

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES  
DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -I**

**JULY-DECEMBER 2018**

<b>Code</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-101A	Mathematics	3	1	0	<b>4</b>
IT-106A	Communication Skills	3	1	0	<b>4</b>
IT-103A	Physics	3	1	0	<b>4</b>
IT-104	C Programming	3	1	0	<b>4</b>
IT-105	PC Software	3	1	0	<b>4</b>
IT-107C	C programming Lab	0	0	4	<b>2</b>
IT-107D	PC Software lab	0	0	4	<b>2</b>
IT-108	Comprehensive Viva	0	0	0	<b>4</b>
Total					<b>28</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES  
DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -II**

**JANUARY-JUNE 2019**

<b>Sub. Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-201	Chemistry and Environment Sciences	3	1	0	4
IT-202	Probability and Statistical Methods	3	1	0	4
IT-203	Digital Computer Organization	3	1	0	4
IT-204	Basic Electronics	3	1	0	4
IT-206B	Programming with C++	3	1	0	4
IT-207B	C++ Programming Lab	0	0	4	2
IT-210C	Basic Electronics Lab	0	0	4	2
IT-208	Comprehensive Viva	0	0	4	4
Total					<b>28</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -III**

**JULY-DECEMBER 2019**

<b>Sub. Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-311	Linear Algebra	3	1	0	4
IT-301A	French	3	1	0	4
IT-304	Digital Electronics	3	1	0	4
IT-302B	DS with C++	3	1	0	4
IT-306	Engineering Drawing	3	1	0	4
IT-308D	Digital Elex. Lab	0	0	4	2
IT-307B	DS Lab	0	0	4	2
IT-309	Comprehensive Viva	0	0	0	4
					<b>28</b>

# M. Tech. (IT) 5 Years

## IV SEMESTER

Batch 2k18

JANUARY – MAY 2020

Sub Code	Subject Name	L	T	P	C
IT-401B	IT Act & Cyber Law	3	1	0	4
IT-402A	Numerical Analysis & Design	3	1	0	4
IT-403B	Data Base Management System	3	1	0	4
IT-409	Data & Computer Communication	3	1	0	4
IT-405A	UNIX Operating System	3	1	0	4
IT-407B	Data Base Management System Lab	0	0	4	2
IT-407D	UNIX Operating System Lab	0	0	4	2
	Comprehensive Viva	0	0	0	4
					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

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**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -V**

**JULY-DECEMBER 2020**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-501C	Computer Architecture	3	1	0	4
IT-502A	Microprocessor and Assembly Language	3	1	0	4
IT-505B	Programming in Java	3	1	0	4
IT-511	System Analysis and Design	3	1	0	4
IT-512	Discrete Structures	3	1	0	4
IT-507C	Programming in Java Lab	0	0	4	2
IT-508E	Microprocessor and Assembly Language Lab	0	0	4	2
IT-509	Comprehensive Viva	0	0	0	4
					<b>28</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -VI**

**JANUARY-MAY 2021**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-601A	Computer Network and Security	3	1	0	<b>4</b>
IT-612	System Programming	3	1	0	<b>4</b>
IT-610	Advanced Java	3	1	0	<b>4</b>
IT-603A	Web Technology	3	1	0	<b>4</b>
IT-605A	Analysis and Design of Algorithms	3	1	0	<b>4</b>
IT-609A	Advanced Java Lab	0	0	4	<b>2</b>
IT-608E	Web Technology Lab	0	0	4	<b>2</b>
IT-607	Comprehensive Viva	0	0	0	<b>4</b>
					<b>28</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -VII**

**JULY-DECEMBER 2021**

<b>Sub. Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-711	Advanced Database Management System	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-702A	Theory Of Computation	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-712	Computer Graphics and Multimedia	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-705	Operating System	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-709A	Computer Graphics and Multimedia Lab	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
IT-710	Project	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
IT-707	Comprehensive Viva	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
Total					<b>26</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -VIII**

**JANUARY-MAY 2022**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-801B	Principles of Programming Language	3	1	0	4
IT-804B	Mobile and Wireless Computing	3	1	0	4
IT-803B	Artificial Intelligence	3	1	0	4
IT-802A	Software Engineering	3	1	0	4
IT-805A	Cloud Computing	3	1	0	4
	Elective -I 1.IT-808: Bio Informatics 2. IT-809: Image Processing 3. IT-810: Simulation and Modelling 4.IT-811A:Information Security 5.IT-812 :Real Time System	3	1	0	4
IT-807	Comprehensive Viva	0	0	0	4
					28



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

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**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -IX**

**JULY-DECEMBER 2022**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-901B	Data Mining and Warehousing	3	1	0	4
IT-908A	Object Oriented Analysis and Design	3	1	0	4
IT-902B	IT Project Management	3	1	0	4
IT-903B	Research Methodology	2	0	0	2
	Elective –II	3	1	0	
	1.IT-913A:Optimization Techniques				
	2.IT-914:Parallel Processing				
	3.IT-915:Information Extraction				
	4.IT-916:Design Patterns				
	5.IT-917:Distributed System				4
IT-912	Object Oriented Analysis and Design Lab	0	0	4	2
IT-906	Project Phase 1	0	0	4	4
IT-907	Comprehensive Viva	0	0	0	4
					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES  
DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -X**

**JANUARY-MAY 2023**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>Credit</b>
IT-1005D	Project Phase 2	12

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -I**

**JULY-DECEMBER 2018**

<b>Code</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-101A	Mathematics	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-106A	Communication Skills	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-103A	Physics	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-104	C Programming	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-105	PC Software	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-107C	C programming Lab	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
IT-107D	PC Software lab	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
IT-108	Comprehensive Viva	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>
					<b>28</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA UNIVERSITY, INDORE**  
**M. Tech. (IT) 5 Yrs. I SEMESTER**  
**IT-101A: Mathematics**

**Course Outcomes:**

- CO1: Understand basic concepts of Partial differentiation, Maxima & Minima of the function, convergence and divergence of the series.
- CO2: Solve mathematical problems based on the course material.
- CO3: Develop mathematical skills and methods appropriate for students in the computer science.
- CO4: Gain knowledge to apply mathematics in complex computer engineering problems.

**Course Contents:**

**UNIT I**

Review of the basic concepts of calculus: Introduction, concepts of function of one variable, Idea of limit, continuity and differentiability of the function.

**UNIT II**

Successive differentiation: Successive differentiation, Rolle's Theorem, Mean value theorem, Taylor's theorem, Taylor's and Mac Lauren series, Intermediate forms.

Application of differentiation: Tangents and normals, Curvature, Maxima and Minima of the function sketching of curves (Cartesian and polar form) Asymptotes.

**UNIT III**

Integration: integration of Rational, irrational, and Transcendental function, Reduction formula, Integral as the limit of the sum, summation of series.

**UNIT IV**

Partial Differentiation: Partial Differentiation function of several variable, limit continuity and differentiability, partial derivatives, Euler's theorem, Mean value theorem, Taylor's theorem

**UNIT V**

Maxima and Minima: Maxima and minima of function of two and three variables.

Convergence Divergence: Convergence and Divergence of series, Definition and various tests.

**Text Books:**

1. Gorakh Prasad, Integral Calculus.
2. Shanti Narayan, Differential Calculus

**Reference Books:**

1. H.K. Pathak, Calculus For IInd Yr.
2. R.B. Thakur, Advanced Calculus.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA  
UNIVERSITY, INDORE  
M. Tech. (IT) 5 Yrs. I SEMESTER  
IT-106A: Communication Skills**

**Course Outcomes:**

- CO1: Understand the need to reflect upon interpersonal communication practices.
- CO2: Gain knowledge of concepts, theories, and research findings in interpersonal communication.
- CO3: Practice communication skills in a supportive environment.

**Course Contents:**

**UNIT I : Fundamentals of Communication and Self Discovery :**

Fundamentals of Communication: Definitions, Importance of communication, Objectives of communication, process of communication, Methods of communication, Types of communication and Barriers of communication.

Self Discovery: Introduction and Importance of knowing yourself, Process of knowing yourself, SWOT analysis: Benefits, SWOT analysis grid

**UNIT II: Perception and Attitude**

Perception: Introduction, Meaning, Factors, Process, Improving perception, Application in organizations.

Attitude: Introduction, Meaning, Features, Attitude and Behavior, Formation of attitude, Change of attitude, Attitude in a workplace, The power of positive attitude: Developing positive attitude, Obstacles in developing positive attitude, positive attitude and its results, Examples, Negative attitude: Staying negative, Overcoming negative attitude, Negative attitude and its results.

**UNIT III: Group Discussion and Interview**

Group Discussion :Meaning, Skills requires in a GD, GD etiquette, Tips of GD.

Interview : Points to be borne in mind as an interviewer or an interviewee, commonly asked questions, Dos and Don'ts. Telephonic Interview, Tips to present well in Interview.

**UNIT IV: Written Communication and Effective Listening**

Written Communication: Skills required in written communication, preparing project report, business correspondence writing Bibliography , Drafting E-mails.

Effective Listening : commandments of listening , types of listening, Barriers to Listening, Importance of listening skills in Business.

**UNIT V: Interpersonal communication and Transactional Analysis**

Interpersonal communication - Introduction and Importance of Interpersonal communication, elements and types of interpersonal communication, Transactional Analysis, Johari Window.

**Text Books:**

1. D. Fisher, Communication in Organizations, latest edition, Jaico Publishing House, India.
2. S. Taylor, Communication for Business, latest edition, Pearson Education.

**Reference Books:**

1. William V. Ruch, Business Communication, Maxwell Macmillan, New York.
2. Lani Arredono, The McGraw-Hill 36-Hour Course: Business Presentation, McGraw-Hill, New York.
3. Bill Scott, The Skills of Communication, Jaico, Bombay.
4. Ronald E. Dulek and John S. Fielden, Principles of Business Communication, McMillan, New York.
5. Effective Technical Communication by M Ashraf Rizvi
6. Business Communication by Raman & Singh
7. M.Raman and P.Singh, Business Communication, latest edition, Oxford University Press, India.
8. M. E. Guffy, Essentials of Business Communication, latest edition, Thomson Publishers.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DEVI AHILYA UNIVERSITY, INDORE**  
**M. Tech. (IT) 5 Yrs. I SEMESTER**  
**IT-103A: Physics**

**Course Outcomes:**

- CO1: Understand the core concepts of physics.
- CO2: Apply knowledge and understanding of physics.
- CO3: Develop the analytical approach to model physical phenomena.
- CO4: Understand the impact of physics on society.

**Course Contents:**

**UNIT I**

Charge, coulomb's law, electric field Intensity, dipole and quadruple fields. Electric potential, flux of electric field, gauss's law and its applications, Torque on a dipole in uniform electric field, Ohm's law, Rise and decay of current in R-L and R-C circuits, decay constants, AC currents RL, RC and LC circuits, series and parallel resonant circuits, Q factor and band width, power consumed in an AC circuit .

**UNIT II**

Capacitors, factors affecting capacity, type of capacitors, series and parallel connection of capacitors, Dielectrics and dielectric polarization, vector and relation between D,E, & j P, capacity of capacitor when dielectric is filled partially, energy stored in a capacitor, redistribution of charge when two conductors are connected by a conductor wire.

**UNIT III**

Electromagnetic Induction, faraday's law, self induction and Mutual inductions Maxwell's displacement current, Maxwell's equations, wave equation satisfied by E & B plane electromagnetic waves in vacuum and in dielectric.

**UNIT IV**

Force on moving charge, Lorentz force and definition of B force on a conductor carrying current in a uniform magnetic field, magnetic dipole moment, angular momentum and gyro-magnetic ratio, Biot and Savart's law calculation of B in simple geometrical situations, Ampere's law, Laplace and Poisson's equation

**UNIT V**

Motion of charged particles in electric and magnetic fields. E as an electric field, electron gun, Linear accelerator, E as a deflecting field, CRO and sensitivity of CRO, Transverse magnetic field :-principles of cyclotron.

**Text Books:**

1. Unified physics part –I R.P.Goyal

**Reference Books:**

1. Basic Electrical circuit Voluem-IB. L.Tharej
2. Resnick and Holiday – Physics part –II

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DEVI AHILYA UNIVERSITY,  
INDORE**

**M. Tech. (IT) 5 Yrs. I SEMESTER**

**IT-104: C Programming**

**Course Outcomes:**

- CO1: Develop the logic for the given problem.
- CO2: Recognize and understand the syntax and construction of C code.
- CO3: Gain experience of procedural language programming.
- CO4: Know the steps involved in compiling, linking and debugging C code.
- CO5: Apply all the concepts for problem solving in real life.

**Course Contents:**

**UNIT I**

Introduction to Programming Language & Problem solving Approach: Development of flow charts & Algorithms, Why Programming Language? Program development steps, Programming language classification, Translators, Program design techniques.

History of C Language, Feature of C Language, Why is C Language Popular? Structure of C Program, A Sample C Language Program. Errors, Compilation and Execution of C Programs and Exercise.

**UNIT II**

Useful terms of Language: Data types, The C character set, Constants, Variables, Keywords, C Instructions, Type Modifier, Storage class specifier, Storage classes in C and Exercises. Operator Expressions and Assignment Statements : Arithmetic Operators, Relational and Logical Operators, Increment and decrement Operators, Assignment Operators and Expressions, Conditional Expression, Precedence and order of Evaluation and Exercises.

**UNIT III**

Control Structure in C : Decision Control Structures, Loop Control Structures, Conditional Statements and Exercises, break Statement, The continue Statement.

Console Input and Output: Introduction to Input/Output, Unformatted and Formatted Input/Output Function.

**UNIT IV**

Array : Introduction to Array, One Dimensional Array, Multidimensional Array, Initialization, Declaration, Storage and Access Mechanisms on Array and Exercises. String Manipulation: Introduction to Strings, Two Dimensional Array of characters.

Function : Introduction to Functions, Function Declaration and Prototypes, Function Definition, Call by Value and Call by Reference, return statement, exit() function, Function with arguments, Calling Function with Array, Command Line, Arguments, Recursion in Function

**UNIT V**

Structure : Structure Definition, Giving Values to members, Structure initialization, Comparison of Structure variables, Array of Structure, Array within Structures, Structures within Structures, Passing Structures to Functions, Why use Structure, Features and Uses of Structures. Union : Union Definition and Declaration, Accessing a union Member, Union of Structures, Initialization of a Union Variable, Use of Union, Use of User Defined Type Declarations.

**Text Book:**

1. Y.P. Kanitkar, Let us C, B.P.B. Publication

**Reference Books:**

1. C -The Complete Reference, Tata Mcgraw Hill
2. Deitel & Deitel, C-How to Program.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES,  
DEVI AHILYA UNIVERSITY, INDORE  
M. Tech. (IT) 5 Yrs. I SEMESTER  
IT-105: PC Software**

**Course Outcomes:**

- CO1: Understand basic units and model of computer.
- CO2: Learn number system for data representation in computer.
- CO3: Gain basic knowledge of Operating system and DBMS.
- CO4: Learn working with MS Office and Internet.

**Course Contents:**

**UNIT I**

Introduction to Computer: Definition, Characteristics, functions and applications of a Computer, Components of a Computer: Hardware and Software, Block diagram of a computer: Input devices, Output devices, CPU, Memory. Classification of computer, generation of computer. Data representation and computer software: Number system-Binary, Decimal, Octal, Hexadecimal and its conversion. Computer software: system software and application software. Computer languages: Machine, Assembly, High level and Fourth generation languages

**UNIT II**

Introduction to Operating System: Definition and functions of an Operating System, Type and classification of Operating Systems.. Introduction to Data Base Management System: Introduction, Quality of information, What is Database, DBMS? Why a database, DBMS? Types of DBMS

**UNIT III**

Microsoft office environment: Microsoft Word: Working with Word, Typing and Editing, Formatting Text, Page design and layout, adding tables, using graphs, mail merge Microsoft Excel: Working with excel, entering data, formatting, customizing workplace, calculation in worksheet, adding charts, advanced features of excel. Microsoft–PowerPoint: Working with PowerPoint, Adding Text, Including Multimedia, Customize PowerPoint, Microsoft Access: Creating database, addition and deletion of records, searching, sorting and indexing the records, creating tables and records, advance features of Access.

**UNIT IV**

Internet and World Wide Web: Introduction, Internet access, Internet basics, Internet protocols, Internet addressing, Web pages and HTML, Web browser and search engines, Electronic mail. Computer Security: Physical access restriction, Passwords, Firewalls, Cryptography, Computer virus, Bombs and worms. Antivirus software. MSDOS: DOS features, External and Internal Commands, Managing disks, advanced command techniques, working with batch programs. Microsoft Windows and its environment

**UNIT V**

Introduction to Multimedia: Introduction, Multimedia in entertainment, Multimedia in software training, Multimedia in education training, Multimedia server and databases, Multimedia tools.

1. Alexis Leon, Introduction to Computer
2. Alexis Leon, Introduction to Information Technology

**Reference Books:**

1. P.K.Sinha ,Fundamentals of computers .



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES,  
DEVI AHILYA UNIVERSITY, INDORE  
M. Tech. (IT) 5 Yrs. I SEMESTER  
IT-107C 'C' programming Lab**

**Assignment**

**Simple/Basic programs**

1. WAP for addition, subtraction, multiplication, division, modulo following numbers
  - a. 2 or 3 integer numbers.
  - b. 2 or 3 characters.
  - c. 2 or 3 Real numbers.
2. Write the code for creating global (Integer, Character and Real) and local variables?
3. Write a program to exchange values of following numbers
  - a. 2 or 3 (integer, real, characters) numbers using 3<sup>rd</sup> variable.
  - b. 2 or 3 (integer, real, characters) numbers without 3<sup>rd</sup> variable.
4. Write a program to calculate result for following formulas :
  - a. Simple interest.
  - b. Compound interest.
  - c. Area and circumference of circle.
  - d. Area and perimeter of rectangle.
  - e. Area of a rectangle
  - f. Area of a triangle
  - g. Convert temperature from Centigrade to Fahrenheit.
  - h. WAP to convert temperature from Fahrenheit to Centigrade.
  - i. Convert & print this distance of 2 cities in meter, feet, inches & centimeter.
  - j.  $(a+b)^2$ ,  $(a+b)^3$ ,  $(a-b)^2$ ,  $(a-b)^3$
  - k. Display square and cube of a number
5. Write a program to perform following operation with entered single character:
  - a. Upper case and print it in lower case.
  - b. Lower case and print it in upper case.

**If-else**

1. Write a program to perform following operation:
  - a. Find out the maximum and minimum number between two numbers.
  - b. Find out the maximum and minimum number between three numbers.
  - c. Check whether enter number is positive, negative or zero
  - d. Check whether enter number is odd or even number.
2. Any character is entered through the keyboard, WAP using conditional operator to determine whether the
  - a. Character entered is a small case alphabet or not.
  - b. Special symbol or not.
3. Any year is input through the keyboard. WAP to determine whether the year is leap year or not.
4. WAP while purchasing certain items, a discount of 10% is offered if the quantity purchased is more than 1000. If quantity and price per item are input through the keyboard, then to calculate the total expenses.
5. The current year and the year in which the employee joined the organization are entered through the keyboard. If the number of years for which the employee has served the organization is greater than 3 then a bonus of Rs. 2500/- is given to the employee. If the years of service are not greater than 3, then program should not do anything.
6. In a company an employee is paid as under :  
If his basic salary is less than Rs. 1500, then HRA=10% of basic salary

and DA=90% of basic salary. If his salary is either equal to or above Rs.1500, then HRA=Rs. 500 and DA=98% of basic salary. If the employee's salary is entered through the keyboard WAP to find his gross salary.

7. The marks obtained by a student in 5 different subjects are input through the keyboard. The student gets a division as per the following rules:
- Percentage above or equal to 60 - First Division
  - Percentage between 50 and 59 - Second Division
  - Percentage between 40 and 49 – Third Division
  - Percentage less than 40- Fail

Write a program to calculate and print the total, percentage, division obtained by the student.

8. If the cost price and selling price of an item is input through the keyboard, Write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit he has made or loss he incurred.

### Loop

**Note: Create following programs by all loops (for, while, do-while)**

1. Write a program to perform following operations:
  - a. Print numbers from 1 to n.
  - b. Print all odd and even numbers from 1 to n.
2. Write a program to perform following operations:
  - a. Add and print result from numbers from 1 to n.
  - b. Add and print result of all odd and even numbers from 1 to n individually.
  - c. Multiply and print result from numbers from 1 to n.
  - d. Multiply and print result of all odd and even numbers from 1 to n individually.
3. Write a program to input 5 digit number and perform following operations:
  - a. Print reverse of the given number
  - b. Input 5 digit number and Sum of the digits of the number.
  - c. Sum of the first and last digit of this number.
4. Write a program to perform following operations:
  - a. Generate Fibonacci series up to given number
  - b. Find a factorial of given number
  - c. Find a given number is prime or not
  - d. Input base and power as a number and calculate power of base number
  - e. Print table of a number
  - f. Print all prime number from 1 to 500
  - g. Print all Armstrong numbers from 1 to 500
5. Write a program to perform following operation with matrix (size can be assumed by own).
  - a. Addition of 2 matrixes
  - b. Multiplication of 2 matrixes
  - c. Transpose of a matrix.
6. Write a program to print following pyramids with the help of nested loops:

a.  
1  
2 2 2  
3 3 3 3 3

b.  
1  
3 3 3

5 5 5 5 5

c.

1  
2 4  
3 6 9  
4 8 12 16

d.

1  
2 2  
3 3 3  
4 4 4 4  
5 5 5 5 5

e.

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7. Write a program to print following series till user wants:
  - a.  $\frac{1}{2}(x-1)/x + \frac{1}{2}(x-1/x)^2 + \frac{1}{2}(x-1/x)^3 + \dots$
  - b.  $1/! 1 + 2/! 2 + 3/! 3 + \dots$
  - c.  $S = 1 + x + x^2 + x^3 + \dots + x^n$ .
  - d.  $S = 1*2 + 2*3 + 3*4 + \dots + n * (n+1)$ .
8. If 5 digit number is input through keyboard, then WAP to print a new number by adding one to each digit. For ex. If the input is 12391 then output should be 23402.

### Switch

1. WAP to enter a character from user, check and print it is vowel or consonant.
2. Write a program to create menu for following operators :
  - a. Arithmetic operator
  - b. Modulo operator
  - c. Relational operator
  - d. Logical operator e. Bitwise operator
3. Design any menu to perform nested switch-case for restaurant.
4. Write a program to design a menu
  - a. For week (0 for Sunday and 6 for Saturday). Take corresponding number between 0-6 and print day according to given number.
  - b. For year (1 for January and 12 for December). Take corresponding number between 1-12 and print month according to given number.

### String

1. Write a Program:
  - a. To print the first letter of your name using special character.
  - b. Input a character from user and display its ASCII number on screen.
  - c. Input an ASCII value from user and display its character on screen.
2. Write a program to perform following operations with string:
  - a. Find length of a string given by the user
  - b. Copy one string in to another string given by the user
  - c. Concatenate one string with another string given by the user
  - d. Compare one string with another string given by the user
  - e. Convert lower case string in to upper case letter given by user
  - f. Convert upper case string in to lower case letter given by user
  - g. Reverse a string given by user
  - h. Count the number of occurrences of a letter in string given by user
  - i. Sets all characters of a string to a given character by user
  - j. Check input string is palindrome or not
  - k. Input a line from the user and print number of spaces present in it.
  - l. Input string from the user and count number of upper and lower alphabets in the string.

### Array

**Notes: You can take assumption for all array size. (Array: 1D, 2D and 3D with Integer, Float and Character)**

1. Write a program to enter 10 numbers

- a. Input a number and search that number in a list of 10 elements. If it is found print message "Number is found" otherwise print message "Number is not found".
- b. Count and print total number of odd and even numbers in the list.
- c. Count and print total number of positive, negative numbers and zeros.
- d. Print sum of all odd and even numbers individually.
- e. Print the sum of first and last index element.
- f. Copy one array into another array.
- g. Display reverse of array elements.
- h. Find out total and average of all elements in array.

### Function

1. A 5-digit positive integer is entered through the keyboard, write a function to calculate sum of digit of the 5-digit number :
  - i. Without using recursion
  - ii. Using recursion
2. Write a program to perform following operations with recursion
  - i. Sum of first 25 natural numbers.
  - j. Multiply of first 25 natural numbers.
  - k. Factorial of a number

### Pointer

**Notes:** Print all necessary notation of pointer.

1. WAP to implement pointer working. (Pointer pointing to single variable)
2. WAP to implement pointer to pointer concept and print all possible notation of pointer (Pointer pointing to pointer)
3. WAP to implement single pointer pointing to array (1-D, 2-D, 3-D) (scanning and printing elements by pointer).
4. WAP to implement double pointer pointing to 2-D array (scanning and printing elements by pointer).
5. WAP to implement pointer pointing to function.
6. WAP to implement pointer pointing to structure.
7. WAP to implement multiple different pointers pointing to different variable.
8. WAP to implement multiple different pointers pointing to 1-D array.
9. WAP to implement array of pointer pointing to different variables.
10. WAP to implement array of pointer pointing to 1-D and 2-D array.
11. WAP to implement void pointer pointing to all data types variables.
12. WAP to implement array of void pointer.
13. WAP to implement array of pointer to string.
14. WAP to implement pointer to an array.
15. WAP to take 1-D array size through malloc, calloc, free functions.
16. WAP to implement 2-D array size through malloc, calloc, free functions.

### Structure

1. Create a structure to specify data on students given below: Roll number, Name, Department, Course, Year of joining  
Assume that there are not more than 450 students in the collage.
  - (a) Write a function to print names of all students who joined in a particular year.
  - (b) Write a function to print the data of a student whose roll number is given.
2. Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 200 customers in the bank.
  - (a) Write a function to print the Account number and name of each customer with balance below Rs. 100.
  - (b) If a customer request for withdrawal or deposit, it is given in the form: Acct. no, amount, code (1 for deposit, 0 for withdrawal)

Write a program to give a message, "The balance is insufficient for the specified withdrawal".

3. There is a structure called **employee** that holds information like employee code, name, and date of joining. Write a program to create an array of the structure and enter some data into it. Then ask the user to enter current date. Display the names of those employees whose tenure is 3 or more than 3 years according to the given current date.
4. Write a menu driven program that depicts the working of a library. The menu options should be:
  1. Add book information
  2. Display book information
  3. List all books of given author
  4. List the title of specified book
  5. List the count of books in the library
  6. List the books in the order of accession number
  7. Exit
5. Create a structure called **library** to hold accession number, title of the book, author name, price of the book, and flag indicating whether book is issued or not.

### File Handling

1. There are 100 records present in a file with the following structure:
 

```

struct date
{
    int d, m, y ;
};
struct employee
{
    int empcode[6] ;
    char empname[20] ;
    struct date join_date ;
    float salary ;
};
      
```

Write a program to read these records, arrange them in ascending order of **join\_date** and write them in to a target file.
2. A hospital keeps a file of blood donors in which each record has the format: Name: 20 Columns  
Address: 40 Columns  
Age: 2 Columns  
Blood Type: 1 Column (Type 1, 2, 3 or 4)
3. Write a program to read the file and print a list of all blood donors whose age is below 25 and blood is type 2.  
Given a list of names of students in a class, write a program to store the names in a file on disk. Make a provision to display the **n<sup>th</sup>** name in the list (**n** is data to be read) and to display all names starting with S.
4. In a small firm employee numbers are given in serial numerical order, that is 1, 2, 3, etc.
  - Create a file of employee data with following information: employee number, name, sex, gross salary.
  - If more employees join, append their data to the file.
  - If an employee with serial number 25 (say) leaves, delete the record by making gross salary 0.
  - If some employee's gross salary increases, retrieve the record and update the salary.

Write a program to implement the above operations.
5. Write a program to read a list of words, sort the words in alphabetical order and display them one word per line. Also give the total number of words in the list. Output format should be: Total Number of words in the list is \_\_\_\_\_  
Alphabetical listing of words is:  
-----  
-----  
-----  
Assume the end of the list is indicated by **ZZZZZZ** and there are maximum in 25 words in the Text file.
6. Write a C program to read a large text file 'NOTES.TXT' and print it on the printer in cut-sheets, introducing page breaks at the end of every 50 lines and a pause message on the screen at the end of every page for the user to change the paper.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES,  
DEVI AHILYA UNIVERSITY, INDORE  
M. Tech. (IT) 5 Yrs. I SEMESTER  
IT-107D: PC Software Lab  
Assignments**

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**Assignment-1**

**Excel Spreadsheets**

1. Introduction
  - Exercise 1.1 – Creating a Spreadsheet
  - Exercise 1.2 – Changing the look and style
  - Exercise 1.3 – Adding Formulae
  - Exercise 1.4 – Adding a Row to a Spreadsheet
  - Exercise 1.5 – Making a Graph of the Data
  - Exercise 1.6 – Multiple Sheets
  - Exercise 1.7 – Dynamic Linking
  - More Advanced Excel Functions
2. Advanced Word Techniques
  - Exercise 2.1 – Building a Word Template
  - Exercise 2.2 – Updating Normal.dot
  - Exercise 2.3 – Inserting a Table of Contents
  - Exercise 2.4 – Inserting Cross-References
3. Composite Documents
  - Exercise 3.1 – Producing a Spreadsheet
  - Exercise 3.2 – Making a Graph of the Data
  - Exercise 3.3 – Making a Drawing
  - Exercise 3.4 – Adding a Picture to the Document
  - Exercise 3.5 – Adding a Table to the Document
  - Exercise 3.6 – Adding a Graph to the Document
  - Exercise 3.7 – Adding an Object

**Assignment -2**

**Ms-Power point presentation**

**Assignment 1**

1. Add new slides at least 75% of the time
  2. Enter and edit text in a slide at least 75% of the time
  3. Insert a Text Box at least 75% of the time
  4. Format the fill and border of a Text Box
  5. Change text direction and Text alignments in Text boxes
  6. Format text size, font face, color, and bold at least 75% of the time
  7. Format Slide background
- 
1. The Learner will be able to:
    2. Insert and Format Slide Text
    3. Insert Picture from Clip Art at least 75% of the time
    4. Format picture using Picture Tools at least 75% of the time
    5. Insert an AutoShape
    6. Format AutoShape color and lifestyle at least 75% of the time
    7. Group and move Objects
- 
1. Create a new PowerPoint using a Design template

2. Insert and Format pictures from ClipArt or from Files at least 75% of the time
  3. Use and modify animations at least 75% of the time
  4. Add Sound to Custom Animation Effects
  5. Insert slide transitions and modify the timing
  6. View the Slide Show at least 75% of the time
1. Change the View to Slide Master at least 75% of the time
  2. Use the Slide Master to change the text formatting at least 75% of the time
  3. Add an image to the Slide Master at least 75% of the time
  4. Modify the Slide Background
  5. Edit the Footer
  6. Close the Slide Master and Return to the Normal View at least 75% of the time
  7. Add sample text and review the slide design

### **Assignment-3**

#### MS-Office -Assignment

#### **Assignment -1**

1. Format text color, bold, and size at least 75% of the time
2. Insert a file INTO an existing Word document
3. Format text into columns
4. Insert a picture from Clip Art and the Design Gallery Live at least 75% of the time
5. Change text wrapping around a picture at least 75% of the time
6. Apply borders and shading to a whole page using the Format Borders and Shading command

#### **Assignment -2**

##### **Working with Pictures**

**Open** a blank Microsoft Word document. You can use Microsoft ClipArt, or Clips Online, to do the following practice exercises.

**Insert a picture** of a sun or sunset.

Use **Format->Size** to resize the picture to 1.5" wide

Use In-Line **Text Wrapping**

Next to the picture **type**: The weather is great!

**Insert a picture** of a camera.

Change the Text Wrapping to Tight

Resize the picture to be 2.5 inches tall

Place the picture to the bottom of the page

**Insert a picture** of a beach.

Format Text Wrapping to Tight

Place the picture into the center of the page

Add a thick BLUE border around the picture

Crop the picture .5 inches from the left

**Save your practice document** and name it: Beginning Word Practice 2<your name>

#### **Assignment -3**

##### **Create a Letter**

Example:-Below

##### **Type the company name and address**

Open a blank Microsoft Word document. Type the following information:



Indian house Academy,8923 Park dale,New Delhi, BC,V9B 4G9 , 474-5311

Select All of the text and use the Font options to format the type:  
Tahoma, 12 point, bold, centered, and dark red

Select the first line of type and make it 14 point.

**Insert a Picture from ClipArt**

Search for a photo or cartoon of a lighthouse  
Select an images and Download it.

**Use one of the pictures for a company logo**

Resize the picture  
Center it above the Company name and address

**Insert the Date and Time**

Remember, the default Date and Time updates automatically. This option is not appropriate for medical or legal documents that must be date/time stamped, but is fine for this exercise.

**Type a sample business letter:**

Dear Mr. Chalifour,

Write in complete sentences and in paragraph form 10 things you like about Lighthouse Christian Academy.

Sincerely, Your Name

**Assignment -4**

4.1 Create a Resume.

**Assignment -5**

**Dos command practical with Internal and External Com**

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -II**

**JANUARY-JUNE 2019**

<b>Sub. Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-201	Chemistry and Environment Sciences	3	1	0	4
IT-202	Probability and Statistical Methods	3	1	0	4
IT-203	Digital Computer Organization	3	1	0	4
IT-204	Basic Electronics	3	1	0	4
IT-206B	Programming with C++	3	1	0	4
IT-207B	C++ Programming Lab	0	0	4	2
IT-210C	Basic Electronics Lab	0	0	4	2
IT-208	Comprehensive Viva	0	0	4	4
Total					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA UNIVERSITY, INDORE**  
**M. Tech. (IT) 5 Years II SEMESTER**  
**IT-201: Chemistry & Environment Science**

**Course Outcomes:**

- CO1: Gain knowledge about various polymers and uses of them.
- CO2: Understand different types of pollution.
- CO3: Understand society, ethics and human values.

**Course Contents:**

**Unit –I High Polymer :**

Introduction, types and classification of polymerization, Natural & Synthetic Rubber; Vulcanization of Rubber, Preparation, Properties & uses of the following- Polythene, PVC, PMMA, Teflon, Poly acrylonitrile, Nylon 6, Nylon 6:6, Terylene, Phenol formaldehyde Resin.

**Unit –II Energy**

Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass, Geothermal, Hydrogen, Solar, Wind, hydal, nuclear energy

**Unit –III Ecosystem**

Segments of Environment : Atmosphere, hydrosphere, Lithosphere, biosphere, Cycles in Ecosystem – Water, Carbon, Nitrogen, Biodiversity: Threats and conservation.

**Unit –IV Air Pollution & Sound Pollution -**

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, Green house effect, ozone layer depletion, acid Rain.

Sound Pollution: Causes, controlling measures, effects of sound pollution

**Unit –V Water Pollution & Sound Pollution -**

**Water Pollution**– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

**Society, Ethics & Human values**– Impact of waste on society. Solid waste management (Thermal, Plastic, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study. Preliminary studies regarding Environmental Protection Acts ,

**Text Book:**

1. “Energy Environment Ecology and Society” By Dr. Surinder Deshwal Dhanpat Rai Publication

**References:**

1. Harris, CE, Prichard MS, Rabin’s MJ, “Engineering Ethics”; Cengage Pub.
2. Rana SVS ; “Essentials of Ecology and Environment”; PHI Pub.
3. Raynold, GW “Ethics in information Technology”; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De “Environmental Chemistry”; New Age Int. Publ.
6. BK Sharma, “Environmental Chemistry” ; Goel Publ. House.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA UNIVERSITY, INDORE**  
**M. Tech. (IT) 5 Years II SEMESTER**  
**IT – 202 :- Probability and Statistical Methods**

**Course Outcomes:**

- CO1: Understand basic concepts of Probability and Statistical Methods for data analysis.
- CO2: Learn Hypothesis testing.
- CO3: Learn the application of different tests such as Chi-square, T & F statistic.

**Course Contents:**

**UNIT 1**

Theoretical Probability Distributions: Binomial Probability distribution, Poisson Probability distribution, Normal Probability distribution.

Estimation: Unbiased-ness, consistency, efficiency and sufficiency , minimum variance unbiased estimator , Cramer-Rao inequality and its application , Maximum Likelihood estimator.

Testing of Hypothesis, Simple and Composite hypothesis, Test of significance for Samples, Test for single proportion and for difference of proportion. Test of significance for single mean , Test of significance for difference of means.

**UNIT II**

Interval estimation: Confidence Interval and Confidence limits, Confidence limits for large samples.

Test of significance: Procedure for testing of Hypothesis, Test of significance for large samples, test for single proportion and for difference of proportions, Test of significance for single mean, Test of significance for difference of means.

**UNIT III**

Test of significance for small samples: Concept of Chi-square, t and F- statistics, Test for Chi-square distribution, to test goodness of fit, to test independence of Attributes, to test the homogeneity of correlation coefficients.

Test based on t- distribution: t-test for single mean, difference of means , paired t- test, t-test for testing significance of an observed sample correlation coefficient.

**UNIT IV**

Test based on F- distribution: Test for equality of population variance, Test for testing the significance of an observed multiple correlation coefficients.

Non parametric test: sign- test, median test, run test, Wilcoxon signed rank test .

**UNIT V**

Analysis of variance and design of experiments: One -way and two- way classification with one observation per cell, Design of experiments, completely randomized design randomized block design and Latin square design.

**Text Book:**

1. S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical statistics, S. Chand sons.

**Reference Books:**

1. S.C. Gupta & V.K. Kapoor : Fundamentals of Applied statistics, S. Chand sons.
2. A.M.Gun, M.K.Gupta, B Dasgupta: An outline of statistical theory(Volume 1).
3. Kapoor and Saxena : Mathematical statistics , S. Chand and sons.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI  
AHILYA UNIVERSITY, INDORE  
M. Tech. (IT) 5 Years II SEMESTER  
IT-203: Digital Computer Organization**

**Course Outcomes:**

- CO1: Study the various functional units of CPU.
- CO2: Study functioning of ALU and CU.
- CO3: Understand instruction formats and addressing modes.
- CO4: Understand interconnection and interfacing of various units of computer system.

**Course Contents:**

**UNIT I**

Introduction to computer organization, Von Neumann Architecture, Computer components, interconnection structures, Bus interconnection.

**UNIT II**

Input output organization: I/O interface, modes of transfer, Interrupt driven I/O, Priority interrupt, DMA, I/O processor, and serial communication, Synchronous, Asynchronous data transfer, strobe control, handshaking, PCI, Working mechanisms of Peripherals: Keyboard, Mouse, Scanners, Video Displays, Touch Screen panel etc.(features and principles)

**UNIT III**

Control Unit: Instruction word format, fetch and execution cycle, sequence of operation of control registers, control of arithmetic operations, microprogramming concepts.

**UNIT IV**

Memory Organization: Memory hierarchy, internal and external memory. Types of memories: ROM: PROM, EPROM, EEPROM, RAM: SRAM, DRAM, High speed memories: Cache memory, Organization and mapping techniques, Virtual memory, secondary storage: Magnetic disk, tape, optical memory, DROM, DVD.

**UNIT V**

CPU Organization: General register organization, stack organization and accumulator type organization. Instruction formats – three address instruction, two addresses, one address and zero address instructions, Instruction set selection. Addressing modes: - Immediate, direct, indirect, register, indexed etc.

**Text Books:**

1. Computer Organization and architecture by William Stalling, 8th edition, Prentice Hall of India
2. Computer System Architecture by M. Morris Mano, 3rd edition, Prentice Hall of India

**Reference Books:**

1. Computer Organization by D A Godse and A P Godse
2. Computer Architecture and Organization by J. P. Hayes, 2nd edition, Tata McGraw-Hill
3. Structured Computer Organization by A. S. Tanenbaum, 3rd edition, Prentice Hall of India

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI  
AHILYA UNIVERSITY, INDORE  
M. Tech. (IT) 5 Years II SEMESTER  
IT-204: Basic Electronics**

**Course Outcomes:**

- CO1: Understand basic components of circuits.
- CO2: Gain knowledge of the use of diodes as power supply rectifiers.
- CO3: Learn the operation of transistors as switching circuits..

**Course Contents:**

**UNIT I**

**Fundamental Laws and Rules-** Introduction, Ohm's law, Kirchhoff's current law (KCL), Kirchhoff's voltage law (KVL), Current division rule, Voltage division rule, Source Transformation, Some more rules about sources, Duality. Star and Delta connection, Star to delta and delta to star conversion.

**UNIT II**

**Basic Components:** Circuit Symbols, Working Principle, Classification according to construction, Specification, and applications of passive components-Resistors & Color coding, Inductors, Switches, Relays (Electromagnetic), Thermistor, LDR

Capacitors: - Capacitance, Capacitor Specifications, Classification of Capacitor-Fixed (Mica, Paper, Ceramic, Plastic, Electrolytic etc), Variable capacitor (Trimmer, Padder, Gang), Stray capacitance, Area of Application. Difference between Capacitors, Inductors, and Resistor.

**UNIT III**

**Energy Bands in Solids and Semiconductor:** The nature of the atom, Atomic energy level, Electronic structure of the element, the energy band theory of Crystal, Conductors, Semiconductors and Insulators, Classification on the basis of Band Theory, Intrinsic and Extrinsic Semiconductors, Diode.

**UNIT IV**

**Junction Diode Characteristics:**

P-N Junction-Forward and reverse bias of Diode. Concept of recombination of carriers, Temperature variation of Forward and Reverse Current through the P-N Junction. Characteristics of Forward & Reverse Bias Diode, Dynamic and Static Resistances.

**UNIT V**

**Special Diodes:** Zener Diode, its construction and characteristics, Tunnel Diode, Varactor Diode, Schottky Diode, Step Recovery Diode, PIN Diode, Light Emitting Diode, Seven Segment Displays, Photodiode.

**UNIT VI**

**Diode Applications:** Introduction load line Analysis, Series diode configurations with DC Inputs, Parallel and Series-Parallel configurations, Half wave rectification, Full-wave rectification, Clippers and Clampers.

**UNIT VII**

**Transistors:-**Introduction, NPN and PNP Transistors, Operation on Transistor, Transistor circuit configuration, Current gain of a Transistor, Transistor Characteristics

**Text Books:**

1. Boylstad, Electronics devices and circuit theory.
2. Milliman J. Halkias C, Integrated electronics

**Reference Books:**

3. Malvino A.P., Electronics principal
4. B.L. Theraja, Electrical Technology
5. V.K. Mehta Principal of electronics.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI AHILYA UNIVERSITY, INDORE**  
**M. Tech. (IT) 5 Years II SEMESTER**  
**IT-206B: Programming with C++**

**Course Outcomes:**

- CO1: Understand object-oriented programming features in C++.
- CO2: Apply these features to program design and implementation.
- CO3: Learn the basic constructs and syntax of C++.
- CO4: Build good quality software using object-oriented techniques.

**Course Contents:**

**UNIT I**

Principle of Object Oriented Programming, Object-Oriented Terminology, OOP Paradigm, Basic concept of OOP, Benefits of OOP, Application of OOP.  
Introduction of C++: Tokens, Keywords, Identifier and constants, Operator, Data Type, Variable Manipulator, Expression and Control structure.

**UNIT II**

*Classes and Function in C++ :*

Class: Defining Classes in C++, Classes and Encapsulation, Member functions, Instantiating and Using Classes, Access specifiers, Static Class Members.  
Constructor and Destructor: Use of Constructors, Multiple Constructors, Types of constructor, Using Destructors to Destroy Instances.  
Function: Function Introduction, Main function, Function Prototyping, inline function, friend function.

**UNIT III**

Inheritance & Polymorphism: Overview of Inheritance, Defining Base and Derived Classes, Constructor and Destructor Calls, Virtual base classes, Abstract classes. Overview of Polymorphism  
Operator & Function Overloading: Operator Overloading, Working with Overloaded Operator Methods, Introduction to Function overloading.

**UNIT IV**

Pointer and Virtual Function: Introduction of Pointer, Dynamic memory allocation, Pointers to object, this pointer, Pointers to derived classes, Virtual Functions, Pure virtual function.

**UNIT V**

Working with files in C++, Exceptions Handling and Templates:

Files: Standard Streams, Manipulators, Unformatted Input and Output, File Input and Output.

Exceptions: Basics of Exception handling, Exception handling mechanism.

Templates: Template Overview, Customizing a Template Method, Standard Template Library Containers.

**Text Books:**

1. The Complete Reference - C++, Tata Mcgraw Hill

**Reference Books:**

1. E. Balagurusamy, Object-Oriented Programming with C++
2. Yashwant Kanitkar, Let us C++.
3. Robert Lafore, Object Oriented Programming in Turbo C++

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -III**

**JULY-DECEMBER 2019**

<b>Sub. Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-311	Linear Algebra	3	1	0	<b>4</b>
IT-301A	French	3	1	0	<b>4</b>
IT-304	Digital Electronics	3	1	0	<b>4</b>
IT-302B	DS with C++	3	1	0	<b>4</b>
IT-306	Engineering Drawing	3	1	0	<b>4</b>
IT-308D	Digital Elex. Lab	0	0	4	<b>2</b>
IT-307B	DS Lab	0	0	4	<b>2</b>
IT-309	Comprehensive Viva	0	0	0	<b>4</b>
					<b>28</b>



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Yrs. III SEMESTER**  
**IT-311: Linear Algebra**

**Course Outcomes:**

- CO1: Develop the ability to solve problems using linear algebra.
- CO2: Understand basic concepts of linear equations, matrix calculus and basic vectors operations.
- CO3: Comprehend the use of various forms of complex numbers to solve numerical problems
- CO4: Emphasize computational problems of linear Algebra
- CO5: Develop abstract and critical reasoning by studying logical proofs and the Axiomatic method as applied to linear algebra

Composition Table, Revision of Group Structure, Extension of Group Structure. Ring, Integral Domain and Field structure, Detailed study of field structure Various examples of field.

Introduction of the algebraic structure for Linear space, Internal and External Compositions, Linear space. Properties of Linear Space. Sub Spaces, Criteria for sub spaces, examples of Sub-Spaces, Formation of Quotient Set, Binary Composition defines in Quotient Sets, Quotient Spaces–Examples of Quotient Space.

Linear combination of vectors over  $\mathbb{R}$  and  $\mathbb{C}$ , Linearly independent and dependent set of vectors over  $\mathbb{F}$ , Concepts of Basis and Dimensions of Linear Space, Determination of Bases and Dimensions of VCF), coordinate representation of vectors over VCF).

**UNIT IV**

Linear Transformation, Isomorphism of linear spaces, properties, kernel of Linear transformation, Null space and range space, fundamental theorem of linear space, Homomorphism, Application of Linear transformation to theory of ordinary linear Differential equations. Matrix representation of linear transformation, Rank and Nullity of Linear transformation Eigen values and vectors of linear maps and matrices. Diagonalization of Matrices, Jordan Blocks and Applications, Inner Products – Inner product space. Norm of a vector in inner product space, Unit vectors. Schwartz's Inequality, Triangle inequality, angle between vectors in inner product space, orthogonal vectors Distance in an inner product space.

**UNIT V**

Orthogonalization of bases, Orthogonal basis Ortho-normal set, Orthonormalization of basis, Gram-Schmidt's process of orthonormalization of base. Quadratic forms, Reduction of quadratic form to Canonical forms. Application, Normal form concept of rank, Index and signature of normal form. Conversion of quadratic form to normal form and determination of rank, Index and signature. Classifications of curves and surface in 2 and 3 dim. Reduction and identification.

1. Dr. H. K. Pathak , Text Book of Linear Algebra .
2. Krishnamurthy, Linear Algebra
3. Hottman & Kunze, Linear Algebra
4. Dr. K. P. Gupta, Linear Algebra

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES DEVI  
AHILYA UNIVERSITY, INDORE  
M.TECH (IT) 5 Years III SEMESTER  
IT-310A French**

**Course Outcomes:**

- CO1: Get acquaint with a foreign language-French.
- CO2: Understand vocabulary and grammar of French language.
- CO3: Practical command of French, emphasizing language as means of communication.
- CO4: Exposure of some aspects of France, its people and culture.
- CO5: Emphasize and develop structural ,phonological and semantical linguistics skills.

**Course Contents:**

**Unit I:A spring in Paris**

- Lesson 1:-Meeting
- Lesson 2:-Sympathies
- Lesson 3:-Tastes and preferences
- Lesson 4:-Agreements and disagreements
- Lesson 5:-Surprises

**Unit II:Adventure in Bourgogne**

- Lesson 1:-Countryside house
- Lesson 2:-Meals in Broussac

**Unit III Grammare**

Articles,Nouns Adjectives, Verbs,Interrogatives,Negatives,Conjugations,Present tense

**Unit IV Communication**

Introduce oneself,Invitation writing and accepting invitation,describe the person

**Unit V Vocabulary:**

Monuments,public places in Paris,professions,different types of houses,etc

**Reference Books:**

- 1.Apprenons le francais 2

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Yrs. III SEMESTER**  
**IT-304: Digital Electronics**

**Course Outcomes:**

- CO1: Understand fundamental concepts and techniques in digital electronics
- CO2: Understand the structure of various number systems and its applications.
- CO3: Designing various combinational and sequential circuits and its applications.
- CO4: Understand TTL and CMOS circuit characteristics, followed by logic devices such as flip-flops, code converters, counters, multiplexers, and registers.

**Course Contents:**

**UNIT I**

Binary Systems and logic circuits. Decimal, Binary, Octal, Hexadecimal numbers and their inter conversions. ASCII, Gray, Excess-3, 8-4-2-1, Error detecting and BCD codes. Logic Gates. Boolean algebra. Demorgan's theorem. Binary addition and subtraction. Unsigned Binary numbers, Signed binary numbers. 2's complement representation and its arithmetic.

**UNIT II**

Circuit analysis and design.

Boolean laws and theorems. Sum of Product and Product of Sum simplification. Two, three and four variable karnaugh map. NAND and NOR implementation. Other two level implementation. Don't care conditions.

**UNIT III**

Combinational circuits.

Design procedure. Half adder, full adder, adder-subtractor circuit. Code converters. Various logic circuits. Multilevel NAND circuit. Multilevel NOR circuit. Data Processing circuits.

Multiplexers, demultiplexers, decoders and encoders. Binary parallel adder, look ahead carry generator, magnitude comparator, ROM, PROM, PLA.

**UNIT IV**

Sequential circuit.

Flip-flops, triggering of flip-flops. Analysis of clocked sequential circuits, state reduction and assignment, flip-flop excitation tables.

**UNIT V**

Registers, counters and integrated circuits.

Design of counters, registers, shift registers. Ripple counters, synchronous counters. TTL logic families.

**Text Books:**

1. Taub H. and Schilling D, Digital Integrated Electronics
2. Ronald J. Tocci, Digital System: Principles and application

**Reference Books:**

1. M. Morris Mano, Digital Logic and Computer Design.
2. Malvino A.P. and Leach D.P, Digital Principles and Application.
3. Taub H. and Schilling D, Digital Integrated Electronics

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES,  
DAVV, INDORE**

**M. Tech. (IT) 5 Yrs. III SEMESTER  
IT-302B: Data Structures with C++**

**Course Outcomes:**

- CO1: Understand data structures such as linear lists, stacks, queues. Data structure and algorithms design method for a specified application.
- CO2: Write data structures programs using object-oriented design principles.
- CO3: Be familiar with advanced data structures such as balanced tree, search tree, priority queues and graphs.
- CO4: Get a good understanding of sorting and searching techniques.

**Course Contents:**

**UNIT I**

Introduction to Data Structure: Introduction to C++, Definition of data st data types. Static and Dynamic implementations. Examples and real lif Structures: Arrays, Address calculation in a single and multi dimens matrices

**UNIT II**

Stacks, Queues and Lists: Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples: Infix, postfix, prefix representation Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples: Infix, postfix, prefix representation  
Applications: Mathematical expression Evaluation  
Definition: Queues & Lists: Array based implementation of Queues / Lists, Linked List implementation of Queues / Lists, Circular implementation of Queues and Singly linked Lists, Straight / circular implementation of doubly linked Queues / Lists, Priority queues, Applications

**UNIT III**

Sorting Searching Algorithm, Hashing: Introduction, Sorting by exchange, selection, insertions, Bubble sort, Selection sort, Insertion sort, Pseudo code algorithm and their C++ implementation, Efficiency of above algorithms, Merge sort, Merging of sorted arrays, merge sort algorithms. Quick sort algorithm, Heap sort algorithm, Radix sort

**UNIT IV**

Straight Sequential Search, Array implementations, Linked List representations, Search, non – recursive Algorithms, recursive Algorithms, Indexed Sequential Binary Search, Hashing, Hash function, Collision Resolution Techniques, Hashing Applications

**UNIT V**

Trees & Graphs: Definition of trees and Binary trees, Properties of Binary trees and Implementation, Binary Traversal - preorder, post order, in order traversal, Binary Search Trees, Implementations, Threaded trees, Balanced multi way search trees, AVL Trees, and their Applications.  
Definition of Undirected and Directed Graphs and Networks, The Array based implementation of graphs, Adjacency matrix, path matrix implementation, The Linked List representation of graphs, Shortest path Algorithm, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Applications.

**Text Books:**

1. A. M. Tanenbaum, Langsam, Moshe J. Augentem, Data Structures using C, PHI Publ Reference Books:
3. E. Balagurusamy, Object – Oriented Programming with C++, Tata Mcgraw Hill.
4. A.V. Aho, J.E. Hopcroft and T.D. Ullman, Data Structures and Algorithms, Original edition, Addison-Wesley, 1999, Low Priced Edition.
5. Ellis Horowitz & Sartaj Sahni, Fundamentals of Data structures
6. Robert Kruse, Data Structures and Program Design in C, PHI Pub.
7. Willam J. Collins, Data Structure and the Standard Template library, Tata Mcgraw Hill.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Yrs. III SEMESTER**  
**IT-306: Engineering Drawing**

**Course Outcomes:**

- CO1: Inculcate proper understanding of the theory of projection.
- CO2: Exposure of the visualization skills.
- CO3: Gain knowledge of various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient.
- CO4: Learn basics of CAD/CAM software tools.

**Course Contents:**

Introduction: Drawing & Classification of drawings, Drawing Instruments and their uses, Indian standard for drawing. Geometrical Constructions; Polygon, Circle, Technical Lettering, Dimensioning.

Engineering Scales: Introduction – Engineering Scales, Graphical scale, Representative fraction, Types of scales – Plain, Diagonal, scale of chords.

Engineering Curves: Conic Section – Ellipse, Parabola, Hyperbola, Normal and Tangent to conic sections. Cycloidal Curves – Cycloid, Epi-cycloid, Hypo-cycloid, normal & tangent to Cycloidal curves. Involute Curves – Involute of circle, polygon, normal and tangents to involutes. Spirals Curves – Archimedean, Logarithmic, Tangents and Normal to spiral curves.

Projections: Types: Parallel and non- parallel projections. Orthographic – First and Third angle Projections, convention used, Orthographic Projection of Simple solids, conversion of 3-D view to orthographic views. Isometric Projection– Simple Solids, Isometric view, Conversion of orthographic view to isometric view. Introduction to oblique projection and perspective projection.

**UNIT V**

Projection of Geometrical features: Points, Straight, lines, Planes and Solids.

Section of Solids: Sections of Prisms, Pyramids, cones and cylinders.

Development of Surfaces: Development of surfaces of Prisms, Pyramids, cones and Cylinders.

Introduction to Computer aided drawings CAD

1. M. B. Shah & B. C. Rana , Engineering Drawing
2. N. D. Bhatt, Engineering Drawing

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech. (IT) 5 Years**

**IV SEMESTER**

**Batch 2k18**

**JANUARY – MAY 2020**

<b>Sub Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-401B	IT Act & Cyber Law	3	1	0	<b>4</b>
IT-402A	Numerical Analysis & Design	3	1	0	<b>4</b>
IT-403B	Data Base Management System	3	1	0	<b>4</b>
IT-409	Data & Computer Communication	3	1	0	<b>4</b>
IT-405A	UNIX Operating System	3	1	0	<b>4</b>
IT-407B	Data Base Management System Lab	0	0	4	<b>2</b>
IT-407D	UNIX Operating System Lab	0	0	4	<b>2</b>
	Comprehensive Viva	0	0	0	<b>4</b>
					<b>28</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IV SEMESTER**  
**IT-401B : IT Act & Cyber Law**

**Objectives:** To understand:

- The basics of Cyber crime and its peculiarity
- Need for Cyber law and other governing laws
- Cyber Law in International and national arenas
- Practical Case laws on Cyber crimes in India

**Prerequisite:** Understanding of the Cyber security, Internet technologies and devices

**Course Contents**

**1. Introduction to Cyber Law & Cyber Crime**

Definition of Cyber law, History of Cyber crime, Types of Cyber Crimes, Classification of Cyber Crimes, Distinction between Cyber Crimes and Conventional Crimes, Need of Cyber Law, Trends in Cyber Crimes, Cyber Criminals, Cyber Crime in India.

**2. Information Technology Act 2000**

Introduction to IT Act 2000, Objective of the IT Act, 2000, Structure of the Act, Features of IT act 2000, Important Chapters of IT Act, Summary of the Act, Amendment Bill 2008, Jurisdiction on Cyber Crime, Filing of Complaint for Cyber Crime, Adjudication and appeal under IT Act 2000, Criminal Liability under IT Act, Civil Liability under IT Act

**3. Cyber Crime Investigation**

Importance of Cyber Crime Investigation, Modes of Committing Cyber Crime, Motive behind Cyber Crime, Types of Cyber Crime, Steps & Procedures during Investigation, Correlating the evidence, Cyber Crime Investigation bodies, Procedure for Search and Seizure of Digital Evidence

**4. International Regime in Cyber Laws and Intellectual Property Rights**

Introduction, United Nations and other International Organizations, IPR In India, Various Acts on IPR: Patents, Trademarks, Industrial Designs, and Geographic Indications of source, (patents), trademarks, industrial designs, The Semi Conductor Integrated Circuits Layout Design Act

**5. Cyber Crime & Other Laws**

Indian Evidence Act and Cyber Crimes, Indian Penal Code and Cyber Crimes, Criminal Procedure Code and Cyber Crimes, Defamation on Cyber World, Arbitration

**6. Practical Study Cyber Crime Case Laws**

**Recommended Books:**

1. Cyber Law & Cyber Crimes By Advocat Prashant Mali; Snow White publications, Mumbai
2. Cyber Law in India by Farooq Ahmad; Pioneer Books
3. Information Technology Law and Practice by Vakul Sharma; Universal Law Publishing Co. Pvt. Ltd.
4. The Indian Cyber Law by Suresh T. Vishwanathan; Bharat Law House New Delhi
5. Guide to Cyber and E – Commerce Laws by P.M. Bukshi and R.K. Suri; Bharat Law House, New Delhi
6. Guide to Cyber Laws by Rodney D. Ryder; Wadhwa and Company, Nagpur
7. The Information Technology Act, 2000; Bare Act – Professional Book Publishers, New Delhi
8. Computer Forensics: Principals and Practices by Linda Volonino, Reynaldo Anzaldua and Jana Godwin; Pearson Prentice – Hall 2007
9. First Responder's Guide to Computer Forensics by Richard Nolan et al; Carnegi Mellon, 2005.
10. Digital Evidence and Computer Crime, 2nd Ed. By Eoghan Casey; Academic Press, 2004.
11. The Regulation of Cyberspace by Andrew Murray, 2006; Rutledge – Cavendish.
12. Scene of the Cybercrime: Computer Forensics Handbook by Syngress.
13. Security and Incident Response by Keith J. Jones, Richard Bejtloich and Curtis W. Rose
14. List of Websites for more information is available on: [Http://www.garykessler.net.library/forensicsurl.html](http://www.garykessler.net.library/forensicsurl.html)
15. Introduction to Forensic Science in Crime Investigation by Dr. (Smt) Rukmani Krishnamurthy

Web Site: <http://www.cyberlawsindia.net>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IV SEMESTER**  
**IT-402A : Numerical Analysis & Design**

**Course Outcomes:**

- CO1: Apply different numerical techniques to solve engineering problems .
- CO2 : Solve numerical approximations of an equation by Newton method, Bisection Method, Secant Method, etc.
- CO3: Using finite differences for interpolation and learn various interpolation methods.
- CO4: Understand numerical integration and differentiation.
- CO5: Establishing the limitations ,pros and cons of numerical methods.

**Course Contents:**

**UNIT I**

**Introduction:** - Error, Types of error, Solution of Transcendental and Algebraic equation, Zeros of a polynomial, Iterative method, Bisection method, False-Position method, Newton Raphson method.

**UNIT II**

**Interpolation:** - Finite Differences, Forward, Backward and Central differences, Differences of a polynomial, Newton's formula for interpolation, Related numerical and derivation, Gauss's central differences formula, Related numerical and derivation, Interpolation with unevenly spaced points, LaGrange's interpolation derivation and numerical, Inverse interpolation derivation and numerical, Divided differences and their properties, Newton's general interpolation formula, Method of successive approximations, Extrapolation.

**UNIT III**

**Numerical Differentiation and Integration:** - Introduction, Numerical Differential & Numerical Integration, General Formula for Integration, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Boole's rule and Weddle's rule.

**UNIT IV**

**Solution of differential Equations:** - Newton - Cotes integration formula, Solution of differential equation, Taylor's series method, Picard's method of successive approximations, Euler's method, Runge - Kutta methods, derivation and numerical.

**UNIT V**

**Ill-conditioned equation and refinement of solution:** - Simultaneous Linear Equations, Solution of simultaneous linear equations, Gauss elimination method, Gauss elimination with pivoting derivation and numerical, Gauss - Seidel iterative methods, derivation and numerical.

**Text Books:**

1. S. S. Shastri, Numerical Methods (Text Book 1 for Numerical Methods)
2. Computer Based Numerical and Statistical Techniques by Dr. Santosh Kumar (S. Chand Publications)

**Reference Books:**

1. Computer Oriented Numerical Methods by *V.Rajaraman*
2. Numerical methods by *Veda Murthi and iyenger.*
3. *C 77* by *Rama N. Reddy and Carol a.Zieglar*
4. Numerical Analysis by *Krishna Murthi.*



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IV SEMESTER**  
**IT-403B: Data Base Management System**

**Course Outcomes:**

- CO1: Understand the necessary concepts for database designing.
- CO2: Design conceptual, logical database model and physical model.
- CO3: Evaluate set of query using SQL and Relational algebra.
- CO4: Understand the Concepts of RDBMS and Object oriented modeling

**Course Contents:**

**UNIT I**

Introduction, Purpose of Database System, View of data, Three Level -Architecture of DBMS, Data independence, Data models - Physical Model, Logical Model, Conceptual Model, Hierarchical data Model, Network data Model, relational data model, Object Oriented Model and their comparison, Database Languages, Transaction Management, Storage Management, Database Administrator, Database Users, Overall System Structure.

**UNIT II**

Entity-Relationship Model:- Basic Concepts, Design Issues, Mapping Constraint, Keys, Entity-Relationship Diagram, Weak-Entity Sets, Design of an E-R Database Scheme, Reduction of an E-R Schema to Tables, generalization and specialization in ER model

**UNIT III**

Introduction to relational database systems, meaning of tuples, attributes, insertion, deletion, updating and retrieval in relational approach, various operations in relational approach like select, project, join, union.

**UNIT IV**

Structured Query Language:- Table Fundamentals, data types, creating, viewing table, inserting, deleting, updating and modifying data in table, Applying data constraints-adding primary key, foreign key, unique key in table. Basic Structure, Set Operations, Oracle functions-string function, numeric function, Aggregation Functions, Null Values, Nested Sub Queries, Joined Relation, Data Definition Language, Data Control Language, Data Transaction Language

Integrity Constraint:- Domain Constraint, Referential Integrity, Triggers,

**UNIT V**

Relational Database Design:- Codd's 12 Rules, Pitfalls in Relational-Database Design, Decomposition, Functional Dependencies, Normalization up to 3NF.

**UNIT VI**

Introduction to VB and connectivity of database with VB.

**Text Books:**

1. A Silberschatz, H.F Korth, Sudersan "Database System Concepts", MGH Publication.
2. Modern Database Management (5th Edition) (Hardcover) by Fred R. McFadden, Jeffrey A. Hoffer, Mary B. Prescott

**Reference Books :**

- 1 Elmasri & Navathe "Fundamentals of Database systems" – III ed.
- 2 B.C. Desai. "An introduction to Database systems" BPB.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (IT) 5 Years IV SEMESTER**

**IT – 409 : Data and Computer Communication**

**Course Outcomes:**

- CO1: Understand basic data communication components.
- CO2: Understand the fundamentals of signaling and data transmission.
- CO3 : Gain knowledge of Error detection and correction mechanisms
- CO4: Functions of Data link layer and data link protocols.
- CO5: Understand LAN standards.

**Course Contents:**

UNIT- I

**Introduction & Overview of Communication Systems:**

Basis for Data Communication, Guided Transmission Media: Twisted Pair; Coaxial Pair; Fiber Optics, Multiplexing Techniques: FDM; WDM; TDM; STDM, Unguided Transmission Media: Wireless Communication; Cellular Radio; Satellite Communication.

UNIT- II

**Network Model:** The OSI model :layered Network Architecture,peer-to-peer Processes,Layers in the OSI Reference model,The TCP/IP Model,Addressing :Physical,Logical ,Port and specific addressing,Comparing and Contrasting-OSI & TCP/IP Model.

UNIT- III

**Physical Layer and Media:**

Digital Data, Digital Signal: NRZL; NRZI; Bipolar AMI; Pseudo Ternary; Manchester; Differential Manchester; B8ZS; HDB3, Digital Data, Analog Signal: ASK; FSK; PSK, Analog Data, Digital Signal: PCM; PAM; DM; ADM, Analog Data, Analog Signal: AM; FM; PM, Switching: Circuit switch networks, Datagram Networks, Virtual Circuit networks, Multiplexing techniques:FDM,WDM,TDM,STDM.

UNIT- IV

**The Data Link Layer:**

Data Link Layer Design Issue: Framing; Character Count; Character Stuffing; Bit Stuffing; Physical Layer Coding Violation: Error Control; Flow Control; Error Correcting Codes; Error Detecting Codes; Hamming Codes; CRC Code. Protocols: Stop & Wait Protocol, Unrestricted Stop & Wait Protocol, Simplex Stop & Wait Protocol, Protocol for Noisy Channel, Sliding Window Protocol, Go Back N, Selective Repeat, Verification using File State, HDLC Data Link Protocol, ISDN, ATM.

UNIT-V

**The Medium Access Protocols:**

The Medium Access Sub Layer: Channel Allocation; Static; Dynamic, Multiple Access Protocols: ALOHA; CSMA, Collision Free Protocols, Limited Connection Free Protocols, WDMA, Wireless LAN Protocols, Digital Cellular Radio. Overview of IEEE Standards.

**Text Books:**

1. Data Communications and Networking (IV Edition). B.A. Forouzan (Tata McGraw Hill Publications)

**Reference Books:**

1. Computer Networks (IV Edition), A.S. Tanenbaum (PHI Publications)
2. Data and Computer Communications, William Stallings (PHI Publications)
3. Data Communications and Networks, Achyut S. Godbole (Tata McGraw Hill Publications)

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IV SEMESTER**  
**IT-405A: UNIX Operating System**

**Course Outcomes:**

- CO1 : Understand UNIX as operating system.
- CO2: Understand UNIX shell and its functionality.
- CO3: Learn to execute UNIX commands.
- CO4: Learn to send and receive electronic mail and what are its real-world limitations
- CO5: File handling and shell programming concepts.

**Course Contents:**

**UNIT I**

Introduction and familiarization: History of UNIX operating system, Architecture of Unix login and log out

**UNIT II**

UNIX file system: File system hierarchy: file name, attributes, access rights and their change, copying moving and removal of files.

File permission mask, /etc/passwd file, su, newgrp, chown, chgrp commands. Contents of file and file commands. Hard and Soft links, search in file system find command.

**UNIT III**

Filters, standard input and standard output, pipes, pipelines, simple text manipulation utilities, utilities for comparing text files. Regular expression grep, egrep, fgrep, programmable filters sed, awk. Back up of files and directories, tar, cpio, dd.

**UNIT IV**

UNIX shell: Basic UNIX user skill, shell as command language, interpreter, command line, shell file metacharacter, script writing, examples of script. Process, ps, shell as process, job control, signals. Vi editor

**UNIT V**

Shell programming concept. Shell script control statements, loops, branching, return codes, test statements, shell parameters.

**Text Books:**

1. Sumitabha Das, UNIX: Concepts and application.

**Reference Books:**

1. Maurice J. Bach, The design of the UNIX operating system.
2. Y. Kanetkar, UNIX shell programming
3. Kamran Hussain, Linux Unleashed, Tim Parker.
4. Christopher Vickery, UNIX shell programmer's Interactive Workbook.
5. Mark F. Komarinsk, Cary Colette, Linux system administration handbook.
6. Dent and Gaddis, Guide to using Linux

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IV SEMESTER**  
**IT-407B DBMS Lab Assignment**

Section -A

1. Study and implementation of following DDL commands:
  - a. CREATE TABLE
  - b. ALTER TABLE
  - c. DROP TABLE
  - d. RENAME
  - e. TRUNCATE TABLE
2. Study and implementation of following DML commands:
  - a. INSERT INTO
  - b. SELECT
  - c. UPDATE
  - d. DELETE
3. Study and implementation of following DCL commands:
  - a. GRANT
  - b. REVOKE
4. Study and implementation of following TCL commands:
  - a. COMMIT
  - b. ROLLBACK
  - c. SAVEPOINT

Section -B

1. Define the schema for the following databases with specific data type and constraints, the table name and its fields name are to be taken from database description which are given below :

A database is being constructed for storing sales information system.

A product can be described with a unique product number, product name, selling price, manufacturer name. The product can sale to a particular client and each client have it own unique client number, client name, client addresses, city, pin code, state and total balance to be required to paid. Each client orders to buy product from the salesman. In the order, it has unique sales order number, sales order date, client number, salesman number (unique), billed whole payment by the party or not and its delivery date.

The salesman have the name, addresses, city, pin code, state, salary of the sales man, delivery date, total quantity ordered, product rate.

- a) Draw an Entity Relationship diagram for above scenario. Make and state your assumptions where required.
- b) Convert above ER model into relational model in step by step manner.
- c) Write the SQL queries for the following –
  1. Create above tables with all constraints required and insert data into above tables.
  2. Retrieve the list of names and the cities of all the clients.
  3. List the various products available.
  4. Find the names of all clients having 'a' as the second letter in their names.
  5. List all the clients who are located in TEZPUR.
  6. Find products whose selling price is greater than 2000 & less than or equal to 5000
  7. Add a new column NEW\_PRICE into the product\_master table.
  8. Rename the column product\_rate of Sales\_Order\_Details to new\_product\_rate.
  9. List the products in sorted order of their description.
  10. Display the order number and date on which the clients placed their order.
  11. Delete all the records having delivery date before 25th August, 2008.
  12. Change the delivery date of order number ON01008 to 16-08-08
  13. Change the bal\_due of client\_no CN01003 to 1200
  14. Find the product with description as 'HDD1034' and 'DVDRW'
  15. List the names, city and state of the clients not in the state of 'ASSAM'
  16. List of all orders that were canceled in the of March .

2. Consider the schema for the following databases with specific data type and constraints, the table structure is given below:

**1.Employee**                      F\_Name varchar2( 15) NOT NULL

LName varchar2(15) NOT NULL,  
 Emp\_id varchar2(5) Primary Key,  
 city varchar(10),  
 Gender char(1) ,  
 Emp\_hire\_date date  
 Job\_code varchar(5)  
 Supervisor\_id varchar(5)  
 Dept\_no number(4)  
 Constraint- Emp\_id pK  
 Emp CHECK (Sex IN ('M', 'm', 'F', 'f')),  
 Supervisor\_id Foreign key references emp\_id of employee  
 Dept\_no foreign key references Dep\_no of Department

**2.Department**            DName varchar(15) ,  
                                   DepNo unumber(4)  
                                   Mgr\_id char(9) NOT NULL  
 Constraints- unique(DName),  
 Primary Key (DepNo),  
 Foreign Key (Mgr\_id) REFERENCES employee (emp\_id)

**3.Project**                    PName varchar(15) not ,  
                                   PNumber number(5) not null,  
                                   DepNo number(4),  
  
 Constraints - Primary Key (PNumber),  
 Foreign Key (DepNo) REFERENCES department (DepNo)

**4.Works\_on**                    emp\_id varchar(5) ,  
                                   PNo number(5)  
  
 Constraints - Primary Key (ESSN, PNo),  
 Foreign Key (emp\_id) REFERENCES employee (emp\_id)  
 Foreign Key (PNo) REFERENCES project (PNumber)

**5.Dependent**                    Emp\_id varchar(5) ,  
                                   Dependent\_Name varchar(15) not null,  
                                   gender char(1)  
  
 Constraints - Primary Key (emp\_id, Dependent\_Name),  
 Check (Gender IN ('M', 'm', 'F', 'f')),  
 Foreign Key (emp\_id) REFERENCES employee (emp\_id)

**Write SQL queries for following:**

1. Create above tables with all constraints mentioned.
2. Insert data into above tables.
3. Write the SQL code to change the job code to 501 for the person whose emp\_id is '888665555'. After you have completed the task, examine the results, and then reset the job code to its original value.
4. Write the SQL code that lists all details of employees with a job code of 502.
5. Write the SQL code to delete the row for the person named William Smithfield, who was hired on June 22, 2004, and whose job code classification is 500. (*Hint: Use logical operators to include all the information given in this problem.*)
6. List the names of all employees who work in department 508.
7. Add a new column named salary in employee table.
8. List names and salaries of all employee ordered by salary.
9. List the name of employees whose salary is between 30000 and 50000.
10. List the name of employees who lives in Houston.
11. List department number and number of employees in each department, ordered by number of employees in each department

12. List department number and number of employees in departments that have more than 2 employees, ordered by department number.
13. List the emp\_id of employees who works on project 3388 or project 1945.
14. list department with their manager name(join)
15. List the name of all female employees.
16. List the first name of all employee whose last name begins with letter 'sm'
17. Find the total no of departments.
18. Find the name of senior most employee (max(hire date))
19. Display from the Employees table the first name (fname), last name (lname), employeeID(emp\_id) and job level (job\_lvl) columns for those employees with a job level greater than 200; and rename the column headings to: "First Name," "Last Name," "IDENTIFICATION#" and "Job Level."
20. Show all the different projects for which employee work. Display only projects in which more than four employees are employed.
21. find emp\_id of all employees working in the project in department named research
22. list employees who joined on the date on which 'john' joined.
23. Find the emp\_id who works on project named 'projectF'
24. list the name of female dependents of employee named 'maria'
25. Execute query 23 using join.
26. List employee details along with their dependent's details(use join)
27. List employee details along with their dependent's details and also include employees those do not have dependents
28. List employees with their supervisor name.
29. Change the name of table employee to employee\_details
30. List the name of employees who doesn't has supervisor
31. increase salary of employee with emp\_id 5 by 10%
- 32 delete all the tables.

#### Section -C

1. Study and implementation of basic controls and their properties of Visual Basic 6.0 with help of designing simple forms.
2. Design a form for entering, storing and displaying employee details in employee table mentioned in question no. 2.

#### SQL Quick Reference

	Syntax
AND / OR	SELECT column_name(s) FROM table_name WHERE condition AND/OR condition
ALTER TABLE	ALTER TABLE table_name ADD column_name datatype or ALTER TABLE table_name DROP COLUMN column_name
AS (alias)	SELECT column_name AS column_alias FROM table_name or SELECT column_name FROM table_name AS table_alias
BETWEEN	SELECT column_name(s) FROM table_name WHERE column_name BETWEEN value1 AND value2
CREATE DATABASE	CREATE DATABASE database_name
CREATE TABLE	CREATE TABLE table_name ( column_name1 data_type, column_name2 data_type,

	column_name2 data_type, ... )
DELETE	DELETE FROM table_name WHERE some_column=some_value or DELETE FROM table_name (Note: Deletes the entire table!!) DELETE * FROM table_name (Note: Deletes the entire table!!)
DROP DATABASE	DROP DATABASE database_name
DROP TABLE	DROP TABLE table_name
GROUP BY	SELECT column_name, aggregate_function(column_name) FROM table_name WHERE column_name operator value GROUP BY column_name
HAVING	SELECT column_name, aggregate_function(column_name) FROM table_name WHERE column_name operator value GROUP BY column_name HAVING aggregate_function(column_name) operator value
IN	SELECT column_name(s) FROM table_name WHERE column_name IN (value1,value2,...)
INSERT INTO	INSERT INTO table_name VALUES (value1, value2, value3,...) or INSERT INTO table_name (column1, column2, column3,...) VALUES (value1, value2, value3,...)
INNER JOIN	SELECT column_name(s) FROM table_name1 INNER JOIN table_name2 ON table_name1.column_name=table_name2.column_name
LEFT JOIN	SELECT column_name(s) FROM table_name1 LEFT JOIN table_name2 ON table_name1.column_name=table_name2.column_name
RIGHT JOIN	SELECT column_name(s) FROM table_name1 RIGHT JOIN table_name2 ON table_name1.column_name=table_name2.column_name
FULL JOIN	SELECT column_name(s) FROM table_name1 FULL JOIN table_name2 ON table_name1.column_name=table_name2.column_name
LIKE	SELECT column_name(s) FROM table_name WHERE column_name LIKE pattern
ORDER BY	SELECT column_name(s) FROM table_name ORDER BY column_name [ASC DESC]
SELECT	SELECT column_name(s) FROM table_name
SELECT *	SELECT * FROM table_name
SELECT DISTINCT	SELECT DISTINCT column_name(s) FROM table_name

SELECT INTO	SELECT * INTO new_table_name [IN externaldatabase] FROM old_table_name <i>or</i> SELECT column_name(s) INTO new_table_name [IN externaldatabase] FROM old_table_name
SELECT TOP	SELECT TOP number percent column_name(s) FROM table_name
TRUNCATE TABLE	TRUNCATE TABLE table_name
UNION	SELECT column_name(s) FROM table_name1 UNION SELECT column_name(s) FROM table_name2
UNION ALL	SELECT column_name(s) FROM table_name1 UNION ALL SELECT column_name(s) FROM table_name2
UPDATE	UPDATE table_name SET column1=value, column2=value,... WHERE some_column=some_value
WHERE	SELECT column_name(s) FROM table_name WHERE column_name operator value



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IV SEMESTER**  
**IT-407D UNIX Lab Assignment**

**Assignment 1**

- Q. 1** Explain Unix functional layer model with the help of a diagram.
- Q. 2** Explain any five services provided by an operating system.
- Q. 3** Why Unix is so popular? List any five reasons.
- Q. 4** Write the purpose of following commands in a table :-  
(4.1) `ls -F *.*`  
(4.2) `mkdir dir1 dir1/dir2 dir1/dir2`  
(4.3) `cd ../../`  
(4.4) `mkdir -p asia/India/mp/indore/iips`  
(4.5) `rm -i file1 file2 file3`
- Q. 5** Explain following commands with their options in a table:-  
(5.1) `wc`  
(5.2) `comm`  
(5.3) `split`  
(5.4) `cmp`  
(5.5) `lp`
- Q. 6** (6.1) What does the command `egrep "dan|robin|ben|mari" phone_list` do?  
(6.2) How do you locate lines containing "saxena" and "saksena".  
(6.3) What is the use of the command:- `grep -r "\.p[ly]" *`  
(6.4) Is 'du' a command? If so, what is its use?  
(6.5) Write about the data structure used to maintain file identification?
- Q. 7** What are a pipe, tee and a filter? Give an example of each.

**Assignment 2**

- Q:-1** What do you mean by "UNIX is a layered operating system". Explain?
- Q:-2** Explain the following command with syntax and example :  
1) pipe  
2) time  
3) who  
4) cat  
5) cup
- Q:-3** Differentiate between Internal and External commands used in UNIX
- Q:-4** Explain following option with particular command :  
1. `ls (-x,-F,-r,-l)`  
2. `who (-H,u,a)`
- Q. 5** What are links and symbolic links in UNIX file system?
- Q.6** How does the inode map to data block of a file?

**Assignment 3**

Q 1.

1. What is common option in rm, cp, mv command & what it will do ?
  2. Which character can't be used in a filename ?
  3. Which ls option marks directories and executable separately ?
  4. What does cd do when used without arguments ?
  5. When will rmdir fail to work ?
  6. What will cat f1 f1 f1 display ?
  7. How will you copy a directory structure bar1 to bar2 ?
  8. How will you remove a directory tree even when it's not empty without using rmdir ?
  9. How will you display only the lines common to two files?
  10. Create a file and then assign all permission to the owner and remove all permission from others. How do you do that ?
  11. How will you assign read permission for all to files beginning with a dot and having at least three characters after the dot ?
  12. A user is not able to change a file's permissions. When can that happen ?
  13. How will you double-space a file ?
  14. How will you produce a list of all files in the current directory without headers, but in three columns ?
  15. Select lines 5 to 10 of a file ?
  16. How will you remove duplicate records from a file ?
  17. How will you remove blank lines from a file ?
  18. What does grep "^\" do ? Is the \ really necessary ?
  19. How do you locate lines containing "saxena" and "saksena".
  20. Locate all lines longer than 15 characters ?
  21. Which important attribute of a file is not maintained in the inode ?
  22. If the owner doesn't have write permission on a file, but his group has, can he edit it ?
  23. What will command touch file do ?
  24. What do you do make sure that no one is able to see the names of the files you have ?
  25. A file was not writable by group and others, and yet it could be deleted by them. How ?
  26. When you issue the ls -l command, it changes the access time of the file. True or False ?
- Q:-2 What is Regular Expression ? What is use of it ?

#### Assignment 4

Q. 1 Explain following commands with description:-

1. find
2. finger
3. fg
4. bg
5. nice
6. at
7. batch
8. tar
9. cpio
10. dd

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES  
DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -V**

**JULY-DECEMBER 2020**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-501C	Computer Architecture	3	1	0	4
IT-502A	Microprocessor and Assembly Language	3	1	0	4
IT-505B	Programming in Java	3	1	0	4
IT-511	System Analysis and Design	3	1	0	4
IT-512	Discrete Structures	3	1	0	4
IT-507C	Programming in Java Lab	0	0	4	2
IT-508E	Microprocessor and Assembly Language Lab	0	0	4	2
IT-509	Comprehensive Viva	0	0	0	4
					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years V SEMESTER**  
**IT-501C Computer Architecture**

**Course Outcomes:**

CO1 : Understand the concepts of design and analysis of the hardware of a computer system and its components such as control unit, arithmetic and logical (ALU) unit, input/output, and memory unit.

CO2: Concepts of microprogramming in the design of the central processing unit of a computer system.

CO3: Understand various ways for interconnecting I/O devices to the system.

CO4: Learn basic concepts of parallel processing

**Course Contents:**

**UNIT I**

Introduction and vocabulary, History of computer architecture, Overview of computer organization, Difference between Computer architecture & organization, von Neumann/Turing, IBM 360 series, Moore's law, Performance measurement: IPC, CPI, MIPS, Amdahl's law, CPU performance equation, Speeding it up, Performance Mismatch & Solutions, Instruction cycle, Interrupt cycle, Bus interconnections: Types, Arbitration, PCI.

**UNIT II**

CPU Structure, Registers, User Visible Registers, General Purpose Registers, accumulator organization, general register organization, stack organization of CPU, High level issues in CPU design, Memory: Location, Capacity, Unit of transfer, Access method, Performance (Access, cycle, transfer rate), Physical type (semi conductor or magnetic), Physical characteristics (volatile, erasable etc.), Locality of references, Cache mapping techniques, Cache write policies, Cache initialization, External memory, RAID organization of hard disks.

**UNIT III**

Input/Output: Programmed I/O, Interrupt Driven I/O, Direct Memory Access. Representing information digitally, Byte Ordering: Big-Endian & Little-Endian. Instruction sets, Elements of an Instruction, Instruction Representation, Instruction types, Number of Addresses, Design Decisions [CISC/RISC], Addressing Modes, Large Register File in RISC.

Register and data flow design, data fetch and instruction fetch in indirect instruction cycle, CPU control unit, Functions of Control Unit, Micro-Operations, Micro Programmed Control and Hardwired control unit and their advantages-disadvantages.

**UNIT IV**

Instruction level parallelism: Pipeline design, Synchronous & Asynchronous Pipeline conflicts: Resource conflict, Data dependency, and Branch difficulties. Solutions to deal with pipelining: Hardware interlocks, operand forwarding, Delayed load, Pre fetch target instruction, Branch target buffer, Loop buffer, Branch prediction, and Delayed branch. Super scalar design; Super pipelining, and VLIW processors.

**UNIT V**

Parallel Processing, Flynn's classification: SISD, SIMD, MISD, MIMD. Vector processor, Array Processor, Symmetric multi processing, NUMA, Cache coherence in parallel computing.

**Reference Books:**

1. William Stallings, Computer Organization and Architecture: Design for performance 8th Ed., Pearson Education.
2. Rajkamal, Computer Architecture, ISP 2006, Tata McGraw HILL.
3. Andrew Tanenbaum, Structured computer organization, 4th Ed., Prentice – Hall, Upper Saddle River, NJ, 2000. (Alternate reference)
4. M. Morris Mano, Computer System Architecture, 3rd Ed., Pearson Education.
5. Kai Hwang, Computer Architecture

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years V SEMESTER**  
**IT-502A: Microprocessor & Assembly Language**

**Course Outcomes :**

- CO1: Understand the basic concepts of microprocessor and assembly language programming.
- CO2 : Understand the operation of microprocessors.
- CO3: Assembly language programming skills .
- CO4: Importance of peripheral devices
- CO5 : Case Study of some popular microprocessors.

**Course Contents:**

**UNIT I**

**Microprocessor–Based Systems:** Hardware and Interfacing, Microprocessors, Microcomputers and Assembly Language 8085, Architecture & Memory Interfacing I/O Devices.

**UNIT II**

**Instruction Set and Addressing modes:** Data transfer, Arithmetic, Logical, Branch & Machine control instructions, related programs & Addressing modes.

**Additional Programming Techniques and Stack Operations:** Subroutine, Counters & time delay, Code conversion, BCD arithmetic, 16 bit data operation.

**UNIT III**

**Interrupt & Interfacing some peripheral I/O:** Interfacing data converters, Programmable Interface Devices: 8155 I/O and Timer, 8279 Keyboard / Display interface

**UNIT IV**

**General purpose programmable peripheral devices:** 8255 (Bidirectional data transfer between two computer) 8254 (Programmable Interval Timer), 8259A Interrupt Controller, 8237 DMA, Serial I/O Communication.

**UNIT V**

**Other eight bit, sixteen-bit Microprocessor:** Z80, MC-6800, MC-68000, NSC

**Introduction to advance Microprocessor:** 8086, 80286, 80386, Microcontroller 8051.

**Text Books:**

1. R.S. Gaonkar, Microprocessor Architecture Programming and Application of 8085(Latest Edition).

**Reference Book:**

1. Shridhar and Ghosh, 0000 to 8085 Microprocessor.
2. Intel Corporation, Microprocessors and peripheral hand book.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years V SEMESTER**  
**IT-505B: Programming in Java**

**Course Outcomes :**

- CO1: Understand fundamentals of Java programming language such as its syntax, idioms, patterns, and styles with object oriented programming concepts.
- CO2 : Understanding fundamentals of object oriented programming in the Java, including defining classes, invoking methods, using class libraries etc and exception handling mechanisms.
- CO3 : Have the ability to write a Java program to solve specified problems.
- CO4: Understand the principles of polymorphism and inheritance
- CO5: Identify the usage of interfaces, packages
- CO6: Identify the usage of collection framework

**Course Contents:**

**UNIT I**

Introduction to Java: Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables, Memory concepts, decision making operators, Naming Conventions Introduction to Class, Objects, Methods and Instance Variables, Primitive type Vs Reference Type, Initializing Objects with Constructors. Type conversion & casting, Operators, Control statement, while, do-while, for, foreach Statements, switch Multiple-Selection Statement, break and continue Statements. Static Method, static field and Math Class, Argument Promotion and Casting, Scope of declaration and Method Overloading.

String Handling & Arrays: String Handling: The String constructors, String operators, Character Exaction, String comparison, String Buffer.

Arrays: Declaring and Creating Arrays, Passing Arrays to Method, Multidimensional Arrays, Variable-Length Argument lists, Using Command-line Arguments. Final Instance Variables, this reference, static import, overloaded Constructors, Garbage collection and method finalize, Overloading methods, Parameter passing.

**UNIT II**

Inheritance & Polymorphism: Inheritance: Extending classes, protected Members, relationship between Superclasses and Subclasses, Using super, Constructor in Subclasses

Polymorphism: Method overriding, upcasting, Dynamic Method Dispatch, final Method and classes, Abstract classes and Methods, instanceof operator, Downcasting

Packages and Interfaces: Packages: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, creating own packages.

Interfaces: Defining an Interface, Properties of interface, advantages of interface, Achieving multiple inheritance through interfaces, Variables in Interfaces.

**UNIT III**

Nested Classes & Exception Handling: Nested Classes: Overview of nested class and interfaces, static nested class and interfaces, non-static nested class and, anonymous classes.

Exception Handling: Introduction, overview of doing it and keywords used, when to use it, Java Exception Hierarchy, finally block, chained exceptions, declaring new exception types .

Streams and Files: Introduction to Data Hierarchy, Files and Streams, Sequential-access Text Files, Object Serialization, Random-Access files, Java Stream class Hierarchy.

#### **UNIT IV**

Multithreading: What are threads, The java thread model, Thread priorities, Thread life cycle, Creating thread and executing thread, Thread Synchronization, producer-consumer problem without Synchronization. Producer-consumer problem with Synchronization, Other class and Interfaces in java.util.concurrent, Monitor and Monitor Locks, Thread Groups, Synchronization, Inter-thread Communication.

Introduction to GUI & Applets: Introduction To GUI : Introduction, Overview of swing Components, Displaying text and Images in a window, Introduction to Event Handling, Common GUI Event Type and Listener Interfaces, How Event Handling Works, Adapter Classes, Layout Managers

Applets: Applet basics, Applet Architecture, Applet life cycle methods, Applet HTML Tag and attributes, Executing applet in web browser and in the appletviewer, in Passing parameters to Applets, doing GUI programming in applet.

#### **UNIT V**

Generic & Collection: API Generic: Introduction, Motivation for Generic Methods, Generic Methods : Implementation and Compile- time Translation Issues, Overloading Generic Methods, Generic Classes, Raw Types, Generic and Inheritance

Database connectivity: JDBC, The design of JDBC, Typical uses of JDBC, The Structured Query language, Basic JDBC Programming concepts, Executing Queries.

#### **Text Books:**

1. Deitel & Deitel, JAVA How to Program, Pearson Education, Sixth Edition
2. Herbert Schildt , Java : The Complete Reference, Tata McGraw- Hill, 7th Edition

#### **Reference Books:**

1. John Hubbard , Programming with Java (Schaum's Easy Outline)
2. JAVA 2 Black Book
3. Bruce Eckel , Thinking in Java, Prentice Hall
4. Gary Cornell, Cay Horstmann Core Java: Volume 1 Fundamentals, Eighth Edition, Pearson,
5. Sams Teach Yourself Java6 in 21 Days

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years V SEMESTER**  
**IT-511: System Analysis & Design**

**Course Outcomes :**

CO1 : Understand system characteristics, project management, prototyping, and systems development life cycle phases.

CO2: Transform requirements specification onto practical and achievable design specifications

CO3 : Evaluate a wide range of problems related to the analysis and design of information systems.

CO4: Develop team building and communication and interviewing skills , which are essential to successful system projects

**Prerequisite(s):** Knowledge of following concepts is required, computer applications and software's, computer programming, Database management systems.

**Course Contents:**

**UNIT- I**

**Overview of system analysis and design:** Systems concepts, Definition, Characteristics of a system, Elements of a system, Types of System Physical or Abstract System, Open or Closed Systems, Man-Made Information Systems: Categories of Information, Formal Information Systems, Informal Information Systems.

**UNIT- II**

**System Development Life Cycle:** Recognition of need, feasibility study, Analysis, Design, Implementation, Post implementation and Maintenance, Project Termination, Prototyping.

**Role of the system Analyst:** Definition, Skills, Academic and Personal Qualifications, The Multifaceted Role of Analyst.

**UNIT- III**

**System Analysis:**

**System Planning and the Initial Investigation:** Bases of Planning in System Analysis, Dimensions of Planning, Initial Investigation, Needs Identification, Strategies for Determining Information Requirements, Problem Definition and Project Initiation, Background Analysis: Fact-Finding, Fact Analysis, Determination of Feasibility.

**Structured Analysis:** Introduction, Tools of Structured Analysis: Dataflow Diagrams, Data Dictionaries, Decision Tables, Decision Trees, Structured English.

**Feasibility study:** Introduction, Feasibility Considerations, Feasibility Study Stages, Feasibility Report, Cost/Benefit Analysis.

**UNIT- IV**

**System design:**

**The Process and Stages of System Design: Introduction, The Process of Design:** Logical and Physical Design, Design Methodologies: Structured Design, Form-Driven Methodology – The IPO Charts.

**Input /Output and Form Design:** Introduction, Input Design, Output Design, Form Design.

**File Organization and Data Base Design:** Introduction, File Structure, File Organization, Data Base Design, Views of Data, Data Structure.

**UNIT- V**

**System Implementation, Post Implementation and Maintenance:** Introduction, Testing objectives, System Testing, Types of System Tests, Quality Assurance: Quality Factors Specifications, Levels of Quality Assurance, Post Implementation and Maintenance, Project Scheduling, Project management.

**Text Books:**

1. System Analysis and Design by Elias M. Awad (GALGOTIA Publications)

**Reference Books:**

1. Analysis and Design of Information Systems by V. Rajaraman (PHI Publications)
2. System Analysis and Design & MIS by Anurag Jain (EXCEL BOOKS Publications)



INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

M.Tech. (IT) 5 Years V SEMESTER

Subject Code: IT-512 Subject Name: Discrete Structure

**Course Outcomes :**

- CO1: Understand the notation of mathematical concepts, proofs .  
CO2: Enhance mathematical reasoning  
CO3: Understand Discrete Mathematics such as sets, permutations, relations, graphs, trees and finite-state machines.  
CO4 : Enhance algorithmic thinking and apply in problem solving.

**Course Contents:**

**UNIT I**

*Set theory:* Introduction, sets and elements, universal set and empty set, subsets, Multi-set, Countable and uncountable sets, Venn diagrams, Set operations, Algebra of sets, Power sets, Partitions, Inclusion and exclusion, Mathematical induction, Ordered pair, Cartesian product, Computer representation of sets.

**UNIT II**

*Relations:* Introduction to relations, Pictorial representation of relations, Domain and range, Types of relations, Composition of relations, Equivalence relations, partially ordered relations. *Functions:* Introduction to functions, functions in terms of ordered pairs, Pictorial representation of functions, Types of functions: surjective, bijective, injective, etc., Inverse function, Equality of functions, Composition of functions.

**UNIT III**

*Logic:* Propositions and logic operations, Existential and universal quantifiers, Tautologies, Contradiction, Contingency, Logical equivalence.

*Boolean algebra:* Combinatorial circuits and their properties, Boolean functions and synthesis of circuits. *Lattices:* Partially ordered sets, Chains and anti chains, Representation and construction of Hasse diagrams, Special elements in POSETs, Lattices.

**UNIT IV**

*Graph Theory-I:* Definition and applications, Finite and infinite graphs, Incidence and degree, Isolated vertex, Pendent vertex, Types of graph, Subgraphs and isomorphic graph, Operations of graph, Paths, Cycles and connectivity, Eulerian and Hamiltonian graph, Planar graphs, Trees, Fundamental properties of trees, rooted and binary trees, spanning trees, fundamental circuits.

**UNIT V**

*Graph theory-II:* Cut sets and their properties, connectivity and separability, Network flows, 1 and 2 isomorphism, Matrix representation of graphs: Incidence and adjacency matrices, Diagraphs and shortest path algorithms, Applications of graphs, General discussion.

**Reference Books:**

1. J.P.Tremblay and R. Manohar . Discrete mathematical structures with applications to computer science, Tata McGraw Hill Publication
2. C.L.Liu . Elements of Discrete Mathematics, Tata McGraw Hill Publication
3. Llipschutz and Lipson. Discrete Mathematics, Schaum's outline series, Tata McGraw Hill Publication
4. K.A.Ross . Discrete Mathematics.
5. Bernard Kolman & Robert C. Busby. Discrete mathematical structures for Computer Science

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years V SEMESTER**  
**IT-507C Programming in Java Lab Assignment**

SNo.	Program related to UNIT -I
1.	Write a program that produces the following output:  Hello World!  It's been nice knowing you.  Goodbye world!
2.	State the order of evaluation of the operations in each of the following Java statements and implement them to show the value of x after each statement.  (1) $x = 7 + 3 * 6 / 2 - 1$ ; (2) $x = 2 \% 2 + 2 * 2 - 2 / 2$ ; (3) $x = ( 3 * 9 * ( 3 + ( 9 * 3 / (3) ) ) )$ );
3.	Write an application that declares 5 integers, determines and prints the largest and smallest in the group.
4.	Write an application that declares 5 integers, calculates and print the average of these numbers.
5.	Write an application that declares two integers, determines whether the first is a multiple of the second and print the result. [ Hint : Use the remainder operator.]
6.	Write an application that calculates the product of the odd integers from 1 to 15.
7.	Write an application that evaluates the factorial of the integers from 1 to 5.
8.	Write an application Program to demonstrate your first object in java.
9.	Write an application Program to demonstrate all control statements(selection,iteration and transfer).

10.	Write an application Program to demonstrate Method call activation records.
11.	Write an application Program to demonstrate Method overloading.
12.	Write an application for calculating Compound-interest (interest rate of 5% for 10 years) with for loop.
13.	Write an application for demonstrating with for-each loop.
14.	Write an application for demonstrate all shift operators.
15.	Modify the above compound-interest application to repeat its steps for interest rates of 5, 6, 7, 8, 9 and 10%. Use a for loop to vary the interest rate.
16.	Write an application Program of factorial number.
17.	Write an application Program of fibonacci series.
18.	Write an application Program of armstrong number.
19.	WAP to determine whether an entered number is prime or not.
20.	WAP in java to implement Selection Sort Algo.
21.	WAP in java to implement Bubble Sort Algo.
22.	WAP in java to implement Binary Search Algo.
23.	WAP in java to demonstrate Stack class.
24.	WAP in java to demonstrate Anonymous Array.
25.	Write a Java program that randomly fill a 3 by 4 by 6 array and then prints the largest and smallest values in the array.
26.	WAP in java to demonstrate 3D Array.
27.	WAP in java to demonstrate VARANGS.
28.	WAP in java to demonstrate Scanner class.
29.	WAP in java to demonstrate Enumarated data type.
30.	Write an application that uses String method equals and equalsIgnoreCase to tests any two string objects for equality.
31.	Write an application that uses String method indexOf to determine the total number of occurrences of any given alphabet in a defined text.
32.	Write an application that uses String method concat to concatenate two defined strings.
33.	Write an application that finds the length of a given string.
34.	Write an application that uses String method charAt to reverse the string.
35.	Write an application that finds the substring from any given string using substring method and startsWith & endsWith methods.
36.	Write an application that changes any given string with uppercase letters, displays it , changes

	it back to lowercase letters and displays it.
	Program related to UNIT -II
37.	Create a class called Employee that includes three pieces of information as instance variables – a first name (type String), a last name (type String) and a monthly salary (double)
38.	Create a constructor in above class to initialize the three instance variables. Provide a get method for each instance variable.
39.	Write a test application named EmployeeTest that demonstrates class Employee’s capabilities. Create two employee objects and display each object’s yearly salary.
40.	Give each employee a 10% raise and display each Employee’s yearly salary again.
41.	Create a class Account with an instance variable balance (double). It should contain a constructor that initializes the balance, ensure that the initial balance is greater than 0.0.
42.	Create two methods namely credit and getBalance. The first one adds the amount (passed as parameter) to balance and does not return any data. The second method allows clients (i.e. the other classes that use this class) to obtain the value of a particular Account object’s balance.
43.	Create class AccountTest to create and manipulate an Account object.
44.	Write another method debit in the above program that withdraws money from an Account. Ensure that the debit amount does not exceed the Account’s balance. In that case the balance should be left unchanged and the method should print a message indicating “Debit amount exceeded account balance”. Modify class AccountTest to test method debit.
45.	Write an application that reads a five digit integer and determine whether it is a palindrome (digit that reads the same backward and forward eg. 12321, 45554 etc.) . display an error message, if the number is no5 five digits long and allow the user to enter a new value.
46.	Write an application that reads three nonzero value entered by the user and determines and prints sum, product, average, smallest & largest of three.
47.	Write an application that prompts the user for the radius of a circle and uses a method called circleArea to calculate the area of the circle.
48.	Add another method in the above program circlePerimeter to calculate the perimeter of the circle.
49.	Write an application to create a super class Employee with information first name & last name and methods getFirstName(), getLastName() derive the sub-classes ContractEmployee and RegularEmployee with the information about department, designation & method displayFullName() , getDepartment, getDesig() to print the salary and to set department name

	& designation of the corresponding sub-class objects respectively.
50.	Derive sub-classes of ContractEmployee namely HourlyEmployee & WeeklyEmployee with information number of hours & wages per hour, number of weeks & wages per week respectively & method calculateWages() to calculate their monthly salary. Also override getDesig () method depending on the type of contract employee.
51.	Write an application to create a super class Vehicle with information vehicle number,insurance number,color and methods getConsumption() and displayConsumption(). Derive the sub-classes TwoWheeler and FourWheeler with method maintenance() and average() to print the maintenance  And average of vehicle.
52.	Extend the above TwoWheeler class with methods getType() and getName() which gives the information about the type and the name of the company.Create sub-classes Geared and NonGeared with method average() to print the average of a geared and non-geared two wheeler.
53.	Create a super class CommunityMember with the information of member i.e. name, address, contact, date_of_join, through methods getName (), getAddress (), getContact (), getDate_of_Join () and derive sub-classes Employee and Student with method Qualification () to print the related information with his/her qualification.
54.	Create a super class Shape with methods getName() which gives the information about the type of the shape.derive its sub-classes TwoDim and ThreeDim with method area() and volume() respectively which prints the area and volume of a two-dimensional and three-dimensional shape.
55.	Extend the class TwoDim with methods getLength(),getBreadth() which displays the length and breadth of two dimensional shapes.Derive sub-classes rectangle, rhombus with method getArea() and getPerimeter() to calculate the area and perimeter of this two dimensional shapes. .
56.	Extend the class ThreeDim with methods getLength(),getBreadth(),getHeight() which displays the length , breadth and height of three dimensional shapes.Derive sub-classes cuboid,tetrahedron with method getArea() and getVolume() to calculate the area and volume of this three dimensional shapes. .
57.	Create a super class Student with methods getQual (), getFirstName(),getLastName(), getAddress(), getContat(), which gives basic details of student.derive sub-classes Faculty and Scholar with method salary(), Course() resp. which gives the additional information about the salary and course of faculty and scholar resp. .
58.	Create an abstract class Shape which calculate the area and volume of 2-d and 3-d shapes with methods getArea and getVolume. Reuse this class to calculate the area and volume of

	square ,circle ,cube.
59.	Create an abstract class Employee with methods getAmount() which displays the amount paid to employee. Reuse this class to calculate the amount to be paid to WeeklyEmployee and HourlyEmployee according to no. of hours and total hours for HourlyEmployee and no. of weeks and total weeks for WeeklyEmployee.
60.	Create an Interface payable with method getAmount ().Calculate the amount to be paid to Invoice and Employee by implementing Interface.
61.	Create an Interface Vehicle with method getColor(),getNumber(),getConsumption(). Calculate the fuel consumed, name and color for TwoWheeler and FourWheeler by implementing interface Vehicle.
62.	Create an Interface Fare with method getAmount() to get the amount paid for fare of travelling. Calculate the fare paid by bus and train implementing interface Fare.
63.	Create an Interface StudentFee with method getAmount(), getFirstName(),getLastName(), getAddress(), getContact(). Calculate the amount paid by the Hostler and NonHostler student by implementing interface StudentFee
64.	WAP to create your own package. Package should have more than two classes. Write a class that uses the package.
65.	Create a package named org.shapes. Create some classes in the package representing some common geometric shapes like Square, Triangle, Circle and so on.
Program related to UNIT -III	
66.	Exception Handling program for division of two numbers that accepts numbers from user.
67.	Exception Handling program for storing values in array of int or String that results into buffer overflow
68.	Exception Handling program for NullPointerException--thrown if the JVM attempts to perform an operation on an Object that points to no data, or null
69.	Exception Handling program for NumberFormatException--thrown if a program is attempting to convert a string to a numerical datatype, and the string contains inappropriate characters (i.e. 'z' or 'Q')
70.	Exception Handling program for ClassNotFoundException--thrown if a program can not find a class it depends at runtime (i.e., the class's ".class" file cannot be found or was removed from the CLASSPATH)
71.	Exception Handling program for IOException--actually contained in java.io, but it is thrown if the JVM failed to open an I/O stream

72.	Write a program that shows that the order of the catch blocks is important. If you try to catch a superclass exception type before a subclass type, the compiler should generate errors.
73.	Program for demonstrating the use of throw, throws & finally - Create a class with a main( ) that throws an object of class Exception inside a try block. Give the constructor for Exception a String argument. Catch the exception inside a catch clause and print the String argument. Add a finally clause and print a message to prove you were there.
74.	Create your own exception class using the extends keyword. Write a constructor for this class that takes a String argument and stores it inside the object with a String reference. Write a method that prints out the stored String. Create a try-catch clause to exercise your new exception.
75.	Write a program to rethrow an exception – Define methods one() & two(). Method two() should initially throw an exception. Method one() should call two(), catch the exception and rethrow it Call one() from main() and catch the rethrown exception.
76.	Write a program to change the priority of thread.
77.	WAP for producer consumer problem (with synchronization).
78.	Open a text file so that you can read the file one line at a time. Read each line as a String and send the results to System.out.
79.	Modify Exercise 1 so that the name of the file you read is provided as a command-line argument.
80.	Modify Exercise 2 to force all the lines in the results to upper case and send the results to System.out
81.	Modify Exercise 2 to also open a text file so you can write text into it.
	Program related to UNIT -IV
82.	Create an application to draw a horizontal line.
83.	Create an application to draw one line perpendicular to other. One line parallel to other.
84.	Create an application to display a circle within rectangle
85.	In the above application fill different colors in the circle & rectangle.
86.	Write an application that displays any string. Choose color from combo box to change the color of this displayed string.
87.	WAP to demonstrat AWT buttons with event handling.
88.	WAP to demonstrat BorderLayout in AWT window.
89.	WAP in java to create a file.
90.	WAP in java to delete a file.

91.	WAP in java to determine a file or dir exist or not.
92.	WAP in java to determine whether a file or dir.
93.	WAP in java to exit from a Frame window when we click on Close button.
94.	WAP in java to move a file.
95.	WAP in java to read a file using FileReader and break the contents using StringTokenizer.
96.	WAP in java to write into a file using FileWriter.
97.	WAP in java to demonstrate RandomAccessFile.
98.	WAP in java to rename a file.
99.	WAP in java to get file length.
100.	WAP in java to reverse a string by word.
101.	WAP in java to demonstrate StringTokenizer class.
102.	WAP to create your own package in defined a class StringUtils in this package.
103.	WAP in java to create thread that print counting by extending Thread class.
104.	WAP in java to demonstrate current thread.
105.	WAP in java to create a thread using Runnable interface.
106.	WAP in java to determine whether a thread is alive or not.
107.	WAP in java to demonstrate join() method of Thread class.
108.	WAP in java to implement toString() method in your class to print objects.
	Program related to UNIT -V
109.	WAP to change background color according to selected color from combo box.
110.	Write a program in java to scroll a string using Applet.
111.	WAP in java to demonstrate all mouse events.
112.	WAP in java to demonstrate all keyboard events.
113.	WAP in java to demonstrate GridLayout.
114.	WAP in java to create an Applet having status bar.
115.	WAP in java to demonstrate Color class.
116.	WAP in java to event handling using adapter class.
117.	WAP in java to demonstrate Check Boxes in applet.
118.	WAP in java to demonstrate Calendar class.
119.	WAP in java to display all available fonts in an applet window
120.	WAP to copy the content of a file to another file.
121.	WAP in java to demonstrate Random class.
122.	WAP in java to create an Applet that's background color will be change on each second.
123.	WAP in java to sum two 2-D matrix and store the result into third matrix.
124.	Create a program that will print every argument given on the command line. consider how your program will deal with no argument.
125.	WAP to draw a string and choose its size respectively from combo box.
126.	WAP in java to demonstrate data entry program.
127.	Create an application of cash withdrawal from the bank account that have no. of users that are operating the accounts.( synchronization)
128.	WAP to create three text boxes and save entered value into a file.
129.	Implement a class Reader that count the number of times a particular character, such as e, is



		read. The character can be specified when the stream is created.
130.		Construct a program Wc ("word count"), which counts number of chars, words and lines of the text file. Space is counted as a character. Empty rows are counted as lines. "Word" will represent a string.
131.		Write a small application with a default date 01/01/2000 and three combo boxes displaying valid days, months & year(1990 – 2050). Change the displayed date with the one chosen by user from these combo boxes.
132.		Create a GUI with a text field and three buttons. When you press each button, make some different text appear in the text field.
133.		Create a GUI application to take input of two numbers(text field) from user. When you press button it should display sum of the two numbers in a third text box.
134.		Create an applet with a Button and a TextField. Write a referenceEvent( ) so that if the button has the focus, characters typed into it will appear in the TextField.
135.		Write an application to create a GUI with two buttons such that clicking on the first displays the message "Welcome to SCS" on the window and clicking on the second changes the color of the message(hint : toggle the color)
136.		Create a GUI with title STUDENT which has labels roll no., name, class, address with textboxes for taking input from the user(without any functionality).
137.		Create a GUI application for fees receipt which contains checkboxes for selecting the course, radio buttons for selecting gender and labels and corresponding textboxes for name, class, date and amount paid.
138.		Create a GUI application to display a calculator using grid Layout (You do not have to provide functionality).
139.		WAP that generate a random number (1 – 10000). Let the user guess the correct number. User will enter the digit. Program should let the user that input is right or wrong. No of turns that user can make a choice for input is twice the number of digits in the system generated numbers.
140.		Convert the input date in words. Input format is dd mm yy.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M.Tech. (IT) 5 Years V SEMESTER**

**IT-508E Microprocessor and Assembly Language Programming Lab Assignment**

1. Exchange of two variables through
  - (a) Memory Location (b) Two Register (c) Register and Memory location
2. Program to add 2 numbers from
  - (a) Two Memory Location (b) Two Register (c) Register and Memory location
3. Program to subtract 2 numbers from
  - (a) Two Memory Location (b) Two Register (c) Register and Memory location
4. Program to OR contents of register and accumulator.
5. Program to XOR contents of register and accumulator.
6. Program to check equality of 2 numbers.
7. Program to divide decimal 42 by 5 and store result in register D.
8. Program to multiply decimal 04 and 05.
9. Program to generate Fibonacci series at memory location from 2050 to 2059.
10. Program to find square root of decimal 36.
11. Program to find factorial of any number.
12. Program to find minimum of 10 numbers.
13. Program to find maximum of 10 numbers.
14. Program to add contents of memory location 2050 and 2051 and store result at 2090.
15. Program to find minimum of 2 numbers.
16. Program to AND contents of register and accumulator.
17. Program to multiply 2 decimal numbers in which result is greater than 8 bits.
18. Program to check 4<sup>th</sup> bit of a 8 bit number.
19. Program to add two 16 bit numbers.
20. Program to find summation ( $n*n$ ) where n varies from 1 to 8.
21. Program to add 2 BCD numbers.
22. Program to arrange numbers in ascending order stored which are at memory location: 2050 to 2059.
23. Program to arrange numbers in descending order which are stored at memory location: 2050

to 2059.

24. Program to subtract two 16 bit numbers.
25. Program to demonstrate use of ADC.
26. Program to exchange contents of DE and HL register pair.
27. Program to implement UP counter.
28. Program to implement DOWN counter.
29. Program to convert a number from hexadecimal to binary.
30. Program to implement above question with help of sub routine.
31. Program to compliment contents of the accumulator.
32. Program to find smallest element in the array.
33. Program to find largest element in the array.
34. Program to arrange array in ascending order.
35. Program to arrange array in descending order.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -VI**

**JANUARY-MAY 2021**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-601A	Computer Network and Security	3	1	0	4
IT-612	System Programming	3	1	0	4
IT-610	Advanced Java	3	1	0	4
IT-603A	Web Technology	3	1	0	4
IT-605A	Analysis and Design of Algorithms	3	1	0	4
IT-609A	Advanced Java Lab	0	0	4	2
IT-608E	Web Technology Lab	0	0	4	2
IT-607	Comprehensive Viva	0	0	0	4
					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M.Tech (5 Years) VI SEMESTER**

**IT-601A: Computer Networks and Security**

**Course Outcomes:**

- CO1: Understand about network components, topologies, network models, protocols and algorithms.
- CO2: Understand the functions of OSI reference and TCP/IP model.
- CO3: Knowledge of the functions of Application layer and Presentation layer paradigms and Protocols.
- CO4: Understand the Session layer design issues and Transport layer services.
- CO5: Exposure of Network layer and routing algorithms, congestion handling mechanisms
- CO6: Exposure of cryptography and various network security algorithms.

**Course Contents:**

**Unit I.**

**Introduction**

Uses of Computer Networks, Network Hardware: LAN, MAN, WAN, Wireless Network, Internetworks; Network Software: Protocol hierarchies, Design issues for the layers, Connection Oriented and Connection less Services, Service Primitives; Reference Models: OSI, TCP/IP, Comparison of OSI and TCP reference models.

**Overview of The Physical Layer**

Guided & Unguided Transmission media, Multiplexing Techniques: Frequency Division Multiplexing, Wavelength Division Multiplexing, Time Division Multiplexing; Switching: Circuit Switching, Message Switching, Packet Switching; Ethernet cabling, Manchester encoding, Differential Manchester Coding.

**Unit II.**

**The Data Link Layer**

Data Link layer design issues, Elementary Data Link protocols: Unrestricted simplex protocol, Simplex stop-and-wait protocol, Simplex protocol for a noisy channel; Sliding Window protocols: One-bit sliding window protocol, Protocol using Go back N, Example Data link protocol: Higher Level Data Link Control, Data link layer in the internet;

**The Medium Access Control Sublayer**

The Channel Allocation problem, Multiple access protocols: ALOHA, Pure ALOHA, Slotted ALOHA, Carrier Sense Multiple Access protocols, Persistent and Non persistent CSMA, CSMA with collision detection, Collision-Free protocols: Bit map protocol, Binary countdown; Limited Contention protocols; Brief introduction to IEEE 802 standards; Ethernet MAC address,.

**Unit III.**

**The Network Layer**

Network layer design issues, Routing Algorithms: Optimality principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing; Congestion Control Algorithms: Congestion Prevention Policies, Jitter Control, Techniques for achieving good quality of service, Congestion control for multicasting; Internetworking, The Network layer in the Internet.

**Unit IV.**

**The Transport Layer**

The Transport service, Elements of Transport protocols: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing, Crash recovery; A simple Transport protocol, The Internet Transport protocols: UDP, TCP.

**Unit V.**

**The Application Layer and Network Security**

Introduction to Application Layer and Application layer protocols, DNS, E-mail, WWW, Network Security: Cryptography: Introduction to cryptography, Fundamental Cryptographic Principles; Symmetric key encryption, Symmetric Key Algorithms: DES, Cipher Modes, Cryptanalysis; Public-Key Algorithms: Public-Key encryptions, Digital Signature, Management of public keys, Authentication protocols, E-mail Security

**Text Book:**

[1] Andrew S Tanenbaum, Computer Networks, PHI publications, 5th Edition, 2012.

**Reference Books:**

[1] Forouzan, Behrouz A., Mosharraf Firouz., *Computer Networks A Top-Down Approach*, TaTa McGraw Hill publications, First Edition, 2012.

[2] Stallings, William, *Data & Computer Communications*, Pearson Education Asia, 6th Edition, 2001

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 Years) VI Semester**  
**IT-612: System Programming**

**Course Outcomes:**

- CO1: Understand basic concepts of system software and system programming.
- CO2: Learn the design of assemblers, compilers and preprocessors.
- CO3: Understand the structure and design of assembler, compiler, linker and loader.
- CO4: Understand the concept and theory behind the implementation of high level languages.

**Course Contents:**

**UNIT I**

Introduction to Software: System Software and Application Software, System Programming, Components of Language Processing System, Fundamentals of Language processing systems.

**UNIT II**

Assembler: Elements of Assembly Language programming, a simple Assembly Scheme, Pass Structures of Assemblers, Design of a Two-pass Assembler, Algorithms for two pass assembler.

**UNIT III**

Macros and Macro Processors: Macro definition and call, macro expansions, nested macro calls, Advance Macro facilities, Design of Macro Preprocessor and macro Assembler.

**UNIT IV**

Compiler: Compiler and Translators, cross compilers, phases in compiler Design, design of Lexical analyzer.

**UNIT V**

Loaders and Linkers: General loader scheme, Absolute loading, Relocating loading, Dynamic Run Time Loading, Linker, Dynamic Linker, Re-locatable and self-relocating programs.

Software Tools: Software tools for program development, Editors, Debugger, Debug Monitors, Programming Environments, User Interfaces, Co-routines and reentrant programs.

**Text Book:**

1. John. J. Donovan, System Programming, Tata McGraw Hill.

**Reference Books:**

1. D. M. Dhamdhare, System Programming and Operating System, 5th edition
2. Aho and Ullman , Principles of Compiler Design, Pearson Education.
3. Leland L. Beck, "System Software An Introduction to Systems Programming", Pearson Education 3rd Edition.
4. Douglas. V. Hall , "Microprocessors and Interfacing", Tata McGraw Hill.
5. Assembly Language Techniques for IBM PC, BPB Publication, Alan R. Millar

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VI SEMESTER**  
**IT-610: Advanced Java**

**Objectives:**

- CO1: Design and develop an understanding of the web applications of Java.
- CO2: Learn Java programming language with new and enhanced versions.
- CO3: Develop skills to program GUI, Threads, Servlets and JSP based systems.
- CO4: Develop distributed object applications.

**Course Contents:**

**UNIT I**

**Collections:** Collection Interfaces, Concrete Collections, the Collections Framework **Multithreading:** Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of thread.

**UNIT II**

**Networking:** Internet Addressing, InetAddress, Factory Methods, Instance Method, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams

**Java Database Connectivity (JDBC):** Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures C

**UNIT III**

**Servlets:** Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession.

**UNIT IV**

**Java Server Pages (JSP):** Introduction, Java Server Pages Overview, A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries.

**UNIT V**

**Remote Method Invocation:** Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client

**Common Object Request Broker Architecture (CORBA):** Technical/Architectural Overview, CORBA Basics, CORBA services

**Text Books:**

- Core JAVA Volume-II- Advanced Features, 9<sup>th</sup> edition , Horstmann Cornell- Pearson.
- “Advanced Java 2 Platform HOW TO PROGRAM” by H. M.Deitel, P. J. Deitel, S. E. Santry – Prentice
- “Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional” by Antonio Goncalves
- Head First Servlets and JSP, Bryan Basham, O'Reilly

**Reference Book/Web:**

- Deitel & Deitel, JAVA How to Program, Pearson Education, Sixth Edition
- Herbert Schildt , Java : The Complete Reference, Tata McGraw- Hill, 9th Edition
- <http://www.w3schools.in/java/>
- <http://www.tutorialspoint.com/>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Yrs. VI SEMESTER**  
**IT-613A: Web Technology**

**Course Outcomes:**

CO1: Understand the fundamental concepts of working of internet.

CO2: Design, format and link web pages

CO3: Write dynamic interfaces using JavaScript.

CO4: Connect databases to web sites.

CO5: Develop web application using HTML, CSS, XML, JavaScript etc.

**Course Contents:**

**UNIT I**

Introduction to computer networks and Internet Basics: Client Server Architecture, Internet Service Provider (ISP), Search Engines, Web Browser Architecture, Internet Addressing: IP Address IPv4 and IPv6, Domain address, Uniform Resource Locator (URL), Internet Services: FTP, Telnet, E-mail (SMTP), WWW (HTTP), DNS.

**UNIT II**

Hypertext Markup Language (HTML): Web Terminologies, Web Characteristics, Effective web programming, Web Documents: Static, Dynamic, Active, Browser Architecture, Characteristics of HTML, Types of Tags, Basic Tags, List, Table, and Introduction to HTML 5 tags.

**UNIT III**

Dynamic Hypertext Markup Language (DHTML): Introduction, Cascading Style Sheet (CSS): Introduction, Attributes, Types (Inline style, Style element, External Style Sheet), Class, Introduction to CSS-3, Media Query, Responsive Site development. Use of CSS Library like *Bootstrap*.

**UNIT IV**

JavaScript: Client side Vs Server side scripting, Introduction to Client side scripting, Document Object Model (DOM), Variables, functions and events, Data Types and operators, Decision making with control structure and statements, Forms, Cookies, AJAX, Use of JavaScript library *jQuery*.

**UNIT V**

Introduction to PHP, connecting php pages to RDBMS, creating Server-side Applications with PHP, Introduction to Extensible Markup Language (XML).

**Required Text(s) :**

1. Data Communication and Networking By Behrouz A. Forouzan (Tata McGraw Hill)
2. Web enabled commercial application By Ivan Bayross (BPB)

**Reference Books:**

1. HTML By Herbert Schildt
2. Web Programming By Chris Bates.
3. HTML 5 and CSS 3: Develop with Tomorrow's Standard Today( Pragmatic Programmers) By Brian P. Hogan
4. Learning jQuery By Jonathan Chaffer & Karl Swedberg (PACKT Publishing)

**Electronic Materials, Web Sites etc:**

1. <http://www.w3schools.com/html/>
2. <http://www.w3schools.com/css/>
3. <http://www.w3schools.com/js/>
4. <http://www.w3schools.com/css3/>
5. <http://www.jquery.com>



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 Years) VI Semester**  
**IT-605A: Analysis and Design of Algorithm**

**Course Outcomes:**

CO1: Learn good principles of algorithm design.

CO2: Understand the application of algorithms and design techniques to solve problems.

CO3: Analyze the complexities of various problems in different domains and design efficient algorithms.

CO4: Understand asymptotic notation to provide a rough classification of algorithms

CO5: Study algorithms for fundamental problems in computer science and engineering work and compare with one another.

CO6: Understand the problems for which it is unknown whether there exist efficient algorithms or even algorithm

**Course Contents:**

**UNIT I**

Introduction to Algorithms: Definition, Algorithm Specification, Performance analysis. Review of Data Structures: Stacks, Queues, Trees and Graphs.

**UNIT II**

Divide and Conquer: General Method, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Selection Sort, radix sort.

Dynamic Programming:- The General Method, Matrix Chain Multiplication, Memoisation, Memoised Fibonacci series computation. 0/1 Knapsack, Traveling Salesperson Problem.

**UNIT III**

The Greedy Strategy: General Method, Knapsack Problem, Job Sequencing with deadlines, Minimum Cost Spanning Trees - Prim's Algorithm, Kruskal's Algorithm

**UNIT IV**

Basic Traversal and Search Techniques:- Techniques for Binary Trees and Graphs  
Back Tracking:- The General Method, The 8-Queens Problem  
Branch And Bound:- The General Method, Traveling Salesperson Problem.

**UNIT V**

NP-Hard and NP-Complete Problems:- The Basic Concepts, Non-Deterministic Algorithms, The Classes NP-Hard & NP-Complete.

1. Thomas H. Cormen, Charles E. Leiserson, Donald L. Rivest. Introduction to Algorithms. Indian Edition Published.
2. Ellis A. Horowitz, Sartaj Sahni, Fundamentals of Computer Algorithm, Computer Science Press.

**International Institute of Professional Studies  
Devi Ahilya University, Indore  
IT-608E : Web Technology Lab  
Lab. Assignment**

1) Write HTML code for each, ordered list and unordered list with its all type ( 1,a,A,l etc. and bulled, circle etc.) for List of IIPS, SCSIT, IMS list item.

2 Write the HTML code for following list output and background of web page is of , different color than white(use rgb() function for color.) ?

- IIPS
- IET
- IMS

Above items are **anchor** and on clicking IIPS it open iips webpage and on clicking IET it opens iet webpage and on IMS it open IMS webpage.

3) Write the HTML Code for the following Table Structure :

Year	Course Name				Total Student
	MCA	M.Tech.	MBA(MS)	B.Com.	
2008	500	150	600	450	1700
2009	520	140	550	400	1610
<b>Grand Total</b>					3310

4)What is Image Map? How many type of Image Map are used in HTML and explain each type with example (HTML Code)?

5)Write a HTML page to show usages of **HTML Table tag** and its attributes. Define following attributes of Table **CELLSPACING, CELLPADDING, ROWSPAN and COLSPAN?**

6) Write HTML code for showing **International Institute of Professional Studies** in H1-H5 tags.

7) Write HTML code for 4 Horizontal Line with

- i) size=10 ii) width = 50% and noshade iii) width=200 size=3 and noshade
- iv) width = 100 and align = right

8) Create a main page in which there is 2 Column of 20% and 80%. In on column show Menu.html file which contain the list of Department of University (IIPS, IMS, etc) and on clicking particular department it opens the **departmentname.html**(like iips.html,ims.html etc ) file in the second column.

9) Create a Box class in style sheet and assign it to 2 **div** tags in one div show the information about University and other will show the information about IIPS. Box class have the following attributes values.

**border: 1pt;**  
**border-color: red;**  
**border-style: solid;**  
**width: 0%;**  
**margin: 1em;**  
**padding: 0.5em;**  
**background-color : #ddddaa**

10) Write a HTML for testing marquee tag with all its attributes. Put some anchor inside marquee also.

11) Write the HTML Code for the following Table Structure. If you click on Yahoo then it open <http://yahoo.com> and if you click google then it open <http://google.com> in below IFrame. :

<b><u>Yahoo</u></b>	<b><u>Google</u></b>
It Is IFrame	

12) Write HTML and CSS code for below given Table . In CSS you should use the class named *even* and *odd* for describing background color and foreground color of the even rows and odd rows of the table.

Year	Course Name		Total Student
	MCA	M.Tech.	
2008	500	150	650
2009	520	140	660
2010	600	200	800
<b>Grand Total</b>			2110

Diagram labels: "Even Rows" points to the 2008, 2009, and 2010 rows. "Odd Rows" points to the 2009 and 2010 rows.

13) Write code for showing example of window.open(), alert(), prompt() methods and its attribute?

14) Write code for following CSS3 Property, create some <div> tag and apply following css property on them:

- transform.
- Scrollbar

15) Write HTML, CSS code for the following animation task.

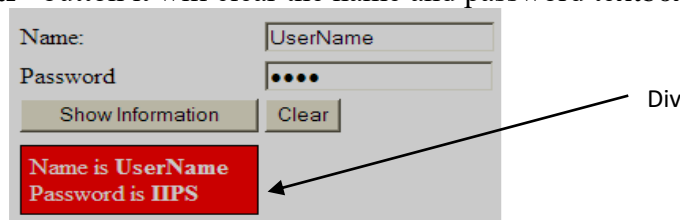
Your web page have a divs element, whose original coordinates are top 100px,left 100px, width 100 px and height 100px. Your animation works for 10 seconds and in this period its:

- background color will have to change from red to green,
- its size to double.

16) Write the javascript, html and CSS code for the below given design: this web page shows the client side clock and it will update its time on each second.



17 ) Write the HTML, JavaScript and CSS code for the following design: when user click on the “**Show Information**” button it show the name and password value in below given div and when user click “**Clear**” button it will clear the name and password textbox.



18) Write the PHP code for the following information:

Your database server url is =>**10.81.203.8:8558** ,  
 User Name =>**IIPS** ,

Password =>IIPSPwd ,

Database Name=>StudentDB .

There is a table **StudMast(Stu\_ID int, Stu\_Name Varchar(50), CGPA number(5,2))** in above said database. Your PHP page should read Stu\_ID, Stu\_Name and CGPA from user by HTML Forms input elements and then save them in database.

19) Write the PHP code for the following information:

Your database server url is =>**10.81.203.8:8558** ,

User Name =>IIPS ,

Password =>IIPSPwd ,

Database Name=>StudentDB .

There is a table **StudMast(Stu\_ID int, Stu\_Name Varchar(50), CGPA number(5,2))** in above said database. Your PHP page should show all records of the table from Database. Sample layout of web page is as follows:



The screenshot shows a web page with the text "Student List is :" followed by a table titled "Table: studmast". The table has three columns: stu\_id, stuname, and cgpa. The data rows are: (1, Kamlesh, 8.72), (2, Prakash, 9.12), and (3, Shyam, 8.88).

stu_id	stuname	cgpa
1	Kamlesh	8.72
2	Prakash	9.12
3	Shyam	8.88

20) Write a HTML page to test various CSS properties like transform, transition, animation, box-shadow etc.

21) Create your resume by HTML tags and beautify it by CSS selectors (H1, anchore, :hover etc.)

22) Write the necessary code for the web page. Your web page has 6 different images. All images has same width and height 200px X 200px and when you move mouse over a particular image, its size goes 1.5 times and a shadow will appear around the image and this action should take 1/10 seconds to complete.

23) Write the javascript, html and CSS code for the below given design: this web page shows the Simple Interest and other information in given format, when the **"Calculate Simple Interest"** Button is clicked. If we clicked the **"Clear"** button, it will clear all the entries. You can use *jQuery* syntax.

Principal Amount	<input type="text" value="15000"/>
Rate of Interest	<input type="text" value="10.25"/>
Time in Years	<input type="text" value="1"/>
<input type="button" value="Calculate Simple Interest"/>	<input type="button" value="Clear"/>

Principal Amount = 15000  
Rate of Interest =10.25  
Time : 1 Years  
Simple Interest is 1537.5 Rs.

← This is div

24) Write the PHP code for displaying the server date and time.

25) Create a XML file for following table structure.

SNo	RollNo	Name	
		FirsrName	LastName
1	10001	Akash	Mishra
2	10002	Mukesh	Jain

26) Write HTML, CSS and JavaScript code for the design given below. Stopwatch should show hours, minutes, seconds and 1/10<sup>th</sup> second in a div. There are 2 buttons one for starting the stopwatch and 2<sup>nd</sup> for stop the stopwatch. When user clicks on Start Stopwatch button then this event should start the stop watch and update the time in Div in each 1/10<sup>th</sup> second and when user clicks Stop Stopwatch then it will stops the stopwatch counter.

Time is 0:0:24:9

← Div

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -VII**

**JULY-DECEMBER 2021**

<b>Sub. Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-711	Advanced Database Management System	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-702A	Theory Of Computation	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-712	Computer Graphics and Multimedia	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-705	Operating System	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>
IT-709A	Computer Graphics and Multimedia Lab	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
IT-710	Project	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
IT-707	Comprehensive Viva	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
Total					<b>26</b>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (IT) 5 Years VII SEMESTER**

**IT-711: Advanced Database Management System**

**Course Outcomes:**

- CO1: Learn advanced features of DBMS and build capacity to implement and maintain an efficient database system using emerging trends.
- CO2: Master the concepts and design with proficiency databases under the relational model.
- CO3: Understand the concept of a transactions and ACID properties.
- CO4: Proficiency in the choice of DBMS platform to use for specific requirements.
- CO5: Acquaint with a broad range of data management issues including data integrity and security, transaction processing and others.
- CO6: Exposure of distributed DBMS, object database management, data warehousing and data mining.

**Course Contents:**

**UNIT I**

Introduction with DBMS and ER Model : Advantage of DBMS approach, various view of data, data independence, schema and sub-schema, primary concepts of data models, Database languages, transaction management, Storage management Database administrator and users, overall system architecture.

Basic concepts of ER model, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema.

**UNIT II**

Functional Dependencies and Normalization: Domains, relations, keys, super key, candidate, primary, alternate and foreign keys, Functional dependence, Full Functional dependence, trivial dependencies, transitive dependencies, Mutual independence, closure set of dependencies, non loss decomposition, FD diagram. Introduction to normalization, first, second, third Normal forms, dependency preservation, BCNF, Multivalued dependencies and fourth normal form.

**UNIT III**

PL/SQL fundamentals: Variables, reserve words, identifiers, anchored data types, blocks, labels, use of DML in PL/SQL, commits, rollback, savepoint, conditional control: if, case, nullif, coalesce, iterative processing with loops: Loop basics , simple loops, while, for loop.

**UNIT IV**

Database Integrity, Transaction, concurrency and Recovery: Basic idea of Database Integrity, Integrity rules, assertions, integrity Constraints, triggers.

Basic concepts of Transaction, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions, Serializability, Conflict serializability, View serializability, basic idea of concurrency control, Concept of locking, types of locks, basic idea of deadlock, deadlock handling.

**UNIT V**

Distributed Database and Emerging Fields in DBMS: Basic idea of Distributed database, distributed data storage, data replication, data fragmentation- horizontal vertical and mixed fragmentation.

Object oriented Databases-basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity.

Data warehousing- terminology, definitions, characteristics, data mining and it's overview, Database on www, multimedia Databases- introduction, similarity based retrieval, continuous media data, multimedia data formats, video servers.

**Reference Books:**

1. A Silberschatz, H.F Korth, Sudersan "Database System Concepts" , MGH Publication.
2. Modern Database Management (5th Edition) (Hardcover) by Fred R. McFadden, Jeffrey A. Hoffer, Mary B. Prescott
3. Elmasri & Navathe "Fundamentals of Database systems" – III ed.
4. B.C. Desai. "An introduction to Database systems" BPB.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VII SEMESTER**  
**IT-702A: Theory Of Computation**

**Course Outcomes:**

1. CO1: Gain knowledge about the basic concepts of Computation.
2. CO2: Understand regular expressions, which are used to specify string patterns in many contexts, from office productivity software to programming languages.
3. CO3: Understand finite automata, formalism mathematically equivalent to regular expressions, Finite automata are used in circuit design and in some kinds of problem-solving.
4. CO4: Learn Context-free grammars to specify programming language syntax.
5. CO5: Understand computability theory and decision problems.

**Course Contents:**

**UNIT I**

Formal languages: Introduction to Computation & Languages: Natural Languages, Computer Programming Languages and Formal Languages. Language Concepts: alphabet, strings, properties of Strings, Kleene closure.

Properties of Formal Languages.

Grammar: Chomsky Hierarchy of grammar, languages represented by type 0,1,2,3 grammars.

**UNIT II**

Regular languages and finite automata-recursive definition, regular expression and corresponding languages, Pumping Lemma for non-regular languages. Finite automata, Kleene's theorem, non-deterministic finite automata. Equivalence of FAs and NFAs. Minimal state finite automata, Mealy machine and Moore machine, Regular grammar and their equivalence to finite automata.

**UNIT III**

Context free languages Parsing, ambiguity, parse trees, parsing methods: Bottom up and top down, Simplification of grammar. Normal form of CFGs: Chomsky Normal Form and Greibach Normal Form, CKY algorithm, Closure Properties of CFLs

**UNIT IV**

Push Down Automata: definition, examples, deterministic PDA, non-deterministic PDA, Parsing and PDAs, PDA and Context Free Languages

**UNIT V**

Turing machines – models of computations, definition, Representation of Turing Machines, TMs as language acceptors, Techniques for TM construction, Church - Turing thesis, Universal Turing machines, Variants of Turing machine.

Unsolvable Decision Problems- Decidability, Decidable Languages, Undecidable Languages Halting Problem of Turing Machine.

**Reference Books:**

1. Hopcraft and Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Publishing House.
2. K.L.P. Mishra, N. Chandrasekaran, Theory of Computer Science (Automata, Languages and Computation), Prentice Hall of India.
3. Peter Linz, An Introduction to Formal Languages and Automata, Narosa Publishing House.
4. Cohen Daniel I.A., Introduction to Computer Theory, John Wiley and Sons, inc New York
6. Martyn John C, Introduction to Languages and Theory of Computation, McGraw Hill, N.Y. (Internal Edition McGraw Hill)
7. Mandrioli Dino, Ghezzi Carlo, Theoretical Fundamentals of Computer Science, John Wiley and Sons, Inc, New York.



# INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

M. Tech. (5 Years) VII Semester  
IT -712: Computer Graphics & Multimedia

## Course Outcomes:

- CO1: Understand the fundamental concepts of Computer Graphics and Multimedia.
- CO2: Learn the graphics techniques and algorithms.
- CO3: Knowledge of different display devices and their functioning.
- CO4: Exposure of Windowing and Clipping techniques.
- CO5: Knowledge of multimedia concepts and various I/O technologies.
- CO6: Develop design animations, flash movies etc.

## Course Contents:

### Unit- I

Introduction:

Application of Computer Graphics, Raster Graphics Fundamentals: Scan conversion, Pixel, Frame Buffer. Graphics Primitives; Line algorithms Circle algorithms, Ellipse, Character generation, Polygon Representation, inside test, Polygon filling algorithms, Antialiasing.

### Unit- II

Display devices:Random scan and Raster scan monitors, Colors CRT monitor, Plasma Panel;

Hard Copy devices:Printers and Plotters; Input devices:Joysticks, Mouse, Digitizer, Scanner, and Camera; Input Techniques;

### Unit- III

Windowing and clipping:2D Transformation, Raster method of Transformation,Window, View port, Viewing, Window to View port Transformation, Line clipping algorithms, Polygon clipping algorithms.

### Unit-IV

Multimedia: Introduction and Applications, Components of multimedia, Fundamentals of Information theory, Multimedia Authoring tools, Basics of Computer Animation (Design, types of animation, using different functions),Hypermedia, multimedia applications

### Unit-V

Computer based Animation (Design and Programming)

Basic concepts , Animation design techniques, animation design using Macromedia flash : Drawing overview, Symbols, layers, Types, Buttons, sound creating animation, Publishing flash movies. Frame actions, Button actions, Variables and data types, Basic actions, Conditionals and operators, loops handling events, sound programming, color programming

## Reference Books :

1. Computer Graphics: Donald Hearn and M.Pauling Baker, Prentice Hall of India. .
2. Procedural Element of Computer Graphics: David F. Rogers McGraw Hill International.
3. Multimedia Computing, Communications & Applications: Ralf and Klara, Prentice Hall.
4. Multimedia: Making It Work: [Tay Vaughan](#), Tata McGraw-Hill Education, 01-Jan-2006

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VII SEMESTER**  
**IT-705: Operating System**

**Course Outcomes:**

- CO1: Understands function, structures and history of operating system.
- CO2: Understanding of design issues associated with operating systems.
- CO3: Understands various process management concepts including scheduling, synchronization, multithreading and deadlocks.
- CO4: Understands concepts of memory management including virtual memory.
- CO5: Understands how system resources are shared among the users.
- CO6: Learn issues related to file system interface and disk management.
- CO7: Becomes familiar with protection and security mechanisms.
- CO8: Becomes familiar with various types of operating systems including Unix.

**Course Contents:**

**UNIT I**

Introduction to Operating System:- Objectives and functions and the services provided by OS.

Evolution of operating system:- Concepts of batch processing, multiprogrammed batched system, time-sharing systems, Parallel Systems, Distributed systems. Operating system structure: -System calls and system programs.

**UNIT II**

Process Management: -Process concept, Process states, Process scheduling , Operations on processes , Co-operating processes and IPC.

CPU scheduling: - Basic concept and scheduling criteria, Long term, short term medium term schedulers, Scheduling algorithms, Multi-Processors Scheduling, Measurement of performance of processor.

**UNIT III**

Process synchronization: - Critical section problem, Mutual exclusion and synchronization, Concept of semaphores, Classical IPC problems. Deadlocks: - Characterization of deadlock, Methods of handling prevention, detection and avoidance, Recovery from deadlock.

**UNIT IV**

Memory management:-Logical and physical address spaces, Swapping and paging, Contiguous, allocation and its drawbacks, Non-contiguous allocation. Virtual memory: - Demand paging and its need, Performance of demand paging, Page replacement and its need, Thrashing and allocation of frames.

File system interface: - File concept, access methods, Directory structure, protection and consistency. File system structure, Allocation methods, Free space management, Efficiency and performance, Coincidence, protection and sharing.

**UNIT V**

I/O system: - Various i/o devices, Device drivers, structure of I/O software, Transforming I/O request of h/w operation. Secondary storage structure:- Disk structure, Disk Scheduling, Disk management, Swap space management and Disk reliability.

**Note:-** Case study of windows and Unix operating system is to be done as assignment.

**Text Book:**

1. Silberschatz , Gagne, Galvin, Operating System concept, 8th edition, WILEY.

**Reference Books:**

1. D. M. Dhamdhare, System Programming and operating system, Tata McGraw Hill, 3rd edition.
2. Gary Nutt, Operating Systems, 3<sup>rd</sup> edition Pearson Education.
3. Andrew S. Tanenbaum, 3<sup>rd</sup> edition Modern Operating Systems

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VII SEMESTER**  
**Lab Assignment**  
**IT-709A: Computer Graphics & Multimedia Lab**

**PROGRAM 1:**

Procedure to create an animation to represent the growing moon.

**PROGRAM 2:**

Procedure to create an animation to indicate a ball bouncing on steps.

**PROGRAM 3:**

Procedure to simulate movement of a cloud.

**PROGRAM 4:**

Procedure to draw the fan blades and to give proper animation.

**PROGRAM 5:**

Devise a routine to produce the animation effect of a square transforming to a triangle and then to a circle.

**PROGRAM 6:**

Create a web page for a clothing company which contains all the details of that company and at least five links to other web pages.

**PROGRAM 7:**

Procedure to display the background given(filename: tulip.jpg) through your name.

**PROGRAM 8:**

Procedure to simulate a ball hitting another ball.

**PROGRAM 9:**

Procedure to create an animated cursor using `tartdrag("ss", true); mouse.hide();`

**PROGRAM 10:**

Procedure to design a visiting card containing atleast one graphic and text information.

**PROGRAM 11:**

Procedure to take a photographic image. give a title for the image. put the border. write your names. write the name of institution and place.

**PROGRAM 12:**

Procedure to prepare a cover page for the book in your subject area . plan your own design

**PROGRAM 13:**

Procedure to extract the flower only from given photographic image and organise it on a background. selecting your own background for organisation.

**PROGRAM 14:**

Procedure to adjust the brightness and contrast of the picture so that it gives an elegant look.

**PROGRAM 15:**

Procedure to position the picture preferably on a plain background of a colour of your choice -positioning includes rotation and scaling.

**PROGRAM 16:**

Procedure to remove the arrows and text from the given photographic image.

**PROGRAM 17:**

Procedure to type a word and apply the effects shadow emboss

**PROGRAM 18:**

Procedure to use appropriate tool(s) from the toolbox, cut the objects from 3 files (f1.jpg, f2.jpg& f3.jpg); organise them in a single file and apply feather effects.

**PROGRAM 19:**

Procedure to display the background given (filename: garden.jpg) through your name using mask.

**PROGRAM 20:**

Procedure to make anyone of one of the parrots black & white in a given picture.

**PROGRAM 21:**

Procedure to change a circle into a square using flash.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -VIII**

**JANUARY-MAY 2022**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-801B	Principles of Programming Language	3	1	0	4
IT-804B	Mobile and Wireless Computing	3	1	0	4
IT-803B	Artificial Intelligence	3	1	0	4
IT-802A	Software Engineering	3	1	0	4
IT-805A	Cloud Computing	3	1	0	4
	Elective –I 1.IT-808: Bio Informatics 2. IT-809: Image Processing 3. IT-810: Simulation and Modelling 4.IT-811A:Information Security 5.IT-812 :Real Time System	3	1	0	4
IT-807	Comprehensive Viva	0	0	0	4
					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (5 Years) VIII Semester**

**IT- 801B: PRINCIPLES OF PROGRAMMING LANGUAGES**

**Course Outcomes:**

CO1: Define the semantics of programming language.

CO2: Investigate semantic issues in programming languages

CO3: Solve problems using a range of programming paradigms.

CO4: Assessment of different programming paradigms for a particular

**Course Contents:**

**UNIT I SYNTAX AND SEMANTICS**

Evolution of programming languages – describing syntax – context-free grammars – attribute grammars – describing semantics – lexical analysis – parsing – recursive-decent – bottomup parsing

**UNIT II DATA, DATA TYPES, AND BASIC STATEMENTS**

Names – variables – binding – type checking – scope – scope rules – lifetime and garbage collection – primitive data types – strings – array types – associative arrays – record types – union types – pointers and references – Arithmetic expressions – overloaded operators – type conversions – relational and boolean expressions – assignment statements – mixedmode assignments – control structures – selection – iterations – branching – guarded statements

**UNIT III SUBPROGRAMS AND IMPLEMENTATIONS**

Subprograms – design issues – local referencing – parameter passing – overloaded methods – generic methods – design issues for functions – semantics of call and return – implementing simple subprograms – stack and dynamic local variables – nested subprograms – blocks – dynamic scoping

**UNIT IV OBJECT-ORIENTATION, CONCURRENCY, AND EVENT HANDLING**

Object-orientation – design issues for OOP languages – implementation of object-oriented constructs – concurrency – semaphores – monitors – message passing – threads – statement level concurrency – exception handling – even handling

**UNIT V FUNCTIONAL AND LOGIC PROGRAMMING LANGUAGES**

Introduction to lambda calculus – fundamentals of functional programming languages – Programming with Scheme – Programming with ML – Introduction to logic and logic programming – Programming with Prolog – multi-paradigm languages

**OUTCOMES:**

Upon Completion of the course, the students will be able to describe syntax and semantics of programming languages

Explain data, data types, and basic statements of programming languages

Design and implement subprogram constructs

Apply object-oriented, concurrency, and event handling programming constructs, Develop programs in Scheme, ML, and Prolog

Understand and adopt new programming languages

**REFERENCES:**

1. Robert W. Sebesta, “Concepts of Programming Languages”, Tenth Edition, Addison Wesley, 2012.

2. Michael L. Scott, “Programming Language Pragmatics”, Third Edition, Morgan Kaufmann, 2009.

3. R. Kent Dybvig, “The Scheme programming language”, Fourth Edition, MIT Press, 2009.

4. Jeffrey D. Ullman, “Elements of ML programming”, Second Edition, Prentice Hall, 1998.

5. Richard A. O’Keefe, “The craft of Prolog”, MIT Press, 2009.

6. W. F. Clocksin and C. S. Mellish, “Programming in Prolog: Using the ISO Standard”, Fifth Edition, Springer, 2003.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (5 Years) VIII Semester  
IT-804B : Mobile and Wireless Computing**

**Course Outcomes:**

- CO1 : Understand the basic concepts of cellular system .
- CO2: Understand the GSM architecture.
- CO3: Understand the concept of wireless LAN, Mobile networks and sensor networks.
- CO4: Acquaint with structures and components of mobile IP.
- CO5: Understanding the techniques for security and privacy.
- CO6: Possible future of Mobile Computing and Applications.

**Prerequisites:** Computer Networks

**Course Contents:**

**Unit I**

Introduction: Overview of the emerging field of mobile computing; Historical perspectives (mainly from the perspective of radio), Land mobile vs. Satellite vs. In-building communications systems, RF vs. IR. Characteristic of Cellular Systems, Mobility support in cellular telephone networks, Mobile applications, Limitations, Health Concerns.

**Unit II**

Mobile communication: Fiber or wire based transmission, Wireless Transmission: Frequencies, Antennas and Signal Propagation – path loss of radio signals, Additional signal propagation effect, Multipath propagation, Spread Spectrum- DSSS and FHSS. Modulation Techniques, Multiplexing techniques, Coding techniques, CDMA, Multiple Radio Access – Introduction Contention based protocols, Channel Allocation

**Unit III**

The Cellular Concept : Introduction, Cell Area, signal strength and cell parameters, capacity of a cell, Frequency reuse, Co-channel Interference, Cell splitting, Cell Sectoring. Mobile Communication System : Introduction, Cellular System Infrastructure, Registration, Handoff support, Multicasting, Authentication & security, frequency hopping. Introduction Contention based protocols, Channel Allocation. GSM- System architecture of GSM, protocols, localization and calling, handover, security. **Unit IV**

IEEE802.11: Protocol architecture, layers, Information bases and networking, Case Study on Wireless LAN infrastructure and Bluetooth.

Mobile IP, goals, assumptions requirements, entities & terminology, IP packet delivery, tunnelling and encapsulation, Feature & format IPv6, DHCP, TCP over Wireless.

**Unit V**

Characteristic of Ad Hoc networks, Applications, need for routing, routing classification, Wireless sensor networks, classification & Fundamental of MAC protocol for wireless sensor networks, Introduction to IOT

**Text Books:-**

1. Mobile Communications author Jochen Schiller, publication John Willy & Sons, Ltd.
2. Wireless And Mobile Systems author D P Agrawal & Qing-An zeng, publication Thomson.

**Reference Books:-**

1. Wireless Networks author P Nicopotidis, publication Addison –Wesley-An zeng publication
- 2: Mobile Computing author Dr. Rajkamal, publication Oxford University Press.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 Years) VIII Semester**  
**IT-803B: Artificial Intelligence**

**Course Outcomes:**

- CO1: Exposure to techniques of solving problems that need human intelligence.
- CO2: Formulate Artificial Intelligence problems
- CO3: Using of heuristic techniques to solve the AI problem.
- CO4: Understand the concepts of Knowledge Representation and Issues.
- CO5: Explore the types of Knowledge, Representation and mapping, approaches and issues in knowledge representation.
- CO6: Formulate Predicate Logics.
- CO7: Learn and implements the concepts through Prolog Programming:

**Course Contents:**

**Unit-I**

**Introduction to AI & Problem Solving in AI:**

What is AI, AI Techniques, Defining the Problem in AI, Problem Spaces, Problem Characteristics, Production System and its Characteristics.

**Unit-II**

**Heuristic Search Techniques:** Heuristic Search, Criteria for Success, various search techniques-Generate and Test, Depth and Breadth First, Hill Climbing , Best first Search, A\* algorithm.

**Unit-III**

**Knowledge Representation and Issues:** Types of Knowledge, Representation and mapping, approaches and issues in knowledge representation, Predicate Logic- representation of simple facts, computable functions, resolution, logic programming, matching, control knowledge.

**Unit-IV**

**Prolog Programming:**

Introduction and applications, facts, objects and predicates, Linguistic variables, Rules, input-output operations, controlling execution: Recursion, fail; Arithmetic operations, List, dynamic databases; expert system design.

**Unit-V**

**Knowledge Representation Techniques and Advanced AI:** Slot and filler structure – introduction, weak and strong structure, semantic nets, frames, conceptual dependency and Frames; fuzzy logic and robotics, Expert system-concept and design.

**Reference Books:-**

1. Artificial Intelligence: Elaine Rich and Kevin Knight (TMH publication)
2. Introduction to AI and expert systems: D.W. Patterson (PHI publication)
3. Essential References: Artificial Intelligence: Petric Henry Winston (Addison-Wesley)
4. N.J.Nilson: Principles of Artificial Intelligence, Narosa Publications.
5. Introduction to Turbo Prolog: Carl Townsend(BPB publication)



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VIII SEMESTER**  
**IT-802A: Software Engineering**

**Course Outcomes:**

- CO1: Knowledge of various software application domains and different process model used in software development.
- CO2: Understand various activities undertaken for software development project.
- CO3: Develop a software project proposal
- CO4: Develop software requirement specification and design documents.
- CO5: Understanding of approaches of verification, validation and various testing approaches.
- CO6: Organize different activities of project as per Risk impact factor.
- CO7: Understanding of quality control standards.

**Course Contents:**

**UNIT I**

Introduction to Software Engineering: Software problem, Software engineering problem, Software engineering approach, Software characteristics and Applications.

Software Processes: Software processes and its components, characteristics of software processes, Software development processes: Linear Sequential model, Prototyping model, RAD model, Iterative Enhancement model, Spiral model, Component based development, Comparative study of various development models

**UNIT II**

Project management process: The people, product, process and project, Phases of project management process, the W5HH principle. Software configuration management process, Process management process: Capability Maturity Model (CMM).

**UNIT III**

Software Requirement Analysis and Specification: Software requirements, Problem analysis, Requirements specifications, Validation and Verification, Metrics.

Project Planning: Project estimation (Size & Cost), Project Scheduling, Staffing and personnel planning, Software configuration management plans, Quality assurance plans, Project monitoring plans, Risk management.

**UNIT IV**

Software Design: Design principles: Problem partitioning and hierarchy, Abstraction, Modularity, Top-down and Bottom-up strategies. Effective Modular design: functional independency, Cohesion, Coupling. Structured design methodology.

**UNIT V**

Software Quality Assurance: Quality concept, Quality management system, movements and assurance, Software reviews: formal and technical, Formal approaches to SQA, Statistical software quality assurance, Software reliability, ISO 9000, SQA plan.

Software Testing: Software testing techniques: Testing fundamentals, White box testing, Black box testing, testing for specialized environments, architectures and applications. Software testing strategies: A strategic approach to software testing, Strategic issues, Unit testing, Integration testing, Validation testing and system testing, the art of debugging

**Reference Books:**

1. Ian Sommerville, Software engineering, Ninth edition Pearson.
2. Pankaj Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House.
3. R. S. Pressman, Software Engineering-A practitioner's approach, Tata McGraw-Hill International Editions, New York.
4. Richard E. Fairly, Software Engineering Concepts, Tata McGraw Hill Inc. New York.
5. W. S. Jawadekar, Software Engineering: Principle & Practice, Tata McGraw-Hill, New York
6. Rajib Mall, Fundamentals of Software Engineering, PHI, New Delhi.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VIII SEMESTER**  
**IT-805A: Cloud Computing**

**Course Outcomes:**

- CO1: Understand the concepts, characteristics, delivery models and benefits of cloud computing
- CO2: Understand the key security and compliance challenges of cloud computing
- CO3: Understand the key technical and organizational challenges
- CO4: Understand the different characteristics of public, private and hybrid cloud deployment models.
- CO5: Apply different cloud programming model as per need.
- CO6: Explore some important cloud computing driven commercial systems such as Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.
- CO7: Explore the concepts of VM management and Cloud Security.

**Course Contents:**

**Unit-I**

**Introduction:** Historical development ,Vision of Cloud Computing, Characteristics of cloud computing as per NIST , Cloud computing reference model ,Cloud computing environments, Cloud services requirements, Cloud and dynamic infrastructure, Cloud Adoption and rudiments .Overview of cloud applications: ECG Analysis in the cloud, Protein structure prediction, Gene Expression Data Analysis ,Satellite Image Processing ,CRM and ERP ,Social networking .

**Unit-II**

**Cloud Computing Architecture:** Cloud Reference Model, Types of Clouds, Cloud Interoperability & Standards, Scalability and Fault Tolerance, Cloud Solutions: Cloud Ecosystem, Cloud Business Process Management, Cloud Service Management. Cloud Offerings: Cloud Analytics, Testing Under Control, Virtual Desktop Infrastructure.

**Unit –III**

**Cloud Management & Virtualization Technology:** Resiliency, Provisioning, Asset management, Concepts of Map reduce , Cloud Governance, High Availability and Disaster Recovery. Virtualization: Fundamental concepts of compute ,storage, networking, desktop and application virtualization .Virtualization benefits, server virtualization, Block and file level storage virtualization Hypervisor management software, Infrastructure Requirements , Virtual LAN(VLAN) and Virtual SAN(VSAN) and their benefits .

**Unit-IV**

**Cloud Security:** Cloud Information security fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture .

**Unit-V**

Market Based Management of Clouds , Federated Clouds/Inter Cloud: Characterization & Definition , Cloud Federation Stack , Third Party Cloud Services .

Case study : Google App Engine

**Recommended Text:**

1. Buyya, Selvi ,” Mastering Cloud Computing “,TMH Pub
2. Kumar Saurabh, “Cloud Computing” , Wiley Pub
3. Krutz , Vines, “Cloud Security “ , Wiley Pub
4. Velte, “Cloud Computing- A Practical Approach” ,TMH Pub
5. Sosinsky, “ Cloud Computing” , Wiley Pub

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years VII SEMESTER**  
**IT-808: Bio-Informatics**

**Course Outcomes:**

- CO1: Develop an understanding of the basic principles of molecular and cell biology.
- CO2: Become familiar with existing tools and resources for computational analysis of biological data, including sequences, phylogenies, microarrays, ontologies, and bio-molecular interactions.
- CO3: Understand basic abstractions and computational approaches used for analysis including data warehouses, data mining, programming languages.
- CO4: Analyse biological data using computational methods, as well as investigating problems in molecular and biology from a computational perspective

**Course Contents:**

**UNIT I**

What is bioinformatics? Definitions and concepts, Objectives/goals of Bioinformatics, Importance of Bioinformatics , Genome projects, DNA, RNA, DNA fingerprinting , types of RNA, functions of mRNA, tRNA, and rRNA, Amino Acids, Proteins, Central Dogma of Molecular Biology, Gene Coding, & Expression , Genetic disorder , cloning.

**UNIT II**

Molecular Biology, RNA, DNA , Protein structure, DNA Sequencing, Base Pairs, Mutations and its type, Sequence Alignment, Dot plots, Simple Alignment. Scoring Matrices. Algorithms Pair wise sequence alignment - NEEDLEMAN and Wunsch, Smith Waterman algorithms; Multiple sequence alignments - CLUSTAL, PRAS; Patterns, motifs and Profiles in sequences.

**UNIT III**

Biological Databanks, Data Mining, Data warehousing, data capture, data analysis; Introduction to Nucleic Acid and Protein Sequence Data banks; Nucleic acid sequence data banks: Genbank, EMBL nucleotide sequence data bank, Protein sequence data banks: NBRF-PIR, SWISSPROT, Signal peptide data bank; Database Similarity Searches: BLAST, FASTA, PSI-BLAST algorithms.

**UNIT IV**

Programming Languages, Programming in C: Pointers, pointers to functions, macro and programming in C, graphs, data structure– linked list, stack, queue, binary trees, threaded binary trees, File and exception handling in C. PERL: Strings, Numbers, and Variables. Variable Interpolation, Basic Input and Output, File handles, Making Decisions, Conditional Blocks, Loops, Combining Loops with Input, Standard Input and Output, Finding the Length of a Sequence File, Pattern Matching, Extracting Patterns, Arrays, Arrays and Lists, Split and Join, Hashes, A Real-World Example, BioPERL; Applications.

**UNIT V**

Bioinformatics medicine, Preventative medicine , Gene therapy , Drug development | Alternative energy sources, personalized medicine, crop improvement, forensics analysis, Biotechnology etc. Machine learning overview, Neural networks, , Phylogenetic trees

**Reference Books:**

1. Pierre Baldi and Søren Brunak, Bioinformatics, The Machine Learning Approach, second edition, MIT Press, Cambridge, MA, 2001.
2. Dan E. Krane, Michael L. Raymer , Fundamental Concepts of Bioinformatics.
3. James Tisdall, Beginning Perl for Bioinformatics.
4. Cynthia Gibas, Per Jambeck , Developing Bioinformatics Computer Skills.
5. Arthur M. Lesk , Database Annotation in Molecular Biology: Principles and Practice.

**International Institute of Professional Studies,  
Devi Ahilya University, Indore.  
Master of Technology(IT) 5 years VIII semester  
IT-809:Image Processing**

**Course Outcomes:**

- CO1: Knowledge of basic concepts of a digital image processing system.
- CO2 : Analyze images in the frequency domain using various transforms.
- CO3 : Exposure of the techniques for image enhancement and image restoration.
- CO4 : Learn various compression techniques.
- CO5: Interpret Image compression standards.
- CO6 : Learn image segmentation and representation techniques.

**Course Contents:**

**UNIT I DIGITAL IMAGE FUNDAMENTALS**

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models

**UNIT II IMAGE ENHANCEMENT**

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering–Smoothing and Sharpening Spatial Filtering – Frequency Domain: Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

**UNIT III IMAGE RESTORATION AND SEGMENTATION**

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

**UNIT IV WAVELETS AND IMAGE COMPRESSION**

Wavelets – Subband coding - Multiresolution expansions - Compression: Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

**UNIT V IMAGE REPRESENTATION AND RECOGNITION**

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors –Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

**Text books:**

- 1.Digital Image Processing and Computer Vision, Sonka, lavac, Boyle, Cenage Learning.
- 2.Digital Image Processing, R.C. Gonzalez, R.R. Woods(TMh)
- 3.Digital Image Processing And Analysis, PHI, B. Chanda, D.Datta Mujumdar.

**References Books:**

- 1.Anil Jain, "Fundamentals Of Digital Image Processing", Anil Jain PHI, ISBN-81- 203-0929-4
- 2.Digital Image Processing using MATLAB, R.C. Gonzalez, R.R. Woods(Person), 2nd Edition.
3. Digital Image Processing, S.Jayaraman, T. Veerakumar ( Mc Graw Hill).
- 4.Introduction to Digital Image Processing with MATLAB, Alasdair McAndrew, Cenage Learning

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 Years) VIII Semester**  
**IT-811A: Information Security**

**Course Outcomes:**

CO1: Knowledge of basic concepts of Information Security.

CO2: Insight and expertise in information security technology, digital forensics or security management.

CO3: Learn different Cryptographic Algorithms.

CO4: Apply knowledge in new areas within the field of information security.

**Course Contents:**

**UNIT-1**

Internet Ethics, Browser Security, Downloads, e-Mail Security and guidelines for using e-mail safely, Malware, Mobile Security, Online Banking Risks, Online Scams, Password Threats

**UNIT-2**

Social Engineering, Desktop Security, Copyrights, Instant messengers, security risks, Data Security, Importance of securing data, Different methods of securing data, Identity theft, Online predators, Phishing and vishing scams, SPAM

**UNIT-3:**

Introduction to Cryptography: History of cryptography, Basic principles and theorem, Block and stream ciphers, Cryptographic Algorithms: DES, 3DES, RC-4, Twofish, Blowfish and AES, RSA, hash functions, Public and private key systems,

**UNIT -4:**

Approximate strength of ciphers, Authentication, Password system. Secure design principles (Least-privilege, fail-safe defaults, complete mediation, separation of privilege), TCB and security kernel construction, System defence against memory exploits Windows security.

**UNIT-5**

Data Security and Network security, Network Intrusion detection and prevention systems, Firewalls, User authentication, authentication-via- secret and session management, SQL Injection, Resource Protection models, Side channel attacks, Authentication models, Authentication methods, Trusted Computing, Legal and Ethical Issues

**References:**

1. W. Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education, 2003.
2. Mann, Mitchell, Krell, "Linux System Security", 2nd Edition, Pearson Education, 2003.
3. Robert, C. Newman, "Enterprise Security", Pearson Education, 2003.
4. Kaufman, Perlman and Speciner, "Network Security, Private Communication in a Public Network", Prentice Hall of India, 2003.
5. Nortcutt & Judy Novak, "Network Intrusion Detection", 3rd Edition, Pearson Education, 2003.
6. Computer Security: Art and Science (2<sup>nd</sup> version)

**Web sites:**

1. [www.infosecuritymag.com](http://www.infosecuritymag.com)
2. [www.list.gmu.edu](http://www.list.gmu.edu)

**E-resources:**

1. [https://onlinecourses.nptel.ac.in/noc15\\_cs03/](https://onlinecourses.nptel.ac.in/noc15_cs03/)
2. [https://onlinecourses.nptel.ac.in/noc16\\_cs01/](https://onlinecourses.nptel.ac.in/noc16_cs01/)
3. [https://onlinecourses.nptel.ac.in/noc17\\_cs08/](https://onlinecourses.nptel.ac.in/noc17_cs08/)
4. [https://onlinecourses.nptel.ac.in/noc18\\_cs24/](https://onlinecourses.nptel.ac.in/noc18_cs24/)
5. <https://www.coursera.org/learn/information-security-data>

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 Years) VIII Semester**  
**IT-812: Real time System**

**Course Outcomes:**

- CO1: Understand the basic concepts and the classification of real time systems.
- CO2: Gain knowledge of requirements for Real time systems.
- CO3: Become aware of various real time languages.
- CO4: Model real time systems using the concepts of RTOS.
- CO5: Analyze various examples of real time systems.

**Course Contents**

Unit-1: Real Time Systems: Introduction to Real Time Systems, Classification of Real Time System, Concept of Computer Control, Types of Real Time Operating Systems.

Unit-2: Requirements for Real Time Systems: Human Computer Interaction in Real Time Systems, Hardware Requirement for Real time Systems, Specialized Processors, Interfaces & Communications.

Unit-3: Modeling Real-Time Systems: Purpose of the Model, Structural Elements, Interfaces, Event-Triggered versus Time-Triggered, Interrupts.

Unit-4: Real Time Languages: Overview of Real Time Languages, Few Real Time Languages, Modula 2 as Real Time Language, Ada as Real Time Language.

Unit-5: Real Time Operating Systems – 1: RTOS Overview, RTOS Components, Task Management & Memory Management, Scheduling Strategies, Commercial Real-time Operating Systems.

**Text Book:**

1. Phillips A Laptante-Real Time System: Design and Analysis, John Wiley-India Edition-2016.

**Reference Books:**

1. Rajib Mall- Real time Systems: Theory and Practice Pearson Edition.
2. J.W.S. Lui Real time Systems Pearson Education, New Delhi.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -IX**

**JULY-DECEMBER 2022**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT-901B	Data Mining and Warehousing	3	1	0	4
IT-908A	Object Oriented Analysis and Design	3	1	0	4
IT-902B	IT Project Management	3	1	0	4
IT-903B	Research Methodology	2	0	0	2
	Elective –II	3	1	0	
	1.IT-913A:Optimization Techniques				
	2.IT-914:Parallel Processing				
	3.IT-915:Information Extraction				
	4.IT-916:Design Patterns				
	5.IT-917:Distributed System				4
IT-912	Object Oriented Analysis and Design Lab	0	0	4	2
IT-906	Project Phase 1	0	0	4	4
IT-907	Comprehensive Viva	0	0	0	4
					28

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (5 Years) IX Semester  
IT-901B: Data Mining & Warehousing**

**Course Outcomes:**

- CO1: Understand basic concepts of data warehousing and data mining.
- CO2: Understand On Line Analytical Processing (OLAP).
- CO3: Learn data mining techniques and understand various algorithms.
- CO4: Knowledge of data mining tools and ETL tools.

**Course Contents:**

**UNIT I**

Data Warehouse, Evolution, Definition, Very large database, Application, Multidimensional Data Model, OLTP V/s Data Warehouse, Warehouse Schema, Data Warehouse Architecture. Data Warehouse Server, Data Warehouse Implementation, Metadata, Data Warehouse Backend Process: Data Extraction, Data Cleaning, Data Transformation, Data Reduction, Data loading and refreshing. ETL and Data warehouse, Metadata.

**UNIT II**

Structuring/Modeling Issues, Derived Data, Schema Design, Dimension Tables, Fact Table, Star Schema, Snowflake schema, Fact Constellation, De-normalization, Data Partitioning, Data Warehouse and Data Marts. OLAP, Strengths of OLAP, OLTP V/s OLAP, Multidimensional Data, Slicing and Dicing, Roll-up and Drill Down, OLAP queries, Successful Warehouse, Data Warehouse Pitfalls, DW and OLAP Research Issues, Tools.

**UNIT III**

Fundamentals of data mining, Data Mining definitions, KDD V/s Data Mining, Data Mining Functionalities, From Data Warehousing to Data Mining, DBMS V/s DM, Issues and challenges in Data Mining. Data Mining Primitives, Data Mining Query Languages. Data Mining applications-Case studies.

**UNIT IV**

Association rules: Methods to discover association rules. Various algorithms to discover association rules like A Priori, partition, Pincer search, Dynamic Itemset Counting Algorithm and more.

**UNIT V**

Classification Technique: Decision Trees, Web Mining, Web content mining, Web Structure mining, Text mining, Temporal Mining and Spatial Data Mining.

Text Books:

1. ARUN K PUJARI, Data Mining Techniques, University Press
2. JIAWEI HAN & MICHELINE KAMBER, Data Mining – Concepts and Techniques, Harcourt India
3. W. H. Inmon, Building the Data Warehouse, Wiley Dreamtech India Pvt. Ltd
4. RALPH KIMBALL, The Data Warehouse Life cycle Tool kit, WILEY STUDENT EDITION



**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IX SEMESTER**  
**IT-908A: Object Oriented Analysis and Design**

**Course Outcomes:**

- CO1: Understand the importance and basic concepts of object oriented modelling,
- CO2: Specify, analyze and design the use case driven requirements for a particular system.
- CO3: Model the event driven state of object and transform them into implementation specific layouts.
- CO4: Identify, analyze the subsystems, various components and collaborate them

**Course Contents:**

**UNIT I**

Object oriented analysis and its design. Software engineering best practices. UML: its road map. Root causes of software failure and symptoms of software failure.

**UNIT II**

Introduction to the Rational Unified process: Workflow and Lifecycle. Introduction to Object Orientations: problem definition, modeling, using UML modeling mechanisms and their representation.

**UNIT III**

Requirements Management: key concepts, problem statement, Glossary, use-case model, supplementary specification, functional and nonfunctional requirements.

**UNIT IV**

Analysis and design overview: architectural analysis-layers. Use case Analysis- Responsibilities, attributes and association, Architectural design.

**UNIT V**

Describe concurrency, Describe distribution, Use-case design, Subsystem Design, Class design, package.

**Reference Books:**

1. P.Kruchten, The Rational Unified Process: An Introduction, Pearson Education Asia, 2000.
2. G. Booch, I. Jacobson, J. Rumbaugh, The Unified Modeling Language- User's Guide, Addison Wesley, 1999.
3. W.Boggs and M. Boggs, Mastering UML with Rational Rose, BPB Publications, 1999.
4. G. Booch, Object oriented Analysis and Design with Applications, Addison Wesley, 1994.
5. M.Blaha, J. Rumbaugh, Object oriented modeling and design with UML, Pearson education 2<sup>nd</sup> edition, 2007.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**

**M. Tech. (IT) 5 Years, IX Semester**

**IT-902B: Information Technology & Project Management**

**Course Outcomes:**

- CO1: Understand basic concepts of ITPM.
- CO2: Develop the concepts of project integration.
- CO3: Knowledge of project quality management etc.
- CO4: Concepts of Human resource planning.
- CO5: Understand project communication management.
- CO6: Implementation of the concepts of ITPM in real world applications.

**Course Contents:**

**UNIT I**

Project, Project Management, Role of the Project Manager, Project Management and Information Technology Context, A system view of Project Management, Understanding the Organization, Stakeholder Management, Project Phases and the Project Life Cycle, Context of Information Technology Projects, Project Management Process Groups, Mapping Process Groups to Knowledge Areas.

**UNIT II**

Project Integration Management, Strategic Planning and Project Selection, Preliminary Scope statements, Project Scope Management, Scope Planning and Scope Management Plan, Scope Definition and the Project Scope Statement.

**UNIT III**

Project Time Management, Activity Definition and Sequencing, Activity Resource and Duration Estimating, Schedule Development and Control, Project Cost Management, Cost Estimating, Cost Budgeting, Cost Control.

**UNIT IV**

Project Quality Management, Quality Planning, Quality Assurance, Quality Control, Project Human Resource Management, Keys to Managing People, Human Resource Planning, Acquiring the Project Team, Developing the Project Team, Managing the Project Team.

**UNIT V**

Project Communication Management, Communication Planning, Information Distribution, Performance Reporting, Managing Stakeholders, Project Risk Management, Risk Management Planning, Risk Response Planning, Risk Monitoring and Control, Project Procurement Management, Planning Purchasing and Acquisitions, Planning Contracting, Requesting Seller Responses, Selecting Sellers, Administering the Contract, Closing the Contract

**Text Book:**

1. Information Technology Project Management, Kathy Schwalbe, 6<sup>th</sup> Edition, Thomson Course technology.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (5 Years) IX Semester**  
**IT-903B : Research Methodology**

**Course Outcomes:**

- CO1: Critically analyse research methodologies identified in existing literature
- CO2: Distinguish appropriate research designs and methodologies .
- CO3: Develop a comprehensive research methodology for a research question.
- CO4: Identify different ways to collect qualitative and quantitative data.
- CO5: Develop a broad understanding of the range of field-related education theories ,ideas and concepts
- CO6: Successfully develop and defend a research proposal

**Course Contents:**

**Unit-1:**

The Information Systems and Computing disciplines, Evidence-based practice, The Internet, and Research. Definition and characteristics of Research, Evaluating research, Rigour, and relevance in research, The 6 P of Research, The purpose and products of research: Reasons for doing research, possible products/outcomes of the research, Finding and choosing research topics, Evaluating the purpose and products of research.

**Unit-2:**

Overview of the Research: A model of the research process, alternatives models of the research process, Evaluating the Research process. Need, types and applications of simulators for researching in CS.

**UNIT-3:**

Reviewing the literature: Purpose and resources of literature review, The internet, and literature reviews conducting a literature review Evaluating literature review Evaluating literature review. Surveys: Defining surveys, Planning and designing surveys, Grounded theory, and surveys, The internet and surveys, Examples of surveys in IS and computing research, Evaluating survey-based research. Interview, Observations, Questionnaire.

**UNIT-4:**

Design and Creation: Defining design and creation: planning and conducting design and creation research.Creative computing and digital art.the internet and design and creation research.Examples of designing and creation research in IS and computing, Evaluating design and creation research.Experiments, Case studies, Action Research, Ethnography, Documents.

**UNIT-5:**

Internet Research: Background to the internet and WWW, Internet Research topics, The internet and literature review The internet and research strategies and methods, Internet research, law and ethics. Participants and Research Ethics: The law and research, Rights of people directly involved, Responsibilities of an ethical researcher, Design, and creation of Project and ethics, Evaluating research ethics.

**Text Book:**

Briony J Oates, Researching information systems and computing, SAGE South Asia  
Edition,2007 ISBN: 978-81-7829-759-0

**Reference Materials:**

1. Research Design. Qualitative, Quantitative, and Mixed Methods Approaches. By John W. Creswell, Fourth Edition. SAGE Publication, 2014
2. The Craft of Research, By Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams, Joseph Bizup, William T. FitzGerald, Third Edition, The University of Chicago Press, 2008
3. The Elements of Style. William Strunk Jr. and E. B. White, Fourth Edition, Pearson, 1999
4. Research Methodology By Panneerselvam R, 2nd Edition, PHI, 2014
5. Selecting Empirical Methods for Software Engineering Research, Steve Easterbrook, Janice Singer, Margaret-Anne Storey, D. Damian, Book Chapter in Guide to Advanced Empirical Software Engineering, Forrest Shull, Janice Singer, and Dag I.K. Sjøberg, Springer 2008

6. Statistical Design and Analysis of Experiments With Applications to Engineering and Science, Robert L. Mason, Second Edition, Wiley InterScience.[Good for Data Analysis and Hypothesis Testing]
7. THE DESIGN OF DESIGN: ESSAYS FROM A COMPUTER SCIENTIST, Frederick P. Brooks Jr., Addison-Wesley Professional, 2010.
8. Serge Demeyer. Research Methods in Computer Science
9. Aaron Sloman. TYPES OF RESEARCH IN COMPUTING SCIENCE, SOFTWARE ENGINEERING, AND ARTIFICIAL INTELLIGENCE

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE**  
**M. Tech. (IT) 5 Years IX SEMESTER**  
**IC-913A: Optimization Techniques**

CO1: Understand different techniques of optimization, which help in analyzing the process of decision- making.  
CO2: Learn problem formulation of optimization.  
CO3: Learn the methods of optimization.  
CO4: Exposure of the applications of optimization.  
CO5: Understand basic concepts of Linear programming and Dynamic Programming

**Course Contents:**

**UNIT I**

Organizational behavior and management. Introduction to O.R. Techniques. Models: - Meaning and classifications.

**UNIT II**

Linear Programming Problems (L.P.P.), Graphical solutions, Simplex algorithm, Principle of Duality, post optimality analysis. Transportation problem, Initial basic feasible solutions, MODI'S optimality analysis, Degeneracy.

**UNIT III**

Assignment Problem, traveling Salesmen problem, Branch and Berend techniques. Integer program: - Necessity of Integer programming, use of Branch and Berend Technology for solving Integer Programming problem.

**UNIT IV**

Queue-theory: - Importance of waiting-line in networking Q-models. Dynamic programming problems.

**UNIT V**

Theory of Games: - Introduction, pay-off matrix, Minimum-Maximum principle, Saddle-point principle of Dominance. Introduction to Inventory Analysis

**Reference Books:**

1. Dr. S.D. Sharma, Text Book of Operations Research.
2. N.D. Vora, Quantitative Techniques in management.
3. Kanti Swarup, P.K. Gupta and M.M. Singh , Operations Research..
4. H.A. Taha, Introduction to Operations Research.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE

M. Tech. (5 Years) IX Semester

IT-914: Parallel processing

**Course Outcomes:**

CO1: Understand the concepts of design hardware of Parallel systems and its components.

CO2: Learn concept of parallel processing.

CO3: Understand various model of parallel computing.

CO4: Understand distributed computing systems.

**Course Contents:**

Unit I

Introduction

Parallel Computing, Parallel Architecture, Architectural Classification Scheme, Classification Based on Grain Size, Bernstein Conditions for Detection of Parallelism, Performance Metrics for Processors

Unit II

Design aspect of pipelining, ways to improve performance of pipelining, Job sequencing and collision, MAL, Advance pipelining techniques, SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, Data Mapping and memory in array processors, interconnection network for SIMD, Memory interleaving, Case studies of SIMD parallel Processors.

Unit III

Multiprocessor Architectures, Study and Comparison of loosely and tightly coupled multiprocessors. Crossbar switch, Multiport Memory Model, Memory contention and arbitration techniques, Cache coherency and bus snooping.

Unit IV

Introduction to Distributed Systems

Definition, Issues, Goals, Types of distributed systems, Distributed System Models, Hardware concepts, Software Concept, Models of Middleware, Services offered by middleware, Client Server model.

Unit V

Desirable Features of global Scheduling algorithm, Task assignment approach, Load balancing approach, load sharing approach, Introduction to process management, process migration, Threads, Virtualization, Code Migration.

Text Books

1. Computer Architecture and Parallel Processing – Kai Hwang and Faye A. Briggs, McGraw-Hill
2. Andrew S. Tanenbaum and Maarten Van Steen, “Distributed Systems: Principles and Paradigms, 2nd edition, Pearson Education, Inc., 2007, ISBN: 0-13-239227-5.

**INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES**

**DEVI AHILYA UNIVERSITY, INDORE**

**M. Tech.(IT) 5 Years**

**Batch 2k18**

**Semester -X**

**JANUARY-MAY 2023**

<b>Sub. Code</b>	<b>Sub. Name</b>	<b>Credit</b>
IT-1005D	Project Phase 2	12