PDM UNIVERSITY
MASTER OF COMPUTER APPLICATIONS

PROGRAM SCHEME

SEMESTER – I

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C
COAP5101	MCA	PC	PROBLEM SOLVING AND PROGRAMMING	4	0	0	4
COAP5102	MCA	PC	EXERCISES FOR LEARNING BASIC PRINCIPLES OF STRUCTURED PROGRAMMING WITH C	0	0	4	2
COAP5103	MCA	PC	PC- SOFTWARE AND WEB TECHNOLOGIES	4	0	0	4
COAP5104	MCA	PC	EXERCISE IN MS-OFFICE,HTML AND DHTML	0	0	4	2
COAP5105	MCA	PC	COMPUTER ORGANIZATION AND ARCHITECTURE	4	0	0	4
COAP5106	MCA	PC	ASSEMBLY LAB	0	0	4	2
COAP5107	MCA	PC	STRUCTURED SYSTEM ANALYSIS AND DESIGN	3	1	0	3.5
MATH0114	MCA	PC	MATHEMATICAL FOUNDATION OF COMPUTER APPLICATIONS	3	1	0	3.5
COAP5108	SP	SP	SPECIAL PROBLEM	0	0	2	1
TOTAL CREDITS				18	2	14	26

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

Category	
MCA	Master of Computer Applications
SP	Seminar & Special Problem

Sub Category	
PC	Program Core
SP	Seminar & Special Problem

SEMESTER – I

PROBLEM SOLVING AND PROGRAMMING
L   T   P
4   0   0

MODULE CODE	**COAP5101**
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:

This course aims to familiarize the students 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

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

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 program manually and Write 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: Computers Introduction; block diagram; Hardware and software components; Programming paradigms; Program development cycle; Evolution of programming languages; Principles of structured programming; Sequential, selective and repetitive structures; Examples for modular programming ; Functions and procedures ; Examples of parameter passing methods.
Unit-II: C Language Fundamentals Character set; Various constants; keywords; Primitive data types: Declaration; Syntax for sequential, selective and repetitive structures; Sample codes for each.
Unit-III: Functions and arrays Functions: Definition, prototypes, block structure, call by value, by reference , recursive function; Arrays: Declaration, accessing array elements and initialization, passing array elements, one dimensional, two dimensional arrays, arrays with pointers, passing arrays to functions; Storage Classes: Uses and their types.
Unit-IV: Pointers Address and indirection operators; Pointer type declaration; Assignment; Initialization: Pointer arithmeti; Pointer with array; Pointer with function; String with pointers; Pointer to pointer; Dynamic memory management.
Unit-V: Structures Variables; Accessing members; Assignment and nesting; Pointers to Structures; Structures with functions; Structures with array; Unions; Bitwise operations.
Unit-VI: File handling FILE structure- Opening and closing a stream, Open modes, Read Modes, Write Modes, Reading and writing to/from a stream,Predefined streams: stdin, stdout and stderr,Stream manipulation: fgetc(), fputc(), fgets() and fputs() functions ¬ Raw input/output: fread() and fwrite() functions

RECOMMENDED BOOKS:

TEXT BOOKS	**1.** Problem Solving and Program Design in C: J.R. Hanly and E.B. Koffman, 6th Edition, 2009, Pearson Education. 2. C programming for the absolute beginner: M.A. Vine, 2nd Edition, 2008, Thomson Course Technology. 3. Computer Science: A Structured Programming Approach Using C: B.A. Forouzan and R.F. Gilberg, 3rd Edition, 2005, Thomson Course Technology. 4.
REFERENCEBOOKS	1. Schaum's Outline of Programming with C: B. Gottfried,, 2nd Edition, 1996, Tata McGraw Hill. 2. The C Programming Language: B.W. Kerninghan, D.M. Ritchie, 2nd Edition, 1995, 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 for theory.

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

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.

EXERCISES FOR LEARNING BASIC PRINCIPLES OF
STRUCTURED PROGRAMMING WITH C   **L T P**
                                                       0 0 4

MODULE CODE	**COAP5102**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	30
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 Program.

3. To develop analyzing and problem solving skills and use the same for writing programs in 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" 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 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.

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.	To write a C Program, Using Switch to Implement Simple Calculator (ADD,MIN, DIV, MUL).
6.	To write a C program to illustrate Call by Value and Call by Reference.
7.	To write a C Program to Find Factorial of a Number using Recursion.
8.	To write a C program to check whether a given string is palindrome or not.
9.	To write a C program for to read two strings and concatenate the Strings.
10.	To write a C Program to implement the following Pointer Concept: a) Pointer to Pointer b) Pointer to Structure. c) Pointer to Function.
11.	Using Array, write a C Program to Implement the transpose of a Matrix.
12.	Using Array, write a C Program to Implement the Multiplication of a Matrix.
13.	Using Structure in C, write a Program to create the record of 10 students consisting of Name, Age, Address & their marks In Percentage.
14.	To write a C program to Create a file and store the Information.
15.	To write a C program to illustrate reading of Data from a File.
Experiments based on advanced topics:	
16.	To implement all the above concept: 1. Develop a Minor Project for Hotel Management System
17.	To implement all the above concept: 1. Develop a Minor Project for Library Management System

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 100 marks for practical.

Practical:

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

PC SOFTWARE AND WEB TECHNOLOGIES   **L   T   P**
                                                        4   0   0

MODULE CODE	**COAP5103**
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:

This course aims at providing insight and knowledge about architectures and protocols for mobile and wireless communication.

1. Make student aware of MS-Word.
2. Acquire knowledge on MS-Excel.
3. Get familiar with the concepts of MS-Powerpoint.
4. Enable learner to understand MS-Access
5. Thorough understanding of HTML and DHTML

LEARNING OUTCOMES:

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

1. Practical knowledge and use of the Windows operating system.

2. Creating word documents for office use, Knowledge of mail merge.

3. Formatting techniques and presentation styles.

4. Use of Basic functions and formulas.

5. Using excel workbooks and templates.

6. How to design web page using HTML and DHTML.

MODULE CONTENT:

UNIT-I: Documentation using Word Processor
Introduction to word processing interface: Toolbars, menus, creating & editing document, formatting document, finding and replacing text, format painter, header and footer, drop cap, auto-text, autocorrect, spelling and grammar tool, Document Dictionary, Page Formatting, Bookmark, Previewing and printing document.
UNIT-II: Advance features of MS-Word
Mail merge, Macros, Tables, File management, Printing, Styles, Linking and embedding object, Template.
UNIT-III: Electronic Spreadsheet
Using MS-Excel: Introduction to MS-Excel; Cell; Cell address; Creating & editing worksheet; Formatting and essential operations; Moving and copying data in excel; Header and footer; Formulas and functions; Charts; Cell referencing; Page setup; Macros.
UNIT-IV: Advance features of MS-excel
Pivot table & pivot chart; Linking and consolidation; Database management using excel-sorting; Filtering; Validation; What if analysis with Goal Seek; Conditional formatting.
UNIT-V: HTML
Internet language; Understanding HTML; Create a web page; Linking to other web pages,; Publishing HTML pages; Text alignment and lists; Text formatting fonts control; E-mail links and link within a page; Creating HTML Forms.
UNIT-VI: Creating Web page
Web page Graphics; Putting Graphics on a Web Page; Custom Backgrounds and Colors; Creating Animated Graphics; Web Page Design and layout: advanced layout with tables; using style sheets; Introduction to java script.

RECOMMENDED BOOKS:

TEXT BOOKS	5. Microsoft Office Complete Reference, BPB Publication 6. Learn Microsoft Office: Russell A. Stultz, BPB Publication 7. Tech Yourself HTML 4 in 24 Hours: Dick Oliver, Techmedia
REFERENCEBOOKS	1. Level Information Technology: Satish Jain **2.** 10 minutes Guide to HTML Style Sheets: Craig Zacker, 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 for theory.

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

Theory:

Assessments	1	2	3	4	5	6
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	1,2		3	4,5	3,4				6	

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.

EXERCISE IN MS-OFFICE, HTML AND DHTML   **L T P**
                                                              0 0 4

MODULE CODE	**COAP5104**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

A study of the subject matter presented in this course will enable the student to become familiar with:
1. Make student aware of MS-Word.
2. Acquire knowledge on MS-Excel.
3. Get familiar with the concepts of MS-Powerpoint.
4. Enable learner to understand MS-Access
5. Thorough understanding of HTML and DHTML

LEARNING OUTCOMES:

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

1. Practical knowledge and use of the Windows operating system.

2. Creating word documents for office use, Knowledge of mail merge.

3. Formatting techniques and presentation styles.

4. Use of Basic functions and formulas.

5. Using excel workbooks and templates.

6. How to design web page using HTML and DHTML.

LIST OF EXPERIMENTS

1.	How to Create, Edit and Format documents in MS Word.
2.	How to insert Header and footer in MS Word.
3.	How to use Drop CapSpelling and Grammer tool in MS Word.
4.	How to make Macro in MS Word.
5.	How to use Mail Merge in MS Word.
6.	How to Creating and editing worksheet in MS Excel
7.	How to use Formula and functions in MS Excel
8.	How to create Charts, pivot chart and pivot table in MS Excel
9.	Database management-sorting, filtering, validation, conditional formatting in MS Excel
10.	**MS Powerpoint** • Manuplating and enhancing slides • Word art • Animations and sounds • Sound effect
11.	**MS Access** • Working with tables • Working with forms • Designing a query • Creating reports
12.	Design a HTML page to illustrate body tag and all its attributes.
13.	Design a HTML page to illustrate ordered list and unordered list and definition list .
14.	Design a HTML page to illustrate the image ,anchor ,table tag.
15.	Design a HTML page to illustrate the form tag and the frame tag.
Experiments based on advanced topics:	
16.	To implement MS Office: 1.Develop a Minor Project for your college.
17.	To implement web designing concept: 1. Develop a web site for your college.

Note: At least 15 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 100 marks for practical.

Practical:

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

COMPUTER ORGANIZATION AND ARCHITECTURE
L T P
4 0 0

MODULE CODE	**COAP5105**
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:

This course aims at providing insight and knowledge about architectures and protocols for mobile and wireless communication.

1. To acquire foundation knowledge for Digital Electronics.
2. To get knowledge about the number system.
3. To get better inside of binary logic circuit and k-maps.
4. To evaluate circuit designs within the context of digital and combinational circuits.

LEARNING OUTCOMES:

1. Understand the basic concepts of digital electronics.
2. Understand number system.
3. Learn Boolean algebra, Boolean Theorems and K-maps.
4. Introduction to circuit design, basic gate design & Learn to design combinational and digital circuits.
5. Learn Assembly and Microprocessor

MODULE CONTENT:

UNIT-I: Information Representation   Number Systems(decimal ,binary,octal and hexadecimal number system), Binary Arithmetic (addition , subtraction multiplication and division) Fixed-point and Floating point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode
UNIT-II: Introduction to Boolean Algebra   Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables K-map SOP form and POS form.
UNIT-III: Combination Circuits   Basic gates , universal gates , circuit design, Multiplexes; Demultiplexers; Decoders; Adders, 7 segment display system.
UNIT-IV: Sequential Circuit   Flip-flops: S-R, J-K, D, T, master slave and Edge triggered; Registers: Shift registers, bi-directional shift registers
UNIT-V: Input-Output Organization   Peripheral devices; Input-output interface; Asynchronous data transfer; Modes of data transfer; Priority interrupt; Direct memory access; Input-output processor , Memory hierarchy; Main memory; Auxiliary memory; Associative memory; Cache memory; Virtual memory;
UNIT-VI: Introduction to Microprocessor & Assemby language   Introduction to 8086, Bus interface unit,   addressing modes, introduction to assembly language.

RECOMMENDED BOOKS:

TEXT BOOKS	1 .M. Morris Mano, "Digital Logic and Computer Design", P rentice Hall of India Pvt. Ltd. 2. microprocessor 8086 by ramesh gaonka 3. M. Morris Mano, "Computer Architecture ", Prentice Hall of India Pvt. Ltd.
REFERENCEBOOKS	1. Nicholas Carter, "Schaum's Outlines Computer Architecture", Tata McGraw-Hill 2. V. Rajaraman, T. Radhakrishnan, "An Introduction to Digital Computer Design", Prentice Hall of India Pvt. Ltd. 3. Andrew S. Tanenbaum, "Structured Computer Organization", Prentice Hall of India Pvt. Ltd. 4. Gill, Nasib Singh and Dixit J.B.: "Digital Design and Computer Organization",University Science Press (Laxmi Publications), New Delhi. 5. Microprocessor 8086 by ramesh gaonka

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	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

Theory:

Assessments	1	2	3	4	5
Class Test	x				x
Quiz		x	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	2	1,2,3	4	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.

ASSEMBLY LAB   **L T P**
                                                                                            0   0 4

MODULE CODE	**COAP5106**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
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 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:	
16.	Write a program to make arithmetic calculator
17.	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.

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	2	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	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.

STRUCTURED SYSTEM ANALYSIS AND DESIGN   **L T P**
                                                                             3 1 0

MODULE CODE	**COAP5107**
CREDIT POINTS	3.5
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. System development life cycle

2. Different structured analysis tools

3. Cost and benefit analysis

4. Testing & implementation of test cases

LEARNING OUTCOMES:

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

1. Define and describe the five phases of the system development life cycle.

2. State at least five expected benefits from systems projects.

3. Explain at least three ways in which information systems support business requirements.

4. Describe how systems analysts interact with users, management, and other information systems professionals.

5. Develop data flow diagrams and decision tables.

6. Perform a feasibility study.

MODULE CONTENT:

Unit I: Introduction to system Definition and characteristics of a system; Elements of a system; Types of system; System development life cycle; Role of system analyst; Analyst/user interface. System planning and initial investigation: Introduction; Bases for planning in system analysis; Sources of project requests; Initial investigation; Fact finding; Information gathering; information gathering tools; Fact analysis; Determination of feasibility.
Unit II: Structured analysis, Tools of structured analysis DFD; Data dictionary; Flow charts; Gantt charts; Decision tree; Decision table.
Unit III: Feasibility study Introduction; Objective; Types; Steps in feasibility analysis; Feasibility report; Oral presentation; Cost and benefit analysis: Identification and classification of costs and benefits, methods of determining costs and benefits, interpret results of analysis.
Unit IV: System Design System design objective; Logical and physical design; Design methodologies; Structured design; Form-driven methodology; Structured walkthrough.
Unit V: System testing Introduction; Objectives of testing; Test plan; Testing techniques; Types of system tests; Quality assurance goals in system life cycle.
Unit VI: System implementation Process of implementation; System evaluation; System maintenance and its types; System documentation.

RECOMMENDED BOOKS

TEXT BOOK	1. Systems Analysis and design by Elias M. Awad, Galgotia Pub.(P) Ltd. 2. Data Management and Data Structures by Loomis, PHI
REFERENCE BOOK	1. Introductory System analysis and Design by Lee, Vol. I & II.

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	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	6
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	2	1		4		5,6				

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.

MATHEMATICAL FOUNDATION OF COMPUTER APPLICATION   **L T P**
                                                          3   1 0

MODULE CODE	**MATH0114**
CREDIT POINTS	3.5
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:

This course aims at providing the understanding of concepts and tools in discrete mathematics and their application to computers by mathematical definitions and proofs as well as applicable methods.

1. Introduce Mathematical fundamental of groups.
2. Introduce proof techniques such as Mathematical Induction and Contradiction.
3. Develop an understanding of counting, functions and relations.
4. Understand basic definitions and properties of Boolean algebra.
5. Have the knowledge of automata theory.

LEARNING OUTCOMES:

1. Understand the Visualize data numerically and/or graphically.
2. Understand the functions concepts and distinguish different types of functions. Identify and describe various types of relations. Develop the ability to solve the recurrence relations by using various methods.
3. Evaluate mathematical principles and logic design
4. Learn how use propositional logic.
5. Learn how to design and analyze automata theory.

MODULE CONTENT:

UNIT-I: Sets and relations   Introduction to set theory**;** Relations: Properties of binary relation, matrix representation of relations, closures of relations, equivalence relations, partial order relation.
UNIT-II: Functions   Introduction to functions; Different **t**ypes of functions; Composition of functions; Recursively defined function.
UNIT-III: Algebraic Structres   Properties; Semi group; Monoid; Group: Abelian group, subgroup, cyclic group; Cosets; Normal Subgroups; Lagrange's Theorem; permutation groups.
UNIT-IV: Propositional Logic   Prepositions; Logical operations; Tautologies; Contradictions; Logical implication; logical equivalence; Normal forms; Theory of Inference and deduction; Predicate Calculus : Predicates and quantifiers; Mathematical Induction.
UNIT-V: Lattices and Boolean Algebra   Partially Ordered Set; Hasse diagram; Well ordered set; Lattices: Properties of lattices, bounded lattices, complemented and distributive lattices; Boolean Algebra.
UNIT-VI: Formal Languages and Automata theory   Introduction to defining language; Kleene Closure; Arithmetic expressions; Chomsky Hierarchy; Regular expressions; Generalized Transition graph; Conversion of regular expression to Finite Automata; NFA; DFA; Conversion of NFA to DFA; Optimizing DFA; FA with output : Moore machine, mealy machine, conversions.

RECOMMENDED BOOKS:

TEXT BOOKS	8. Elements of Discrete Mathematics: C.L.Liu, McGraw Hill. 9. Discrete Mathematics: Lipschutz, Seymour, Schaum's Series. 10. Discrete Mathematics: Babu Ram, Vinayek Publishers, New Delhi. 11. Discrete Mathematical Structure with Application to Computer Science: Trembley, J.P. & R. Manohar", TMH. 12. Discrete Mathematics and its applications: Kenneth H. Rosen, TMH. 13. Introduction to Automata theory,Languages and Computation: Hopcroft J.E., Ullman J.D, Narosa Publishing House, New Delhi.
REFERENCEBOOKS	1. Applied Discrete Structuresfor Computer Science: Doerr Alan & Levasseur Kenneth, Galgotia Pub. Pvt. Ltd. 2. Mathematical Structure for Computer Science: Gersting, WH Freeman & Macmillan.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support and text book / course material reading. 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

Theory:

Assessments	1	2	3	4	5
Class Test	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	3	1		3	4,5	3,4		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
MASTER OF COMPUTER APPLICATIONS

SPECIAL PROBLEM

L T P
0 0 2

MODULE CODE	**COAP5108**
CREDIT POINTS	1
FORMATIVE ASSESMENT MARKS	
SUMMATIVE ASSESMENT MARKS	
END SEMESTER EXAM DURATION	
LAST REVISION DATE	

PDM UNIVERSITY
MASTER OF COMPUTER APPLICATIONS

SEMESTER-II

MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C
COAP5109	MCA	PC	DATA STRUCTURES	4	0	0	4
COAP5110	MCA	PC	EXERCISES TO IMPLEMENT VARIOUS DATA STRUCTURE	0	0	4	2
COAP5111	MCA	PC	DATA BASE MANAGEMENT SYSTEM	4	0	0	4
COAP5112	MCA	PC	EXERCISES /CASE STUDIES THAT REQUIRE TABLE DESIGN NORMALIZATION AND QUERY BUILDING	0	0	4	2
COAP5113	MCA	PC	OPERATING SYSTEM	3	1	0	3.5
COAP5114	MCA	PC	OBJECT ORIENTED PROGRAMMING	4	0	0	4
COAP5115	MCA	PC	OBJECT ORIENTED PROGRAMMING USING C++	0	0	4	2
COAP5116	MCA	PC	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM	3	1	0	3.5
COAP5117	SP	SP	SEMINAR	0	0	2	1
TOTAL CREDITS				18	2	14	26

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

Category	
MCA	Master of Computer Applications
SP	Seminar & Special Problem

Sub Category	
PC	Program Core
SP	Seminar & Special Problem

SEMESTER – II

DATA STRUCTURES   **L   T   P**
                                                                             4   0   0

MODULE CODE	**COAP5109**
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. Different data structures

2. Modular programming

3. Tree traversing methods

4. Searching, Sorting Techniques

LEARNING OUTCOMES:

5. Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms.
6. Demonstrate advantages and disadvantages of specific algorithms and data structures.
7. Select basic data structures and algorithms for autonomous realization of simple programs or program parts.
8. Determine and demonstrate bugs in program, recognise needed basic operations with data structures
9. Formulate new solutions for programing problems or improve existing code using learned algorithms and data structures.
10. Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

MODULE CONTENT:

Unit-I: Objectives To introduce different data structures; searching and sorting techniques and their applications.
Unit-II: Introduction to Arrays, List Definition, examples, representation and applications.
Unit-III: Stack and Queue Definition, examples, representation and applications.
Unit-IV: Binary Trees Binary Tree Representations, node representation, internal and external nodes, implicit array representation, operations on binary trees, binary tree traversals, representing lists as Binary Trees, Threaded binary tree AVL tree and B-tree.
Unit-V: Searching and sorting Linear and binary search, basic sorting techniques, selection sort, bubble sort, insertion sort and merge sort, Radix sort, heap sort, search trees, tree searching, hashing.
Unit-VI: Graphs Representation, linked representation of graphs, graph traversals, Topological sort, transitive closure, single source shortest path algorithms, Bellman-Ford algorithm and Dijkstra's algorithm

RECOMMENDED BOOKS:

TEXT BOOKS	14. Data Structures: S. Lipschutz and G.A.V. Pai, Tata McGraw-Hill. 15. Data Structures and Problem Solving using Java: M.A.Weiss, 4th Edition, 2009, Addison Wesley. 16. Advanced Data Structures: P. Brass, Cambridge University Press.
REFERENCEBOOKS	3. Data Structures using Java: M.J.Augestein, Y.Langsam and A.M. Tenenbaum, Pearson Education. 4. Data Structures and Program Design in C: R. Kruse and C.L. Tondo, 2nd Edition, 1996, Prentice Hall. 5. Data structures, Algorithms and Software principles in C: T.A.Standish, 1994, Addison Wesley.

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 Marks
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

Theory:

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

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.

EXERCISE TO IMPLEMENT VARIOUS DATA STRUCTURES   **L T P**
                                                            0 0 4

MODULE CODE	**COAP5110**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
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 analyze 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.

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 linked list.
8.	Program to implement insertion in Linked list.
9.	Program to implement Deletion in Linked list.
10.	Program to implement searching in linked list.
11.	Program to implement sorting in linked list.
12.	Program to implement deletion in linked list.
13.	Program to implement stack using array with both of its operations.
14.	Program to implement queue.
15.	Program to implement insertion sort.
16.	Program to implement heap sort.
17.	Program to implement quick sort.

Note: At least 15 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 100 marks for practical.

Practical:

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

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

MODULE CODE	**COAP5111**
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. Data Modelling concept
2. ER Diagram
3. SQL
4. Relational Database concept

LEARNING OUTCOMES:

At the end of this class, the successful student will:

1. have a broad understanding of database concepts and database management system software
2. have a high-level understanding of major DBMS components and their function
3. be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.
4. be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
5. be able to program a data-intensive application using DBMS APIs.

MODULE CONTENT:

Unit-I: Basic Concepts Data modelling for a database, abstraction and data integration, three level architecture of a DBMS, overview of relational, network, hierarchical data models.
Unit-II: Database Design Entity Relationship model, Extended Entity Relationship model.
Unit-III: Relational Model & Relational Data Manipulations Relation, conversion of ER diagrams to relations, integrity constraints, relational algebra, relational domain & tuple calculus.
Unit-IV: Structured Query Language DDL, DML, Views, Embedded SQL.
Unit-V: Relational Database Design Concepts Functional dependencies, determining keys, normalization :1st, 2nd, 3rd, BCNF, 4th and 5th; lossless join and dependency preserving decomposition
Unit-VI: Advanced Database Concepts Transactions, ACID properties, dealing with deadlocks, security and recovery, concurrency control in databases.

RECOMMENDED BOOKS:

TEXT BOOKS	2. Database System Concepts (5th ed.): A. Silberschatz, H. Korth and S. Sudarshan,McGraw Hill, 2006 3. Fundamentals of Database Systems (4th ed.): R. Elmasri and S. B. Navathe, Addison Wesley, 2006 4. Database Management Systems (3rd ed.): R. Ramakrishnan and J. Gehrke, McGraw Hill,2005
REFERENCEBOOKS	1. Databases and Transaction Processing-An application oriented approach: Philip Lewis, Arthur Berstein and Michael Kifer Addison Wesley, 2002 2. Database Systems"Design, Implementation, and Management (7th ed.): P. Rob and C. Coronel, Thomson Learning, 2006. 3. Database Systems Concepts, Design and Applications: S.K. Singh, Pearson Education 2006.Level Information Technology: Satish 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 for theory.

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

Theory:

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

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.

EXERCISE/CASE STUDIES THAT REQUIRE TABLE DESIGN NORMALIZATION AND QUERY BUILDING

<pre>
                                                                    L   T   P
                                                                    0   0   4
</pre>

MODULE CODE	**COAP5112**
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

The sub-objectives are:

1. To provide a sound introduction to the discipline of database management as a subject in its own right, rather than as a compendium of techniques and product-specific tools.

2. To familiarize the participant with the nuances of database environments towards an information-oriented data-processing oriented framework

3. To give a good formal foundation on the relational model of data

4. To present SQL and procedural interfaces to SQL comprehensively

5. To give an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design

6. To motivate the participants to relate all these to one or more commercial product environments as they relate to the developer tasks

7. To present the concepts and techniques relating to query processing by SQL engines.

LEARNING OUTCOMES

After undergoing this laboratory module, the participant should 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. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS

6. Programming PL/SQL including stored procedures, stored functions, cursors, packages.

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LIST OF EXPERIMENTS

1.	**Queries Based on DDL**
2.	**Queries Based on DML**
3.	**Queries Based on DCL**
4.	**Queries Based on SQL JOINS**
5.	**Queries Based on SQL Functions**
6.	**Queries to Create/Drop a View in SQL.**
Experiments based on advanced topics:	
7.	**PL/SQL Program to find radius of a circle and result get stored into the Database.**
8.	**PL/SQL Program to Create Function & how it can be used in our Program.**
9.	**PL/SQL Program to Create Cursor & how it can be used in our Program.**
10.	**PL/SQL Program to Create Procedure & how it can be used in our Program.**
11	**PL/SQL Program to Create Trigger & how it can be used in our Program.**

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 100 marks for practical.

Practical:

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

OPERATING SYSTEM   **L   T   P**
                                                         3   1   0

MODULE CODE	**COAP5113**
CREDIT POINTS	3.5
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. Process concept

2. File system structure

3. Methods for handling deadlock

4. Disk scheduling

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: Operating System concept OS Structure , Services-System calls , Process management: Process Concept , operations on process , Cooperating processes , Inter-process communication , Process scheduling , Scheduling algorithms , Threads , Multithreading models.
Unit-II: Process synchronization Critical-section problem , Synchronization hardware , Semaphores , Classic problems of synchronization , critical regions , monitoring deadlock , deadlock characterization , methods for handling deadlocks , recovery from deadlock.
Unit-III: Memory management Buddy system , swapping , Paging , segmentation ,Virtual Memory ,demand paging , page replacement algorithms , allocation of frames , thrashing.
Unit-IV: Files and Directories Files System structure, implementation, file allocation methods, free space management.
Unit-V: Device management I/O systems, I/O interface, Kernel I/O subsystem. Disk scheduling algorithms, Disk management.
Unit-VI: Deadlocks System Model, deadlock characterization, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock.

RECOMMENDED BOOKS:

TEXT BOOK	1.Operating System Concepts: Silbersachatz , Galvin Pearson Education, New Delhi
REFERENCE	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	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

Theory:

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

MAPPING OF COURSE LEARNING OUTCOMES

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

OBJECT ORIENTED PROGRAMMING
                                                                            L   T   P
                                                                             4   0   0

MODULE CODE	**COAP5114**
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:

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

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

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

7. To learn the characteristics of an object oriented language: data abstraction and information hiding, inheritance and dynamic binding of the messages to the methods.

8. To learn how inheritance, virtual functions and templates are used.

LEARNING OUTCOMES:

1. To understand how C++ improves C with object-oriented features.
2. To learn how to implement copy constructors and class member functions.
3. To understand the concept of data abstraction and encapsulation.
4. To learn how to overload functions and operators in C++.
5. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
6. To learn how to design and implement generic classes and exception handling with C++.

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MODULE CONTENT:

Unit-I: Programming Paradigms Introduction to OOP , Overview of C++ : Classes , Structures, Union , Friend Functions , Friend Classes , Inline functions , Constructors and their types , Destructors , Dynamic Initialization of Objects, Static Members , Scope Resolution Operator , Passing objects to functions , Function returning objects , Arrays of Objects, Object as Function Arguments.
Unit-II: Arrays Pointers , this pointer , References , Dynamic memory Allocation , functions Overloading , Default arguments , Overloading Constructors , Pointers to Functions , Ambiguity in function overloading , Operator Overloading , Friend Operator Function , Overloading some special operators like [ ] , ( ) , and comma operator , Binary Operators .
Unit-III: Inheritance Types of Inheritance – Single , Multiple , Multilevel , Hierarchical , Hybrid . Issues in Inheritance , Protected members , Virtual base Class , Polymorphism , Virtual functions , Pure virtual functions and their applications.
Unit-IV: Class templates and generic classes Function templates and generic functions , Overloading function templates , power of templates.
Unit-V: Exception Handling Exception and derived classes , function exception declaration , unexpected exception , exception when handling exception .
Unit-VI: Streams Formatted I/O with IOS class functions and manipulators , creating own manipulator, overloading << and >> , File I/O ,Name spaces , conversion functions , Error handling during file operations, Formatted I/O , Objects-String Class , Iteators, Specialized Iteators,

RECOMMENDED BOOKS:

TEXT BOOKS	17. C++ The Complete Reference, 4th Edition, 2003: H. Schildt, Tata McGraw-Hill, New Delhi. 18. C++ Program Design – An Introduction to Programming and Object-oriented Design, 2nd Edition, 1999: J.P. Cohoon and J.W. Davidson, Tata McGraw-Hill, New Delhi. 19. C++ programming Today, 2002: Johnston, PHI, New Delhi.
REFERENCEBOOKS	6. Object Oriented Programming with ANSI & Turbo C++", 2005: N Kanthane,Pearson Education, New Delhi. 7. The C++ Programming Language, 3rd Edition, 2000: Bjarne Stroustrup, Addison Wesley

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	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

Theory:

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

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.

OBJECT ORIENTED PROGRAMMING USING C++   **L T P**
                          0 0 4

MODULE CODE	**COAP5115**
CREDIT POINTS	2
FORMATIVE ASSESMENT MARKS	30
SUMMATIVE ASSESMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

This course aims to familiarize the students 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 learn the characteristics of an object oriented language: data abstraction and information hiding, inheritance and dynamic binding of the messages to the methods.

4. To learn how inheritance, virtual functions and templates are used.

LEARNING OUTCOMES:

1. To understand how C++ improves C with object-oriented features.
2. To learn how to implement copy constructors and class member functions.
3. To understand the concept of data abstraction and encapsulation.
4. To learn how to overload functions and operators in C++.
5. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
6. To learn how to design and implement generic classes and exception handling with C++.

LIST OF EXPERIMENTS

1.	Write a program to print "Hello World"
2.	WAP Find out sum of all digit of a given number. Write a program addition of n even number.
3.	WAP to simple calculator using switch case.
4.	Write a program to Swap the contents of two variable Using call by value and Call by reference.
5.	Write a program to implement function overloading to calculate volume of different shapes using default and constant arguments.
6.	Write a program to overload unary operator ++ and --.
7.	Define Class EMPLOYEE with static member function having name, salary, height.
8.	Write a program to create various types of constructors and destructors for the class. • Use default constructor to get numbers from user and display average. • Use parameterized constructor to display date. • Use copy constructor and print value of object four times. • Use dynamic constructor to calculate interest of amount.
9.	WAP to calculate the average value of the given number using friend function.
10.	Write a program for single level inheritance for class STUDENT to read and display marks of three subjects for each student.
11.	Write a program to create a class STUDENT, SUB, RESULT for multilevel inheritance for student to read marks and display final result.
12.	WAP to create class STUDENT, SUB , SPORTS, RESULT for multiple inheritance for student to read marks of subjects and sports class and display final result for both.
13.	WAP to demonstrate the concept of virtual base class.
17.	WAP to calculate the hexa and octal value of the given no using virtual function.
18.	WAP to Use of I/O stream classes • Use of get() and put() • Use of getline() and write().
19.	WAP to use of manipulators setw(), setfill(), setprecision().
20.	WAP to use of Exception Handling
21.	WAP to use of class template and function template

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	2	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	5		6

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.

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM
                                                                    L   T   P
                                                                    3   1   0

MODULE CODE	**COAP5116**
CREDIT POINTS	3.5
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. Problem solving methods.
2. Knowledge representation techniques.
3. Expert Sysyem.
4. Game playing using AI.

LEARNING OUTCOMES:

1. Understand different types of AI agents.
2. Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms).
3. Understand the fundamentals of knowledge representation.
4. Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information.
5. Basic techniques for automated reasoning, in particular search techniques and production systems.

MODULE CONTENT:

Unit 1: Introduction
Problem formulation, Problem Definition, Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics, Specialized production systems.

Unit-II :Problem Solving methods
Problem graphs, Matching, Indexing and Heuristic functions, Measure of performance and analysis of search algorithms - Game playing.

Unit III: Knowledge representation
Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic.

Unit IV: Structured representation of knowledge
Basic plan generation systems : Strips, Advanced plan generation systems , K strips ,D Comp

Unit-V: Expert system
Expert systems , Architecture , Roles , Knowledge Acquisition , Meta knowledge, Heuristics, Knowledge representation ,Production based system, Frame based system, Inference :Backward chaining, Forward chaining; Rule value approach,

Unit-VI :Fuzzy system
Fuzzy reasoning : factors, Bayesian probability ; Strategic explanations : Why, Why not and how explanations; Learning : Machine learning, adaptive learning ,Typical expert systems.

RECOMMENDED BOOKS:

TEXT BOOKS	20. Artificial Intelligence, 1985: Elaine Rich, McGraw Hill.
REFERENCEBOOKS	1. Principles of Artificial Intelligence, 1992: Nilsson N.J. Narosa.

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	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

Theory:

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

SEMINAR
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0 0 2

MODULE CODE	**COAP5117**
CREDIT POINTS	1
FORMATIVE ASSESMENT MARKS	30
SUMMATIVE ASSESMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

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MASTERS OF COMPUTER APPLICATIONS

SEMESTER - III

MODULE CODE	CATE GORY	SUB CATE GORY	MODULE	L	T	P	C	MARKS		
								INTERN AL	EXTER NAL	TOT AL
COAP6101	MCA	PC	COMPUTER GRAPHICS	4	0	0	4	30	70	100
COAP6102	MCA	PC	EXERCISE IN COMPUTER GRAPHICS USING C	0	0	4	2	30	70	100
COAP6103	MCA	PC	INTERNET AND JAVA PROGRAMMING	4	0	0	4	30	70	100
COAP6104	MCA	PC	PROGRAMMING IN JAVA	0	0	4	2	30	70	100
COAP6105	MCA	PC	SYSTEM PROGRAMMING	4	0	0	4	30	70	100
COAP6106	MCA	PC	EXERCISE TO LEARN VARIOUS COMMANDS IN UNIX & SHELL PROGRAMMING	0	0	4	2	30	70	100
COAP6107	MCA	PC	SOFTWARE ENGINEERING	3	1	0	3.5	30	70	100
		PE	ELECTIVE-I*	3	1	0	3.5	30	70	100
COAP6111	SP	SP	SEMINAR	0	0	2	1	50		50
TOTAL CREDITS				18	2	14	26	TOTAL MARKS		850

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

ELECTIVES

MODULE CODE	ELECTIVE-I*
COAP6208	COMPUTER NETWORK
COAP6209	ADVANCED SYSTEM ADMINISTRATION
COAP6210	SOFT COMPUTING

COMPUTER GRAPHICS
                                                                          L   T   P
                                                                           4   0   0

MODULE CODE	COAP6101
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. Hardware used in computer graphics.
2. Software aspects used in computer graphics.
3. Study of 2 -dimensional and 3- dimensional mathematics.

LEARNING OUTCOMES:

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

1. Have a knowledge and understanding of techniques for representing2D and 3D geometrical objects.
2. Understand the basic principles of implementing copmputer graphics primitives
3. Familiarity with key algorithms for modelling and rendering graphical data.
4. Develop design and problem solving skills with application to computer graphics.

MODULE CONTENT:

Unit 1:Development of computer Graphics: Raster Scan and Random Scan graphics storages; displays processors and character generators; colour display techniques; interactive input/output devices.
Unit 2:Points; lines and curves: Scan conversion; line-drawing algorithms; circle and ellipse generation; conic-section generation; polygon filling anti-aliasing.
Unit 3:Two-dimensional viewing: Co-ordinate systems; linear transformations; line and polygon clipping algorithms.
UNIT4: Fractals: Generation; Classification and Dimension. Some basic fractal images- Koch curve; Spearpinski triangle; Mandelbort and Julia sets Applications.
UNIT5:Three-dimensional concepts: 3-D representations; transformations; perspective and parallel projections; spline curves and surfaces; Quadtree and Octree data structures.
UNIT 6: hidden surface and color models: Hidden Surface and hidden - line removal algorithms; Shading models and colour models for solid objects.

RECOMMENDED BOOKS:

TEXT BOOKS	1. Computer Graphics –C Version: Donald Hearn Pauline Baker Pearson Education;2004. 2.Computer Graphics using OPENGL: F.S. Hill Second edition Pearson Education;
REFERENCEBOOKS	1.ComputerGraphics- Principles and practice: James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes Pearson Education; 2007.

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	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

Theory:

Assessments	1	2	3	4
Class Test	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	3	1,2		3	4	3,4				2,4	

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;
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- 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.

EXERCISE IN COMPUTER GRAPHICS USING C   **L T P**
                                             0 0 4

MODULE CODE	COAP6102
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
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. 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 copmputer graphics primitives.

5. Familiarity with key algorithms for modelling and rendering graphical data.

6. Develop design and problem solving skills with application to computer graphics

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MASTERS OF COMPUTER APPLICATIONS

LIST OF EXPERIMENTS

1.	Write a program to write your name in Hindi and English and scroll it.
1.	Write a program to implement DDA Line drawing Algorithm.
2.	Write a program to implement Bresernham's Line drawing Algorithm.
3.	Write a program to implement Bresernham's Circle drawing Algorithm.
4.	Write a program to implement Mid Point Circle drawing Algorithm.
5.	Write a program to make a Landscape & color it with different filling styles.
6.	Write a program to implement flood fill Algorithm.
7.	Write a program to implement Boundary fill Algorithm.
8.	Write a program to implement 2 D transformations using switch case.
9.	Write a program to show solar system.
Experiments based on advanced topics:	
10.	Write a program to show control the speed of a moving fan.
11.	Write a program to show the player and football movement.

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 100 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	2	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		3			2,5		6	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.

INTERNET AND JAVA PROGRAMMING   **L   T   P**
                                                                 4   0   0

MODULE CODE	COAP6103
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:

- Basic OOP's concepts , java features
- Application programming in java
- Web programming in java using applets.

LEARNING OUTCOMES:

Upon completion of this class, students should be able to:

1. Understand the concept of OOP as well as the purpose and usage principles of inheritance, polymorphism, encapsulation and method overloading.
2. Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
3. Create Java application programs using sound OOP practices (e.g., interfaces and APIs) and proper program structuring (e.g., by using access control identifies, automatic documentation through comments, error exception handling)
4. Use testing and debugging tools to automatically discover errors of Java programs as well as use versioning tools for collaborative programming/editing.
5. Develop programs using the Java Collection API as well as the Java standard class library.

MODULE CONTENT:

UNIT-I: Java Introduction   Object-Oriented Languages, Java's History, Creation of Java, Importance of Java for the Internet, Java's Magic: Byte-code, Its Features, Object-Oriented Programming in Java, Java features :Java Program Structure and Java's Class Library, Data Types, Variables, and Operators, Operator Precedence. Selection Statements, Scope of Variable, Iterative Statement. Defining Classes & Methods, Constructors, Creating Objects of a Class, Assigning Object Reference Variables, and Variable this, Defining and Using a Class, Automatic Garbage Collection. Arrays and Strings- Arrays, Arrays of Characters, String Handling Using String Class, Operations on String Handling Using, String Buffer Class.
UNIT-II: Extending Classes and Inheritance   Using Existing Classes, Class Inheritance, Choosing Base Class, Access Attributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, The Universal Super class-Object Class.
UNIT-III: Packages & Interfaces   Understanding Packages, Defining a Package, Packaging up Your Classes, Adding Classes from a Package to Your Program, Understanding CLASSPATH, Standard Packages, Access Protection in Packages, Concept of Interface, and Exception Handling: The concept of Exceptions, Types of Exceptions, Dealing with Exceptions, Exception Objects, Defining Your Own Exceptions.
UNIT-IV: Multithreading Programming   The Java Thread Model, Understanding Threads, The Main Thread, Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Deadlocks Inter-thread communication, Deadlocks.
UNIT-V: Input/output in Java   I/O Basic, Byte and Character Structures, I/O Classes, Reading Console Input Writing Console Output, Reading and Writing on Files, Random Access Files, Storing and Retrieving Objects from File, Stream Benefits.   Creating Applets in Java- Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, Requesting Repainting, Using The Status Window, The HTML APPLET Tag Passing Parameters to Applets.
UNIT-VI: Working with Windows   AWT Classes, Window Fundamentals, Working with Frame, Creating a Frame Window in an Applet, Displaying Information Within a Window.   Working with Graphics and Texts- Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts, Managing Text Output Using Font Metrics, Exploring Text and Graphics. Working with AWT Controls, Layout Managers and Menus.

RECOMMENDED BOOKS:

TEXT BOOKS	1. "The Complete Reference JAVA", Herbert Shiled TMH Publication 2. "Beginning JAVA" , Ivor Horton WROX Publication 3. "Programming with java : A primer " ,E.Balaguruswamy TMH publications
REFERENCEBOOKS	1. "JAVA 2 UNLEASHED", Tech Media Publications. 2. "JAVA 2(1.3) API Documentations". 3. "Head First Java",Kathy Sierra (Author) , publication Oreilly

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	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

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	3	1,2		3	4,5	3,4				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.

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

MODULE CODE	COAP6104
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES:

1. Programming in the Java programming language.

2. knowledge of object-oriented paradigm in the Java programming language

3. The use of Java in a variety of technologies and on different platforms.

LEARNING OUTCOMES:

1. knowledge of the structure and model of the Java programming language, (knowledge)

2. Use the Java programming language for various programming technologies (understanding)

3. Develop software in the Java programming language, (application)

4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)

5. Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem (synthesis)

6. Choose an engineering approach to solving problems, starting from the acquired knowledge of programming and knowledge of operating systems. (Evaluation)

PDM UNIVERSITY
MASTERS OF COMPUTER APPLICATIONS

LIST OF EXPERIMENTS

1.	WAP in java to accepts two numbers (int) as command line arguments and print their sum.
2.	WAP in java to accepts two numbers (int) with the help of JOptionPane class and display their sum.
3.	WAP in java to find the sum of the digits of a number.
4.	WAP in java to convert an int value into its Hexadecimal and binary equivalent.
5.	Write a non-static function in java that prints the sum of two numbers.
6.	Write a static function in java to find the sum of two numbers
7.	WAP in java to print the factorial of a number using recursion
8.	WAP in java in which a class inherits two interfaces
9.	WAP in java that keeps track of all the objects created from a particular class and prints the no of objects created, whenever an object is created
10.	WAP in java to handle Arithmetic Exception.
11.	WAP in java to swap two integers with out using third variable. The swapping must be done in a different method in a different class

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 100 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	2	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	3,4		1,3		4		5,6	

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.

SYSTEM PROGRAMMING
L T P
4 0 0

MODULE CODE	COAP6105
CREDIT POINTS	3.5
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. **B**asics of Compilers
2. 8086 Microprocessor
3. assembler
4. loaders and linkers

LEARNING OUTCOMES:

Following this course students will be able to:

1. Discuss IT-oriented security issues and protocols.
2. Demonstrate appropriate social skills and personal responsibility.
3. Communicate effectively with a range of audiences.
4. Analyse the local and global impact of computing on individual's organizations and society.
5. Demonstrate strong programming skills which may include writing debugging or testing computer programs.

MODULE CONTENT:

Unit I: Evolution of the components of systems programming Assemblers; Loaders; Linkers; Macros; Compilers.
Unit II: Software Tools Variety of software tools, Text editors, Interpreters and program generators, Debug Monitor, Programming environment.
Unit III: Loader Loader schemes, compile and go loader, general loader schemes, absolute loader, Subroutine linkage, Reallocating loader, Direct Linkage Loader, Binders, Linking loader, overlays.
Unit IV: Assembly language programming Introduction to 8086. Architecture of 8086 microprocessor, Data representation, Instruction formats, addressing techniques, Flow control, Segments – Data Segment, Code Segment, Stack Segment, Procedures, Input/ Output, Interrupts and Program development in 8086. Basic programming in Assembly.
Unit V: Assembler Macro processor, macros, calls, parameters, expansion, design of two-pass assembler.
Unit VI: Loaders and linkers Loading schemes, design of absolute and direct linking loaders.

RECOMMENDED BOOKS

TEXT BOOK	1. Microcomputer Systems: The 8086-8088 Family, Architecture, Programming, and Design**:** Yu-Cheng Gibson, Glenn A and Liu, Prentice Hall Inc., NJ 2. The Intel Microprocessors: 8086/8088, 80186, 80286, 80386, 80486, Pentium, Pentium Pro, and Pentium II, Pentium III, Pentium 4: Barry B Brey Prentice Hall, New Delhi
REFERENCE BOOK	1. IBM PC Assembly Language and Programming: Peter Abel Pearson Education 2. Linkers and Loaders- The Morgan Kaufmann Series in Software Engineering and Programming: J R Levine 3. System Software**:** S Chattopadhyay Prentice-Hall of 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.

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
Quiz		x		x	
Assignment			x		x

MAPPING OF COURSE LEARNING OUTCOMES

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

EXERCISE TO LEARN VARIOUS COMMANDS IN UNIX & SHELL PROGRAMMING

L T P
0   0   4

MODULE CODE	COAP6106
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

1. To familiarize students with the Linux environment
2. To learn the fundamentals of shell scripting/programming
3. To familiarize students with basic linux administration

LEARNING OUTCOMES

Following this course, students will be able to:

1. Work confidently in Unix/Linux environment
2. Write shell scripts to automate various tasks
3. Master the basics of linux administration

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LIST OF EXPERIMENTS

1.	Write a command in unix Basic shell programs
2.	Write a command in unix Fibonacci Series
3.	Write a command in unix Designing Calculator
4.	Write a command in unix File Operations
5.	Write a command in unix Base conversion
6.	Write a command in unix Usage of cut and grep commands
7.	Write a command in unix Usage of user defined functions
8.	Write a command in unix Managing User Accounts
9.	Write a command in unix User Quota Management
10.	Write a command in unix Installation of RPM software and Zipping,tar
Experiments based on advanced topics:	
11.	Write a command in unix Configuring RAID
12.	Write a command in unix Configuring Web server

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 100 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	2	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					

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**
                                                                   3   1   0

MODULE CODE	COAP6107
CREDIT POINTS	3.5
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 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: Software Engineering The software crisis; principles of software engineering; programming in- the-small vs. programming-in-the-large.
Unit II: Software process The software lifecycle; the waterfall model and variations; risk-driven approaches; introduction to evolutionary and prototyping approaches; agile process models; system classifications.
Unit III: Project management Relationship to lifecycle; project planning; project control; project organization; risk management; cost models; configuration management; version control; quality assurance; metrics.
Unit IV: Software requirements Requirements analysis; functional and non-functional requirements elicitation; analysis tools; requirements definition; requirements specification; static and dynamic specifications; requirements review.
UNIT-V : Software design Design for reuse; design for change; design notations; design evaluation and validation.
Unit VI: Implementation and Maintenance Programming standards and procedures; modularity; data abstraction; static analysis; unit testing; integration testing; regression testing; verification and validation; tools for testing; fault tolerance; The maintenance problem; the nature of maintenance; planning for maintenance.

RECOMMENDED BOOKS:

TEXT BOOKS	1. "Software Engineering: A Practitioner's Approach (6th ed.)"; R.S. Pressman; ; McGraw-Hill; 2006. 2. "Software Engineering (revised 2nd ed.)"; K.K. Aggarwal and Y. Singh; ; New Age International Publishers; 2006.
REFERENCEBOOKS	**1**. "An Integrated Approach to Software Engineering (3rd ed.)" P. Jalote; Narosa Publishing House; 2005. 2. "Software Engineering (6th ed.)"; I. Sommerville; Pearson Education; 2004. 3. "Software Engineering for Students (4th ed.)"; Douglas BellAddison-Wesley; 2005.

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	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

Theory:

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

COMPUTER NETWORK   **L T P**

                                                                                3 1 0

MODULE CODE	COAP6208
CREDIT POINTS	3.5
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. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

LEARNING OUTCOMES:

Following this course students will be able to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network

MODULE CONTENT:

Unit 1: Data Communication: Theoretical basis of data communication; analog and digital signals; asynchronous and synchronous transmission; data encoding and modulation, techniques, broadband and baseband transmission; pulse code modulation, bandwidth, channel, baud rate of transmission; multiplexing; transmission medium; transmission errors - error handling mechanisms.
Unit 2: Network Classification and Data Communication Services: Local Area Networks, Wide Area Network, wireless network, internetworking;
Unit 3 : Network Reference Models: Layered architectures, protocol hierarchies, interface and services: ISO-OSI reference model, TCP/IP reference model; internet protocol stacks.
Unit 4: Datalink Layer Functions and Protocols: Framing, error-control, flow control ; sliding window protocol; HDLC; Data link layer of internet.
Unit 5: Medium Access Sublayer: CSMA/CD protocol, switched and fast Ethernet, IEEE standards for LAN.
Unit 6 : Network functions and protocols: Switching mechanism: Circuit switching, message switching, packet switching, routing and congestion control, TCP/IP protocol architecture, Network Applications- File transfer protocol, electronic mail, World Wide Web.

RECOMMENDED BOOKS

TEXT BOOK	1. "Computer Networks (4th ed.)", A.S. Tanenbaum Prentice-Hall of India, 2003 2. "Data Communications and Networking" Behrouz Forouzan and S.C. Fegan, , McGraw Hill, 2006 1.
REFERENCE BOOK	1. "Introduction to Data Communications and Networking" W. Tomasi, , Pearson Education, 2007. 2. "Digital Communications"S. Haykin, , John Wiley & Sons, Inc., 2005 3. "Computer Networks: A Systems Approach (3rd ed.)" L. L. Peterson and B. S. Davie, ,Morgan Kaufmann, 2003 4. "Data and Computer Communications (8th ed.)" , William Stallings, Pearson Education.

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			
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	3,5			2,4		

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.

ADVANCED SYSTEM ADMINISTRATION   **L   T   P**
                                                      3   1   0

MODULE CODE	COAP6209
CREDIT POINTS	3.5
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. The concepts related to system administration and its advanced features are introduced in this subject.
2. This creates strong foundation for operating systems.
3. Students install the operating system, maintain user accounts, manage file systems and processes, install and configure software and hardware, and perform routine system maintenance and backup functions.
4. Students learn accepted practices and responsibilities of system administrators.
5. Students will learn various commands of UNIX operating systems.

LEARNING OUTCOMES:

By the end of this module, students should be able to:

1. Explain the role of a system administrator and its privileges
2. Install and configure various kinds of operating systems and different software and hardware
3. Critically evaluate alternative designs and architectures for databases and data warehouses
4. Take backup and recover the system in case of failure
5. Explain and run various UNIX system administration commands
6. Write a shell program in UNIX

MODULE CONTENT:

Unit-I: Introduction to System Administration The Goals of System Administration, Role of a System Administrator, Operating Systems Installation Procedure(Windows, Linux, Unix), File Systems and Standards (UFS, NFS, NTFS), Processes and Job Control, Privileged, User and Group Accounts, Systems Performance Tuning. *Host Management:* Booting and Shutting down of an Operating System, Formatting, Partitioning and Building a File System, File System Layout, Super user/Administrator Privileges.
Unit-II: Process Management Process Management and Monitoring, Scheduling Processes, Killing/Stopping processes, Restarting a Process, Monitoring Process Activity, Maintaining Log Files, File System Repair, Backup and Restoration, System Sharing, User IDs, Passwords and Authentication.
Unit-III: Theoretical Concept of Unix Operating System Basic features of operating system; File structure: CPU scheduling; Memory management: swapping, demand paging; file system: block and fragments, i-nodes, directory structure.
Unit-IV: Getting Started with Unix User names and groups, logging in; Format of Unix commands; Changing your password; Characters with special meaning; Files and directories; Current directory, looking at the directory contents, absolute and relative pathnames; Looking at the file contents; File permissions; basic operation on files; changing permission modes; Standard files, filters and pipelines; Processes; finding out about processes; Stopping background process; Unix editor vi.
Unit-V: Test Manipulation Searching for patterns; Comparing files; Operating on files; Printing files; Rearranging files; Sorting files; Splitting files; Translating characters; AWK utility.
Unit-VI: Shell Programming Introduction to Unix shells, Wild cards; Simple shell programs; Shell variables; Shell programming constructs; interactive shell scripts; Advanced features.

RECOMMENDED BOOKS:

TEXT BOOKS	1. C. J. Date, "Introduction to Database Systems", AWL. 2. J. L. Warrington , "Object Oriented Database Design", Morgan Kaufman. 3. T. J. Tewrey, "Database Modeling and Design", Morgan Kaufman.
REFERENCEBOOKS	1. A. Silberschatz, H. Korth and S. Sudarshan,"Database System Concepts (5th ed.)", McGraw Hill, 2006 2. R. Elmasri and S. B. Navathe, "Fundamentals of Database Systems (4th ed.)", Addison Wesley, 2006 3. R. Ramakrishnan and J. Gehrke, "Database Management Systems (3rd ed.)", McGraw Hill,2005

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 Marks
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

Theory:

Assessments	1	2	3	4	5	6
Class Test	x	x	x	x	x	x
Quiz	x		x	x	x	
Assignment	x	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			1,3		2		4,6		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;
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- 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.

SOFT COMPUTING   **L   T   P**
                                                                                                          3   1   0

MODULE CODE	COAP6210
CREDIT POINTS	3.5
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. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
2. Basic neural networks, fuzzy systems, and optimization algorithms concepts and their relations.
3. Acquire a working knowledge of various software tools to solve real life problems using a Soft Computing approach that will help them in industry oriented learning.

LEARNING OUTCOMES:

Following this course, students will be able to:

1. To know about the basics of soft computing techniques and also their use in some real life situations.
2. To solve the problems using neural networks techniques.
3. To find the solution using different fuzzy logic techniques.
4. To use the genetic algorithms for different modelling.
5. To integrate the various soft computing techniques.

MODULE CONTENT:

UNIT-I: Introduction   Introduction: Introduction to soft computing; introduction to biological and artificial neural network; introduction to fuzzy sets and fuzzy logic systems.
UNIT-II: Introduction to Genetic Algorithm   Genetic Operators and Parameters, Genetic Algorithms in Problem Solving, Theoretical Foundations of Genetic Algorithms, Implementation Issues.
UNIT-III: Fuzzy systems and applications   fuzzy sets; fuzzy reasoning; fuzzy inference systems; fuzzy control; fuzzy clustering; applications of fuzzy systems.
UNIT-IV: Neuro-fuzzy systems   neuro-fuzzy modeling, neuro-fuzzy control.
UNIT-V: Artificial neural networks and applications   Different artificial neural network models; learning in artificial neural networks; neural network applications in control systems. Neural Nets and applications of Neural Network.
UNIT-VI: Applications   Pattern Recognitions, Image Processing, Biological Sequence Alignment and Drug Design, Robotics and Sensors, Information Retrieval Systems, Share Market Analysis, Natural Language Processing.

RECOMMENDED BOOKS:

TEXT BOOK	1. M. Mitchell: An Introduction to Genetic Algorithms, Prentice-Hall. 2. J.S.R.Jang, C.T.Sun and E.Mizutani: Neuro-Fuzzy and Soft Computing, PHI, Pearson Education. 3. Timothy J.Ross: Fuzzy Logic with Engineering Applications, McGraw-Hill
REFERENCE	1.Davis E.Goldberg: Genetic Algorithms: Search, Optimization and Machine Learning, Addison Wesley. 2. S. Rajasekaran and G.A.V.Pai: Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI. 3. D. E. Goldberg: Genetic Algorithms in Search, Optimization, and Machine Learning, Addison-Wesley. 4. Z. Michalewicz: Genetic Algorithms+ Data Structures = Evolution Programs, SpringerVerlag. 5. N.K. Sinha & M. M. Gupta(Eds): Soft Computing & Intelligent Systems: Theory & Applications, Academic Press. 6. M.T. Hagan, H. B. Demuth, And M. Beale: Neural Network Design, Thompson Learning. 7. C. Lau (Ed): Neural Networks, IEEE Press.

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	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

Theory:

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

MAPPING OF COURSE LEARNING OUTCOMES

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

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SEMINAR

L T P
0   0   2

MODULE CODE	COAP6210
CREDIT POINTS	1
FORMATIVE ASSESMENT MARKS	50
SUMMATIVE ASSESMENT MARKS	-
END SEMESTER EXAM DURATION	
LAST REVISION DATE	

MCA SEMESTER - IV

MODULE CODE	CATEGORY	SUB CATEGORY	MODULE	L	T	P	C	MARKS		
								INTERNAL	EXTERNAL	TOTAL
COAP6112	MCA	PC	ASP.NET USING C#	4	0	0	4	30	70	100
COAP6113	MCA	PC	BUILDING SMALL APPLICATION USING DOT NET	0	0	4	2	30	70	100
COAP6114	MCA	PC	ADVANCE JAVA	4	0	0	4	30	70	100
COAP6115	MCA	PC	LEARNING PROGRAMMING IN ADVANCE JAVA	0	0	4	2	30	70	100
COAP6116	MCA	PC	SOFTWARE TESTING AND QUALITY ANALYSIS	4	0	0	4	30	70	100
COAP6117	MCA	PC	PHP PROGRAMMING	4	0	0	4	30	70	100
COAP6118	MCA	PC	DEVELOPING APPLICATIONS USING PHP	0	0	4	2	30	70	100
	MCA	PE	ELECTIVE-II	3	1	0	3.5	30	70	100
	MCA	GE	ELECTIVE-A*	3	1	0	3.5	30	70	100
COAP6122	SP	SP	SEMINAR	0	0	2	1	50		50
TOTAL CREDITS				22	2	14	30	TOTAL MARKS		950

ELECTIVES

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

MODULE CODE	PROGRAM ELECTIVE-II
COAP6219	OBJECT ORIENTED ANALYSIS AND DESIGN
COAP6220	SATELLITE AND MOBILE COMM. NETWORK
COAP6221	CLOUD COMPUTING
MODULE CODE	**GENERIC ELECTIVE-A***
SAPA0320	SAP (ABAP) ψ
SAPM0321	SAP (MM) ψ
SAPS0322	SAP (SD) ψ
SAPF0323	SAP (FI) ψ
SAPH0324	SAP (HR) ψ
CCNA0325	CCNA ψ

ψAdditional fee, if any, shall be borne by the student.

ASP.NET USING C#   **L   T   P**
                                                                         4   0   0

MODULE CODE	COAP6112
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, C#, SQL Server and ADO.NET.
3. Create web-based distributed applications using C#, AP.NET, SQL Server and ADO.NET.

MODULE CONTENT:

Unit I: Basic of the .net framework   .net architecture; managed code; assemblies; CLR; execution of assemblies code; IL; JIT; .NET framework class library; common type system; common language specification; interoperability with unmanaged code.
Unit II: Introduction to VB.Net   VB.Net: Net features; Data Types.
Unit III: C#   Data Types; Operators; Garbage Collection; Jagged Array; Collection (Array list; Hash table); Indexer(One Dimension) and property; Delegates and events (Multicasting; Multicasting Event); Exception Handling.
Unit III: ADO.Net & Object Oriented Concepts (Using VB.Net or C#)   Basic window control; Architecture of ADO.Net; Comparison with ADO; .Net Data provider; Data Adapter; Data Set; Data Row; Data Column;Data Relation; command; Data Reader; Data Grid Constructor; Destructor; Abstraction; interface ;polymorphism (Over loading and over ridding)
Unit V: ASP.Net   Anatomy of ASP.NET Page; Server Controls: label; dropdown list box; validation controls; list box; text box; radio button; check box.
UNIT-VI: State Management   State Management: session; caching; Authentication (window; .Net Passport; Forms Based); Authorization; web services; Advance Grid Manipulation.

RECOMMENDED BOOKS:

TEXT BOOKS	1. "Applied .Net Framework Prog. In MS VB.Net"; Jeffrey Richter; Francesco Balena; TMH Publication. 2. "Complete Reference C#"; Herbert SchildtTMH Publication. 3. Programming in C# By E. Balaguruswamy, Tata McGraw Hill.
REFERENCEBOOKS	1. Michael Halvorsan;"Microsoft Visual Basic.NET step by step"; PHI Publication. 2. G.Andew Duthie;"Microsoft ASP.Net With C#.Net step by step"; PHI Publication.

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support and text book / course material reading. 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	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

Theory:

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

MAPPING OF COURSE LEARNING OUTCOMES

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

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
MASTERS OF COMPUTER APPLICATIONS

BUILDING SMALL APPLICATION USING DOT NET   **L T P**
                                                                 0   0 4

MODULE CODE	COAP6113
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	30
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES
1. Set up a programming environment for ASP.net programs.
2. Configure an asp.net application.
3. Creating ASP.Net applications using standard .net controls.
4. Develop a data driven web application.
5. Connecting to data sources and managing them.
6. Maintain session and controls related information for user used in multi-user web applications
7. Understand the fundamentals of developing modular application by using object oriented methodologies

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 ASP.NET

2. Successful students will be able to use ASP.NET controls in web applications.

3. Successful students will be able to debug and deploy ASP.NET web applications

4. Successful students will be able to create database driven ASP.NET web applications and web services

LIST OF EXPERIMENTS

1.	Write a program to implement the concept of inheritance.
2.	To create connectivity in C# and asp.net.
3.	Write a program to manipulate the string.
4.	To use the concept of command line argument.
5.	Write a program to implement the concept of that number is palindrome or not.
6.	Write a program to implement the concept of number is factorial.
7.	Write a program to implement the concept of jagged array.
8.	Write a program to implement the concept of array list.
9.	To create the user id and password login.
10.	To implement the concept of delegates.
11.	Write a program to implement the concept of inheritance.
12.	To create connectivity in C# and asp.net.
13.	Write a program to manipulate the string.
14.	To use the concept of command line argument.
15.	Write a program to implement the concept of that number is palindrome or not.
Experiments based on advanced topics:	
16.	To implement all the above concept: 1. Develop a Minor Project for Hotel Management System
17.	To implement all the above concept: 1. Develop a Minor Project for Library Management System

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 100 marks for practical.

Practical:

Assessment #	Type Of Assessment	Per Semester	Maximum Mark
1	Internal Assessment	2	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	2,3				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.

ADVANCE JAVA

L   T   P
4   0   0

MODULE CODE	COAP6114
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. Familiar with advance technology
2. Learning Web site design using jsp

LEARNING OUTCOMES:

At the end of the course the participant 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

MODULE CONTENT:

UNIT-I: Introduction   Introduction to Java Scripts; Objects in Java Script; Dynamic HTML with Java Script. XML: Document type definition; XML Schemas; Document Object model; Review of Applets; Class; Event Handling; AWT Programming
UNIT-II: 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: Java Beans   Introduction to Java Beans; Advantages of Java Beans; BDK Introspection; Using Bound properties; Bean Info Interface; Java Beans API
UNIT-IV: 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-V: JSP Application Development   Generating Dynamic Content; Using Scripting Elements Implicit JSP Objects; Conditional Processing – Displaying Values Using an Expression to Set an Attribute; Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages; Requests; and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage
UNIT-VI: Consideration Database Access   Database Programming using JDBC Studying Javax.sql.* package Accessing a Database from a JSP Page Application.

RECOMMENDED BOOKS:

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

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support and text book / course material reading. 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

Theory:

Assessments	1	2	3	4	5
Class Test	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	3	1		3	4,5	3,4		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
MASTERS OF COMPUTER APPLICATIONS

LEARNING PROGRAMMING IN ADVANCE JAVA   **L   T   P**
                                            0   0   4

MODULE CODE	COAP6115
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	70
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. Familiar with advance technology
2. Learning Web site design using jsp

LEARNING OUTCOMES:

At the end of the course the participant 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			

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 TESTING & QUALITY ASSURANCE   **L   T   P**
                                                                            3   1   0

MODULE CODE	COAP6116
CREDIT POINTS	3.5
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. Employ correct testing terminology throughout the testing process.

2. Execute specific software tests with well-defined objectives and targets.

3. Apply various testing techniques, including domain, code, fault, usage and model-based.

4. Execute program and test evaluations.

5. Perform a complete testing process, taking into account practical considerations.

LEARNING OUTCOMES:

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

1. Designing of Test Cases; use of various test tools

2. Various test processes and continuous quality improvement.

3. Types of errors and fault models.

4. Methods of test generation from requirements.

5. Application of software testing techniques in commercial environments.

MODULE CONTENT:

Unit I :Software Testing and the related concepts
Introduction, Verification and Validation, Software Testing And Its Relation With Software Lifecycle, Significance and Potential of Software Testing, Principles of Software Testing , Software Testability And Its Characteristics, Stages in Software Testing Process, Types of Software Testing, Black-box Testing (BBT), BBT Techniques, White-box Testing (WBT), WBT Techniques

Unit II: Software Testing Strategies
Introduction, Static Analysis, Dynamic Analysis, Software Test Design, Software Testing Strategies, Defect Testing, Interface Testing, Alpha and Beta Testing, Object Oriented Testing Methods, Real-Time Systems Testing, Automated Software Testing Tools, Debugging
 Debugging Techniques

Unit III: Comparative evaluation of techniques
Introduction, Software Quality Definition, Software Quality Factors, Factors Affecting Software Quality, Software Quality Assurance (Sqa), SQA Objectives, SQA Goals, SQa Activities, SQA Plan, Software Reviews, Formal Technical Reviews (FTRs), Code Reviews And Walkthroughs, Metrics For Rating The Software Quality Factors, Software Quality Metrics, Technical Metrics For Software

Unit IV: Technical Metrics for Software
Introduction, Software Quality System and Quality Management Principles, International Standards And Their Importance, Overview of ISO Standards, ISO 9000 Quality Standard , Elements of the ISO 9000 Standard, Applicability of ISO 9000 Standard, Implementation Success Factors of ISO 9000, ISO 9000 Quality System Certification, SEI Capability Maturity Models, CMM Evaluation Assessment, CMM Vs ISO

Unit V: Object Oriented Testing
OOT strategies and issues; Test Case design; interface testing.
Software Quality Assurance: concept; importance and essence; FTR; structured walk through technique etc.

Unit VI: SW Reliability
Introduction, Software Reliability Definitions, Software Reliability Vs Hardware Reliability, Factors Influencing Software Reliability, Basic Concepts of Faults, Failures, Time and Failure Functions, Software Failure Classification, Characteristics of Fault-Free Software, Dependable Systems, Benefits of Software Reliability, Limitations of Software Reliability , Hazard Definitions, Concept of Software Safety, Significance of Software Safety, Safety Critical System, Hazard Analysis, Software Hazard Analysis, Hazard Analysis Techniques

RECOMMENDED BOOKS:

TEXT BOOKS	1. "Software Engineering: A Practitioner's Approach (6th ed.)"; R.S. Pressman; McGraw-Hill; 2006. 2. "Software Engineering (revised 2nd ed.)"; K.K. Aggarwal and Y. Singh; New Age International Publishers; 2006.
REFERENCEBOOKS	1. "An Integrated Approach to Software Engineering (3rd ed.)" P. Jalote; Narosa Publishing House; 2005. 2. "Software Engineering (6th ed.)"; I. Sommerville; Pearson Education; 2004. 3. "Software Engineering for Students (4th ed.)"; Douglas BellAddison-Wesley; 2005.

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	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

Theory:

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

MAPPING OF COURSE LEARNING OUTCOMES

Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Learning Outcomes				1		3		2,4		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;
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PDM UNIVERSITY
MASTERS OF COMPUTER APPLICATIONS

PHP PROGRAMMING   **L   T   P**
                                                                      4   0   0

MODULE CODE	COAP6117
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:

LEARNING OUTCOMES:

PDM UNIVERSITY
MASTERS OF COMPUTER APPLICATIONS

MODULE CONTENT:

Unit I: Dynamic Content and the Web:HTTP and the Internet, PHP and MySQL's Place in Web Development , The Components of a PHP Application , Integrating Many Sources of Information , Requesting Data from a Web Page.   Installation: Developing Locally, Working Remotely   Exploring PHP: PHP and HTML Text, Coding Building Blocks
Unit II: PHP Decision-Making: Expressions, Operator Concepts, Conditionals, Looping.   Functions: Calling Functions, Defining Functions, Object-Oriented Programming   Arrays: Array Fundamentals
Unit III: Working with MySQL: MySQL Database, Managing the Database, Using phpMyAdmin, Database Concepts, Structured Query Language
Unit IV: Database Best Practices: Database Design, Backing Up and Restoring Data, Advanced SQL.
Unit V: Getting PHP to Talk to MySQL: The Process, Querying the Database with PHP Functions, Using PEAR   Working with Forms: Building a Form, Templates.
UNIT-VI: Practical PHP: String Functions, Date and Time Functions, File Manipulation, Calling System Calls.   Validation and Error Handling: Validating User Input with JavaScript, Pattern Matching, Redisplaying a Form After PHP Validation Fails

RECOMMENDED BOOKS:

TEXT BOOKS	1. Learning PHP, MySQL, books by ' O' riley Press
REFERENCEBOOKS	

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support and text book / course material reading. 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	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

Theory:

Assessments	1	2	3
Class Test			
Quiz			
Assignment			

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, 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:

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- 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.

DEVELOPING APPLICATIONS USING PHP

L T P
0   0   4

MODULE CODE	COAP6118
CREDIT POINTS	2
FORMATIVE ASSESSMENT MARKS	30
SUMMATIVE ASSESSMENT MARKS	30
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	

OBJECTIVES

LEARNING OUTCOMES

PDM UNIVERSITY
MASTERS OF COMPUTER APPLICATIONS

LIST OF EXPERIMENTS

1.	Write a PHP program to print sum of digits.
2.	Write a PHP program to check even and odd.
3.	Write a PHP program to check prime number.
4.	Write a PHP program to print table of a number.
5.	Write a PHP program to print factorial of a number.
6.	Write a PHP program to check armstrong number.
7.	Write a PHP program to check palindrome number.
8.	Write a PHP program to print fibonacci series without using recursion and using recursion.
9.	Write a PHP program to reverse given number.
10.	Write a PHP program to reverse given string.
11.	Write a PHP program to swap two numbers with and without using third variable.
12.	Write a PHP program to find area of triangle.
13.	Write a PHP program to find if the given year is leap year or not.

14.	Write a PHP program to print alphabet triangle.
	`       A`
	`      ABA`
	`     ABCBA`
	`    ABCDCBA`
	`   ABCDEDCBA`

15.	Write a PHP programs to print star triangle.
	`* * * * *`
	`* * * *`
	`* * *`
	`* *`
	`*`

Experiments based on advanced topics:	
16.	DEVELOPING APPLICATIONS USING PHP

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	2	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	2,3				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.

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MASTERS OF COMPUTER APPLICATIONS

OBJECT ORIENTED ANALYSIS AND DESIGN　　　　　　　　**L　T　P**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　1　0

MODULE CODE	**COAP6219**
CREDIT POINTS	3.5
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. Familiar with modeling technique
2. Familiar with query languages in OOPS Databases
3. To learn the concept of Object Oriented Software Development Process
4. To understand Object Oriented Analysis Processes

LEARNING OUTCOMES:

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

1. Understand Object Oriented Software Development Process.
2. Gain exposure to Object Oriented Methodologies & UML Diagrams.
3. To apply Object Oriented Analysis Processes for projects
4. Ability to analyze and model software specifications.
5. Ability to abstract object-based views for generic software systems.

MODULE CONTENT:

Unit 1: Object Model :   Evolution; Elements – Nature of Classes and Objects – Relationships among Classes - Classification – Identification of classes and objects – Key abstractions and mechanisms – Basic and Advanced Modeling techniques.
Unit 2: Methodology :   Modeling and UML – Rambaugh's Method – Booch Metthod – Jacobson et al Method – Comparions – UML – Static-Dyanmic Models – Diagrams –Use Cases.
Unit 3: OO Design Process and Design Axioms :   Designing Classes – Object Storage – Interoperability – View Layer Interface ;
Unit 4: Process of design: Design principles; architectural patterns; design document; difficulties and risks in design - Frameworks: reusable subsystem. Design patterns – Singleton; observer; adapter; Façade; proxy with examples.
Unit 5: Pattern Categories: Relationships between patterns - Pattern descriptions – Patterns based Applications – Object Oriented Testing.
Unit 6: Object Oriented Database :   Relational Database Design – Mapping Object Models to tables - OODB Features - OO Data Model; Complex Object; Persistence; Transaction; Concurrency Control; OODB Architecture; Query Language for OO Relational Databases; Gemstone / O2 / Orion

RECOMMENDED BOOKS:

TEXT BOOKS	1. "Object-Oriented Modeling and Design with UML"; Michael Blaha and James Rumbaugh; 2nd Edition; 2005; Pearson Education.
REFERENCEBOOKS	1. "Object-Oriented Analysis and Design with Applications"; Grady Booch et al; 3rd Edition; Pearson; 2007.rd Edition; Addison-Wesley; 1997.

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	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

Theory:

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

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.

SATELLITE AND MOBILE COMM. NETWORK   **L   T   P**
                                                3   1   0

MODULE CODE	**COAP6220**
CREDIT POINTS	3.5
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. Familiar with advance technology

2. Basic data communication using satellite.

LEARNING OUTCOMES:

Upon completion of this module, students will be able to:

1. Explain radio-wave propagation and interference in mobile communications
2. To carry out cellular system design and planning
3. Describe the orbital aspects and components of a satellite and communication.
4. Analysing the link budget of a satellite communication system

MODULE CONTENT:

Unit-I: Satellite Communication and Networks Geosynchronous satellite; low orbit satellite networks; polling; ALOHA; FDMA TDMA; CDMA; low orbit satellite for mobile communication; VSAT networks.
Unit-II: Introducing the Mobile Internet The Mobile Internet is here; The Rise of Mobile data. Key Services for the mobile Internet; Business opportunities
Unit-III: WAP The Mobile Internet Standard: Making the Internet Mobile: Challenges and Pitfalls; Overview of the Wireless Application Protocol
Unit-IV: Implementing WAP Services The Wireless Markup Language; Enhanced WML: WML Script and WTAI; User Interface Design: Marking Wireless Applications Easy to Use.
Unit-V: Advanced WAP: Tailoring Content to the Client; Push Messaging; Wireless Telephony ; Applications; Building and Deploying End-to-End WAP Services.
Unit-VI Where Next: The Mobile Internet Future

RECOMMENDED BOOKS:

TEXT BOOKS	1. C.N. Thurwachter;"Wireless Networking"; Prentice-Hall of India; 2002 2. A.S. Tanenbaum;"Computer Networks (4th ed.)"; Prentice-Hall of India; 2003
REFERENCEBOOKS	1. M. Richharia;"Mobile Satellite Communications: Principles & Trends"; Pearson Education; 2001 2. Jochen Schiller;"Mobile Communications"; Pearson Education; 2000.

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 Marks
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

Theory:

Assessments	1	2	3	4
Class Test	x	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			1,3		2		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.

CLOUD COMPUTING   **L T P**
                                                                             3 1 0

MODULE CODE	**COAP6221**
CREDIT POINTS	3.5
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:

1. To introduce the broad perceptive of cloud architecture and model
2. To understand the concept of Virtualization and design of cloud Service.
3. To be familiar with the lead players in cloud.
4. To understand the features of cloud simulator.
5. To apply different cloud programming model as per need.
6. To learn to design the trusted cloud Computing system.

LEARNING OUTCOMES:

After successfully completing the couse, you should be able to

1. Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing
2. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
3. Explain the core issues of cloud computing such as security, privacy, and interoperability.
4. Choose the appropriate technologies, algorithms, and approaches for the related issues.
5. Identify problems, and explain, analyze, and evaluate various cloud computing solutions.

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MODULE CONTENT:

UNIT-I:Cloud Computing Introduction   Historical development, Cloud Computing definition, Vision of Cloud Computing, private, public and hybrid cloud, Characteristics of cloud computing as per NIST, Private, public and hybrid cloud.Cloud types, – Cloud Services – Cloud models (IaaS, PaaS, SaaS) ,Cloud Architecture, next generation Cloud Applications.
UNIT-II Cloud Services   Cloud Services Management: Reliability, availability and security of services deployed from the cloud. Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages
UNIT-III: Application Development   Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App
UNIT-IV: Programming Model   Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim
UNIT-V: Security in the Cloud   Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security

RECOMMENDED BOOKS:

TEXT BOOKS	1.Distributed and Cloud Computing, 1st edition, Morgan Kaufmann, 2011. 2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN: 978-0521137355].
REFERENCEBOOKS	1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012. 2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010. 3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009. 4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011. 5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly

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	05
2.	Sessional Test	2	20
3.	Group Discussion	2	05
4.	End Semester Exam	1	70

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MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

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

EVALUATION

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- 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.

GENERIC ELECTIVE - A   **L   T   P**
                                                                  4   0   0

MODULE CODE	
CREDIT POINTS	4
FORMATIVE ASSESMENT MARKS	30
SUMMATIVE ASSESMENT MARKS	70
END SEMESTER EXAM DURATION	3 hrs
LAST REVISION DATE	