 3. Bill Siggelkow; S P D O'Reilly;"Jakarta Struts"; Cookbook. 9. 4 Murach;"Murach's beginning JAVA JDK 5"; SPD. 10. 5. Wang-Thomson;"An Introduction to Web Design and 11. Programming". 12. 6. Knuckles;"Web Applications Technologies Concepts";John 13. Wiley. 14. 7. Sebesta;"Programming world wide web"; Pearson. 15. 8. Bai/Ekedaw-Thomas;"Web Warrior Guide to Web 16. Programmming". 17. 9. Jon Duckett;"Beginning Web Programming"; WROX

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 150 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	05
2.	Sessional Test	2	30
3.	Group Discussion	2	05
4.	End Semester Exam	1	100

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test	x	x	x	x	
Quiz	x	x			x
Assignment	x	x		x	

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	3,5	2	1		4	2,4	3		4,5		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

ADVANCED JAVA LAB   **L T P**
                                                              0 0 4

MODULE CODE	COAP4206
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	15
SUMMATIVE ASSESSMENT MARKS	35
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

The basic thrust of the course would be to learn programming .

1. Familiar with advance technology.

2. Learning Web site design using jsp.

LEARNING OUTCOMES:

At the end of this lab session, the student will

1. Develop Swing-based GUI

2. Develop client/server applications and TCP/IP socket programming

3. Update and retrieve the data from the databases using SQL.

4. Develop distributed applications using RMI.

5. Develop component-based Java software using JavaBeans Develop server side programs in the form of servlets.

List of experiments

1	Script showing use of arrays in javascript.
2	Script showing user defined functions
3	Script showing use of alert dialog box javascript
4	Script showing use of prompt dialog box javascript
5	Script showing use of Confirm dialog box javascript
6	Program showing javascript front-end validation
7	Program to execute select query using JDBC.
8	Program to update customer information.

9	A simple servlet to generate simple text.
10	Program to implement basic arithmetic functions using JSP
11	Program to display a string using JSP.
12	Program to create check boxes using JSP.
13	Program implementing the concept of cookies in JSP.
14	Program implementing the concept of session in JSP
15	Program to generate simple text using Java Beans.

Note: At least 14 Experiments out of the list must be done in the semester.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	30
2	External Assessment	1	70

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4		3,5	5

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,

PDM UNIVERSITY
B.SC (H) COMPUTER SCIENCE

- Problems encountered in the subject delivery,

- Suggested remedies / corrective measures, and

- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
BSC(H) CS SEMESTER VI								**MARKS**		
COAP3125		PC	ARTIFICIAL INTELLIGENCE	4	0	0	4	40	60	100
COAP3126		PC	ARTIFICIAL INTELLIGENCE LAB	0	0	4	2	15	35	50
COAP3127		PC	COMPUTER GRAPHICS	4	0	0	4	40	60	100
COAP3128		PC	COMPUTER GRAPHICS LAB	0	0	4	2	15	35	50
		PE	DSE-III	4	0	0	4	40	60	100
		PE	DSE-III LAB	0	0	4	2	15	35	50
		PE	DSE-IV	4	0	0	4	40	60	100
VALU0136	P	AE	APTITUDE II	2	0	0	2	25	50	75
VALU0123	P	SE	PROFESSIONAL COMMUNICATION-II	2	0	0	2	25	50	75
COAP3129		PD	SPECIALIZED MAJOR PROJECT (INDIVIDUAL)##	0	0	4	2	40	60	100
TOTAL CREDITS				20	0	16	28	**TOTAL MARKS**		800

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ARTIFICIAL INTELLIGENCE   **L T P**

                                                               4 0 0

MODULE CODE	COAP3125
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

1. Gain a historical perspective of AI and its foundations.

2.Become familiar with basic principles of AI toward problem solving, inference, perception, knowledge representation, and learning.

3.Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

4. Experience AI development tools such as an 'AI language', expert system shell, and/or data mining tool.

5. Explore the current scope, potential, limitations, and implications of intelligent systems.

LEARNING OUTCOMES:

1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.

2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.

3. Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

4. Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

5 Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

UNIT I Introduction To Artificial Intelligence: Need of intelligent systems, Foundation and history of AI, AI problems and techniques – AI programming languages, Intelligent agent.

UNIT II Heuristic search Techniques: Problem spaces and searches, blind search strategies, Breadth first- Depth first-heuristic search techniques Hill climbing: best first- A* algorithm AO* algorithm- game tree, Min max algorithms, Problem Reduction, Constraints,Satisfaction, Means End Analysis.

UNIT III Planning: Overview to Planning, Planning in situational calculus, representation for planning, partial order planning algorithm, learning from examples, discovery as learning, Iearning by analogy, explanation based learning

UNIT IV Knowledge Representation and Reasoning: Knowledge representation issues, predicate logic- logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, skolemization, resolution and various resolution strategies. Horn formulas and programs. Undecidability and incompleteness in logic.

UNIT V Natural Language Processing and Agents: Introduction to NLP, Principles of Natural language processing, Introduction to Agents and their Application in Intelligent Systems. AI application to robotics and current trends in intelligent systems.

UNIT VI Expert system:Expert system Introduction, Expert System development life cycle: Problem selection, Prototype construction, Formalization, Implementation, Evaluation, Knowledge acquisition: Knowledge engineer, Acquisition techniques.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS

TEXT BOOK	1. Artificial Intelligence: A Modern Approach (Third edition) by Stuart Russell and Peter Norvig. 2. Rich Elaine and Knight Kevin : Artificial Intelligence, Tata McGraw Hill
REFRENCE BOOK	1. TaniMoto : Introduction to AI using LISP. 2. Patterson : Artificial Intelligence and Expert Systems. 3. Winston, P.H. and: LISP B.K.P.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES
Theory:

Assessments	1	2	3	4
Class Test	x		X	
Quiz			X	
Assignment	x	X		x

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

• Problems encountered in the content delivery;
• Suggested remedies / corrective measures;
• Approved refinement decisions due for implementation;
• Actions taken based on previous course review; and
• Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ARTIFICIAL INTELLIGENCE LAB
 L **T** **P**
 0 0 4

MODULE CODE	**COAP3126**
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:
The aim of this course is to introduce programming in the Prolog language. Prolog encourages a different programming style to Java or ML and particular focus is placed on programming to solve real problems that are suited to this style. Practical experimentation with the language is strongly encouraged
- be able to write programs in Prolog using techniques such as accumulators and difference structures;
- know how to model the backtracking behavior of program execution;
- appreciate the unique perspective Prolog gives to problem solving and algorithm design;
- understand how larger programs can be created using the basic programming techniques used in this course.

LEARNING OUTCOMES

Following this course, students will be able:
1. Understand the concept of problem solving as search, and learn how to use the various and Heuristic Search Techniques.
2. Learn the essentials of the Prolog Programming Language.
3. Backtracking in PROLOG and Backward Chaining and Theorem Proving in PROLOG .
4. Intelligent Agents.
5. Solve a problem requiring a suitable knowledge representation and a search method.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Study of Prolog
1.	Write a Prolog program to check greater number
2.	Write a Prolog program of quadratic equation
3.	Write a Prolog program to implement water jug problem.
4.	Write a program to solve the Monkey Banana problem.
5.	Write a Prolog program to Convert The String Given In Upper Case Letters Into Lower Case Letters And Vice-Versa.
6.	Write a Prolog program to implement string operations.
7.	Write a Prolog program of compound predicates.
8.	Write a Prolog program of or Using Input, Output, Cut And Fail Predicates.
9.	Write a Prolog program to solve 4-Queen problem
10.	Write a Prolog program to Study Usage Of Recursion In Prolog
11.	Write a Prolog program as to Accept • Name Of The Student • Roll no • Subject Name • Maximum Marks • Obtained Marks Compute the Percentage Of A Student and display His Result With Other Information.
12.	**Write a prolog program for** travelling salesman problem.
13.	Write Program To Study Usage Of Cut, Not, Fail Predicates In Prolog

Note: At least 12 Experiments out of the list must be done in the semester.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	G	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

COMPUTER GRAPHICS   **L T P**

                                                                         4 0 0

MODULE CODE	COAP3127
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

The main objective of this module is to introduce to the students the concepts of computer graphics. It starts with an overview of interactive computer graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping, filling and an introduction to 3-D graphics.

1. Fundamental of computer Graphics.
2. Transformations
3. Object Drawing
4. Working of display devices.
5. To discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.

LEARNING OUTCOMES:

On successful completion of this module, students should be able to:

1. Use the underlying algorithms, mathematical concepts, supporting computer graphics.
2. Composite 3D homogeneous matrices for translation, rotation, and scaling transformations.
3. Plane, surface normal's, cross and dot products.
4. Hidden surface detection / removal, Scene graphs, display lists.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENT:

Unit I: Introduction

Overview of Computer Graphics:Applications of Computer Graphics; Display devices: Pixel, Resolution, Aspect Ratio; Raster-Scan Systems and Display: CRT, Refresh Rate and Interlacing; Bit Planes, Color Depth and Color Palette, Frame Buffer, Video Controller, Raster-Scan Display Processor, Lookup Table, RGB Color Model, Color CRT monitors; Random-Scan Displays; Flat Panel Display : LCD, Plasma Panel; Graphics Monitors and Workstations; Popular Graphics Input Devices; Hard-Copy Devices.

Unit II: Coordinate Representations:

Coordinate Representations, Graphics Primitives: Line Drawing Algorithms- DDA Algorithm, Bresenham's Algorithm; Different Line Styles; Circle-Generating Algorithms- Properties of Circles, Circle Drawing using Polar Coordinates, Bresenham's Circle Drawing Algorithm; Ellipse-Generating Algorithms; Anti-aliasing.

Unit III: Geometric Transformations(2D)

Scaling, Translation, Rotation; Matrix Representations and Homogeneous Coordinates; Rotation Relative to an Arbitrary Point; Reflection; Shearing; Coordinate Transformation; Inverse Transformation; Affine Transformation; Raster Transformation; Composite Transformations; Fixed-point Scaling; Input Techniques: Pointing, Positioning, Rubber-band method, Dragging.

Unit IV: Geometrical transformations(3D)

Scaling, Translation, Rotation; Matrix Representations and Homogeneous Coordinates;3D Transformations, The Window-to-Viewport Transformation, Efficiency,

Unit V: Representing curves and surfaces

Polygon Meshes, Parametric Cubic Curves, Quadric Surfaces.

Unit VI: 3-D Viewing

Introduction, Representation of 3 D Objects, Projection , Parallel Projection, Orthographic Projection, Oblique Projection, Perspective Projection, 3 D Clipping, Hidden Surface Removal, Polygon rendering.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS:

TEXT BOOKS	1. "Computer Graphics", Donald Hearn, M. Pauline Baker, PHI. 2. "Computer Graphics", Apurva A. Desai, PHI, 2010 3. 3. "Principles of Interactive Computer Graphics", Newmann & Sproull, McGraw Hill. 4. Computer Graphics Principles and Practice : Foley, Van Dam, Feiner and Hughes Addison Wesley, New Delhi 5. Computer Graphics : D Harn and Baker Prentice Hall of India, New Delhi
REFERENCEBOOKS	1. Fundamentals of Interactive Computer Graphics Foley, J D and Van Dam Addison Wesley Publishing Company, New Delhi

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	10
2.	Sessional Test	2	20
3.	Group Discussion	2	10
4.	End Semester Exam	1	60

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES
Theory:

Assessments	1	2	3	4
Class Test	X		X	
Quiz			X	
Assignment	X	X		x

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

• Problems encountered in the content delivery;
• Suggested remedies / corrective measures;
• Approved refinement decisions due for implementation;
• Actions taken based on previous course review; and
• Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

COMPUTER GRAPHICS LAB   **LTP**
                                                              004

MODULE CODE	COAP3128
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	15
SUMMATIVE ASSESMENT MARKS	35
END SEMESTER EXAM DURATION	3hrs
LAST REVISION DATE	

INSTRUCTIONS: In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES

A study of the subject matter presented in this course will enable the students to become familiar with:

1. Describe the major computer graphics applications.

2. Explain some classic 2D and 3D graphics algorithms.

3. Create computer models of 2D and 3D objects using mathematical knowledge and techniques.

4. Generating a raster-scan image.

5. Colour models and Clipping algorithms.

LEARNING OUTCOMES

Following this course, students will be able:

1. Develop design drawings that demonstrate computer graphics and design skill

2. Prepare technical drawings that demonstrate expertise

3. Understand the structure of modern computer graphics systems

4. Understand the basic principles of implementing computer graphics primitives.

5. Familiarity with key algorithms for modeling and rendering graphical data.

Develop design and problem solving skills with application to computer graphics

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Write a program to write your name in Hindi and English and scroll it.
2.	Write a program to implement DDA Line drawing Algorithm.
3	Write a program to implement Bresernham's Line drawing Algorithm.
4	Write a program to implement Bresernham's Circle drawing Algorithm.
5	Write a program to implement Mid Point Circle drawing Algorithm.
6	Write a program to make a Landscape & colour it with different filling styles.
7	Write a program to implement flood fill Algorithm.
8	Write a program to implement Boundary fill Algorithm.
9	Write a program to implement 2 D transformations using switch case.
10	Write a program to show solar system.
Experiments based on advanced topics:	
11.	Write a program to show control the speed of a moving fan.
12.	Write a program to show the movement of a cartoon character.

Note: At least 10 Experiments out of the list must be done in the semester.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	15
2	External Assessment	1	35

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	G	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are

  communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

.NET TECHNOLOGIES(DSE III)   **L   T   P**

                                                                  4   0   0

MODULE CODE	COAP4207
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	30
SUMMATIVE ASSESMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS:

In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

A study of the subject matter presented in this course will enable the students to become familiar with:

1. Basic of the .net framework

2. C# basics

3. The usage of recent platforms used in developing web applications such as the .Net environment like C#.

LEARNING OUTCOMES:

Upon completion of this course the student should be able to:

1. Display proficiency in C# by building stand-alone applications in the .NET framework using C#.

2. Create distributed data-driven applications using the .NET Framework and C#.

3. Create web-based distributed applications using C#, .NET, SQL Server and ASP.NET.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MODULE CONTENT:

UNIT-I: .Net Framework Introduction Building blocks of .Net Platform (the CLR, CTS and CLS), Features of .Net, Deploying the .Net Runtime, Architecture of .Net platform, Introduction to namespaces & type distinction. Types & Object in .Net, the evolution of Web development. Class Libraries in .Net, Introduction to Assemblies & Manifest in .Net, Metadata & attributes.
UNIT-II: Introduction to C# Characteristics of C#, Data types: Value types, reference types, default value, constants, variables, scope of variables, boxing and unboxing.
UNIT-III: Control Constructs in C# Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity, Decision making, loops, Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.
UNIT-IV: C#.Net Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).
UNIT-V: Visual Inheritance in C#.NET Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms.
UNIT-VI: State Management State Management: session; caching; Authentication (window; .Net Passport; Forms Based); Authorization; web services; Advance Grid Manipulation.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

RECOMMENDED BOOKS

TEXT BOOK	1. "Introduction to C# using .Net"; Robert J. Oberg; PHI, 2002. 2. "Complete Reference C#"; Herbert Schildt TMH Publication. 3. Programming in C# By E. Balaguruswamy, Tata McGraw Hill
REFERENCE BOOK	1 C# and .NET Platform by Andrew Troelsen, Apress, 1st edition, 2001.. 2 The Complete Guide to C# Programming by V. P. Jain.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES

This subject will be evaluated for a total of 100 marks.

Theory:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1.	Class Test	2	05
2.	Sessional Test	2	20
3.	Group Discussion	2	05
4.	End Semester Exam	1	70

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Assessments	1	2	3	4	5
Class Test	x	x	x	x	
Quiz	x	x			x
Assignment	x	x		x	

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

MAPPING OF COURSE LEARNING OUTCOMES

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes	3,5	2	1		4	2,4	3		4,5		3

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

.NET Technology LAB (DSE III)   **L T P**
                                                                      0 0 4

MODULE CODE	COAP4208
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

1. Set up a programming environment for .net programs.

2. Configure an .net application.

3. Creating .Net applications using standard .net controls.

4. Develop a data driven web application.

5. Connecting to data sources and managing them.

LEARNING OUTCOMES:

The student will be able apply technical knowledge and perform specific technical skills, including:

1. Successful students will able to design web applications using .NET

2. Successful students will be able to use .NET controls in web applications.

3. Successful students will be able to debug and deploy .NET web applications

4. Successful students will be able to create database driven .NET web applications and web services.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

LIST OF EXPERIMENTS

1.	Write a program to print "HELLO WORLD" using C#.
2.	Write a program to input and print an integer number using C#.
3.	Write a program to display date and time in C#.
4.	Write a program to implement conditional if statement.
5.	Write a C# program to print pattern of 0's and 1's.
6.	Write a C# program to implement the concept of number is factorial or not.
7.	Write a program how to replace a character with another character in string in C#.
8.	Write a C# program to implement conditional switch statement.
9.	Write a C# program to compute the sum of the first 500 prime numbers.
10.	Write a C# program to check if an given integer is within 20 of 100 or 200.
11.	Write a C# program to check if the first element or the last element of the two arrays (length 1 or more) are equal
12.	Write a C# program to implement the concept of array list.
13.	Write a C# program for default arguments.
14.	Write a C# program to implement repetitive statement.
15.	Write a program to implement reusable header and footer file.
	Experiments based on advanced topics:
16	To implement all the above concept: 1. Develop a Minor Project for automobile EMI management system.
17	To implement all the above concept: 1. Develop a Minor Project for Employee Management System

Note: At least 14 Experiments out of the list must be done in the semester.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	1	30
2	External Assessment	1	70

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes		1,2,4	1,3,4	3,4		1,3		4			

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

ADVANCED MATHMATICS (DSE IV)   **L   T   P**
                                                                 4   0   0

MODULE CODE	COAP4226
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	40
SUMMATIVE ASSESMENT MARKS	60
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

INSTRUCTIONS:

- In total SEVEN questions will be set. Question ONE will be compulsory and will cover all units. Remaining six questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

MODULE CONTENT:

Unit 1
Relation : Relations, Properties of Binary relation, Matrix representation of relations, Closures of relations, Equivalence relations, Partial order relation. **Function :** Types, Composition of function, Recursively defined function.

Unit 2
Algebraic Structures : Properties, Semi group, Monoid, Group, Abelian group, Subgroup, Cyclic group, Cosets, Normal Subgroups, Lagrange's Theorem, Permutation groups.

Unit 3
Propositional Logic : Prepositions, logical operations, Tautologies, Contradictions, Logical implication, Logical equivalence, Normal forms, Theory of Inference and deduction. Predicate Calculus : Predicates and quantifiers,

Unit 4
Lattices and Boolean Algebra : Introduction, Partially Ordered Set, Hasse diagram, Lattices, Properties of lattices, Bounded lattices, Complemented and Distributive lattices, Boolean Algebra.

Unit 5
Formal Language: Introduction to formal language, Kleene Closure, Arithmetic expressions, Chomsky Hierarchy, Regular expressions, Generalized Transition graph.

Unit 6
Automata : Introduction to Automata .Conversion of regular expression to Finite Automata, NFA, DFA, Conversion of NFA to DFA.

PDM UNIVERSITY
B.SC. (HONS.) COMPUTER SCIENCE

List of references

1. C.L.Liu : Elements of Discrete Mathematics McGraw Hill.
2. Babu Ram : Discrete Mathematics, Vinayek Publishers, New Delhi.
3. Trembley, J.P. & R. Manohar : Discrete Mathematical Structure with Application to Computer Science, TMH.
4. Kenneth H. Rosen : Discrete Mathematics and its applications,TMH.
5. Doerr Alan & Levasseur Kenneth; Applied Discrete Structuresfor Computer Science, Galgotia Pub. Pvt. Ltd.
6. Gersting : Mathematical Structure for Computer Science, WH Freeman & Macmillan.
7. Hopcroft J.E., Ullman J.D. : Introduction to Automata theory,Languages and Computation, Narosa Publishing House, New Delhi.