

**RAMA UNIVERSITY UTTAR PRADESH, KANPUR**

**Faculty of Engineering & Technology**



**SYLLABUS & EVALUATION SCHEME**

[Effective from the Session 2015-16]

**Diploma in Computer Science & Engineering**

**2<sup>nd</sup> & 3<sup>rd</sup> Year**

### THIRD SEMESTER

| S.N.                        | Subject Code | Subject Name                           | Period    |          |          | EVALUATION SCHEME |            |            | Subject Total | Credit    |
|-----------------------------|--------------|--|-----------|----------|----------|-------------------|------------|------------|---------------|-----------|
|                             |              |  | L         | T        | P        | CE                | MTE        | ETE        |               |           |
| <b>Theory subjects</b>      |              |  |           |          |          |                   |            |            |               |           |
| 1                           | DCS-301      | <b>OBJECT ORIENTED PROGRAMMING</b>     |           | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 2                           | DCS-302      | <b>DIGITAL ELECTRONICS</b>             | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 3                           | DCS-303      | <b>OPERATING SYSTEM</b>                | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 4                           | DCS-304      | <b>PROGRAMMING IN C</b>                | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 5                           | DCS-305      | <b>COMPUTER ARCHITECTURE</b>           | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| <b>PRACTICALS / PROJECT</b> |              |  |           |          |          |                   |            |            |               |           |
| 6                           | DCS-351P     | <b>OBJECT ORIENTED PROGRAMMING LAB</b> |           | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 7                           | DCS-352P     | <b>DIGITAL ELECTRONICS LAB</b>         | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 8                           | DCS-353P     | <b>OPERATING SYSTEM LAB</b>            | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 9                           | DCS-354P     | <b>PROGRAMMING IN C LAB</b>            | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| <b>Total</b>                |              |  | <b>15</b> | <b>5</b> | <b>8</b> | <b>220</b>        | <b>180</b> | <b>500</b> | <b>900</b>    | <b>24</b> |

L-Lecture, T-Tutorial, P- Practical, CE- Continuous Evaluation, MTE-Mid Term Examination, ETE-End Term Examination

#### Evaluation Scheme:

- Course without practical components**

For Continuous Evaluation (CE) is such as: 20 Marks

- Attendance: 5 Marks
- Assignments/Quiz / Seminar/Term paper /Project :15Marks

MTE - Mid Term Examination: 20 Marks

- First Mid Term Examination: 10 marks
- Second Mid Term Examination: 10 marks

ETE - End Term Examination: 60 Marks

- Course with practical components only**

For Continuous Evaluation (CE) is such as: 30 Marks

Conduct / Perform/Execution /Practical File/ Viva-Voice

MTE - Mid Term Examination: 20 Marks

- First Mid Term Examination: 10 marks
- Second Mid Term Examination: 10 marks

ETE - End Term Examination: 50 Marks

## FOURTH SEMESTER

| S.N.                        | Subject Code | Subject Name                    | Period    |          |          | EVALUATION SCHEME |            |            | Subject Total | Credit    |
|-----------------------------|--------------|---------------------------------|-----------|----------|----------|-------------------|------------|------------|---------------|-----------|
|                             |              |                                 | L         | T        | P        | CE                | MT E       | ETE        |               |           |
| <b>Theory subjects</b>      |              |                                 |           |          |          |                   |            |            |               |           |
| 1                           | DCS-401      | PROGRAMINMG IN VISUAL BASIC     | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 2                           | DCS-402      | DATE STRUCTURE                  | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 3                           | DCS-403      | MICROPROCESSORS                 | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 4                           | DCS-404      | SYSTEM ANALYSIS AND DESIGN      | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 5                           | DCS-405      | DATABASE MANAGEMENT SYSTEM      | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| <b>PRACTICALS / PROJECT</b> |              |                                 |           |          |          |                   |            |            |               |           |
| 6                           | DCS -451P    | PROGRAMINMG IN VISUAL BASIC LAB | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 7                           | DCS-452P     | DATE STRUCTURE LAB              | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 8                           | DCS-453P     | MICROPROCESSROS LAB             | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 9                           | DCS-455P     | DATABASE MANAGEMENT SYSTEM LAB  | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
|                             |              | <b>Total</b>                    | <b>12</b> | <b>4</b> | <b>8</b> | <b>200</b>        | <b>160</b> | <b>440</b> | <b>900</b>    | <b>24</b> |

L-Lecture, T-Tutorial, P- Practical, CE- Continuous Evaluation, MTE-Mid Term Examination, ETE-End Term Examination

### Evaluation Scheme:

- **Course without practical components**

For Continuous Evaluation (CE) is such as: 20 Marks

1. Attendance: 5 Marks
2. Assignments/Quiz / Seminar/Term paper /Project :15Marks

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 60 Marks

- **Course with practical components only**

For Continuous Evaluation (CE) is such as: 30 Marks

Conduct / Perform/Execution /Practical File/ Viva-Voice

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 50 Marks

## FIFTH SEMESTER

| S.N.                        | Subject Code | Subject Name                      | Period    |          |          | EVALUATION SCHEME |            |            | Subject Total | Credit    |
|-----------------------------|--------------|-----------------------------------|-----------|----------|----------|-------------------|------------|------------|---------------|-----------|
|                             |              |                                   | L         | T        | P        | CE                | MT<br>E    | ETE        |               |           |
| <b>Theory subjects</b>      |              |                                   |           |          |          |                   |            |            |               |           |
| 1                           | DCS-501      | INDUSTRIAL MANAGEMNT              | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 2                           | DCS-502      | ECOMMERCE AND ITS APPLICATION     | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 3                           | DCS-503      | COMPUTER NETWORKS                 | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 4                           | DCS-504      | NUMERICAL ANALYSIS                | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| 5                           | DCS-505      | AUTOMATA THEORY                   | 3         | 1        | 0        | 20                | 20         | 60         | 100           | 4         |
| <b>PRACTICALS / PROJECT</b> |              |                                   |           |          |          |                   |            |            |               |           |
| 6                           | DCS-551P     | PROGRAMMING IN FOXPRO LAB         | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 7                           | DCS-552P     | ECOMMERCE AND ITS APPLICATION LAB | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 8                           | DCS-556P     | COMPUTER WORKSHOP                 | 0         | 0        | 2        | 30                | 20         | 50         | 100           | 1         |
| 9                           | DCS-553P     | COMPUTER NETWORKS LAB             | 0         | 0        | 2        | 50                | -          | 50         | 100           | 1         |
|                             |              | <b>Total</b>                      | <b>12</b> | <b>4</b> | <b>8</b> | <b>200</b>        | <b>160</b> | <b>440</b> | <b>900</b>    | <b>24</b> |

L-Lecture, T-Tutorial, P- Practical, CE- Continuous Evaluation, MTE-Mid Term Examination, ETE-End Term Examination

### Evaluation Scheme:

- **Course without practical components**

For Continuous Evaluation (CE) is such as: 20 Marks

1. Attendance: 5 Marks
2. Assignments/Quiz / Seminar/Term paper /Project :15Marks

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 60 Marks

- **Course with practical components only**

For Continuous Evaluation (CE) is such as: 30 Marks

Conduct / Perform/Execution /Practical File/ Viva-Voice

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 50 Marks

## SIXTH SEMESTER

| S.N.                        | Subject Code | Subject Name                              | Period    |          |          | EVALUATION SCHEME |           |            | Subject Total | Credit    |
|-----------------------------|--------------|---|-----------|----------|----------|-------------------|-----------|------------|---------------|-----------|
|                             |              |   | L         | T        | P        | CE                | MT<br>E   | ETE        |               |           |
| <b>Theory subjects</b>      |              |   |           |          |          |                   |           |            |               |           |
| 1                           | DCS-601      | COMPUTER GRAPHICS                         | 3         | 1        | 0        | 20                | 20        | 60         | 100           | 4         |
| 2                           | DCS-602      | PC ORGNIZATION                            | 3         | 1        | 0        | 20                | 20        | 60         | 100           | 4         |
| 3                           | DCS-603      | INSTALLATION AND MAINTENANCE OF COMPUTERS | 3         | 1        | 0        | 20                | 20        | 60         | 100           | 4         |
| 4                           | DCS-604      | OPERATIONAL RESEARCH                      | 3         | 1        | 0        | 20                | 20        | 60         | 100           | 4         |
| <b>PRACTICALS / PROJECT</b> |              |   |           |          |          |                   |           |            |               |           |
| 5                           | DCS-656P     | MAJOR PROJECT WORK                        | 0         | 0        | 8        | 200               | 0         | 300        | 500           | 8         |
| <b>Total</b>                |              |   | <b>12</b> | <b>4</b> | <b>8</b> | <b>280</b>        | <b>80</b> | <b>540</b> | <b>900</b>    | <b>24</b> |

L-Lecture, T-Tutorial, P- Practical, CE- Continuous Evaluation, MTE-Mid Term Examination, ETE-End Term Examination

### Evaluation Scheme:

#### Course without practical components

For Continuous Evaluation (CE) is such as: 20 Marks

- 1 Attendance: 5 Marks
2. Assignments/Quiz / Seminar/Term paper /Project :15Marks

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 60 Marks

#### • Course with practical components only

For Continuous Evaluation (CE) is such as: 100 Marks

Major Project or Project Work /Conduct / Perform/Execution /Practical File/ Viva-Voice

MTE - Mid Term Examination: 20 Marks

- a. First Mid Term Examination: 10 marks
- b. Second Mid Term Examination: 10 marks

ETE - End Term Examination: 100 Marks

## SEMESTER III

### DCS 310 OBJECT ORIENTED PROGRAMMING

L T P  
3 1 0

Credit-4

#### UNIT 1

##### 1. Object Oriented Paradigm

Structured v/s object oriented development, elements of object oriented programming, objects, classes, multiple views, encapsulation and data abstraction, inheritance, polymorphism, object oriented programming (OOP) languages.

##### 2. C++ at A Glance

Introduction, classes, derived classes, operator overloading

#### UNIT 2

##### 3. Data Types, Operators and Expressions

Data type such as character, integers etc, variables, operators and expressions

##### 4. Control Flow

Statements such as blocks, if statements, if else statement, for loop, while loop, do while loop, switch statement.

##### 5. Arrays and Strings

Operators on arrays, multidimensional arrays, strings, array of strings, string Manipulation

#### UNIT 3

##### 6. Classes and Objects

Class specification, class objects, accessing class members, defined member function, passing objects on arguments, returning objects from functions, structures and classes, constructors and destructors

##### 7. Constructors and Destructors

Parameterized constructors, constructor with default arguments

#### UNIT 4

##### 8. Operator Overloading

Unary operator overloading, binary operator overloading.

##### 9. Inheritance

Derived class declaration, forms of inheritance, constructor and destructor are derived classes.

#### Reference Books:

1. James Rumbaugh et. al, "Object Oriented Modeling and Design", PHI
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education
3. Naughton, Schildt, "The Complete Reference JAVA2", TMH
4. Mark Priestley "Practical Object-Oriented Design with UML", TMH
5. Booch, Maksimchuk, Engle, Young, Conallen and Houston, "Object Oriented Analysis and

Design with Applications", Pearson Education

6. Pandey, Tiwari, "Object Oriented Programming with JAVA", Acme Learning

## DCS310P

### OBJECT ORIENTED PROGRAMMING LAB

1. Exercises involving various control statement
2. Exercises involving class and object creation
3. Exercises involving unary operator overloading
4. Exercises involving binary operator overloading
5. Exercises involving Derived classes

## DCS 320

### DIGITAL ELECTRONICS

L T P

3 1 0

Credit-4

#### UNIT 1

##### 1. Introduction

Basic difference between analog and digital signal. Applications and advantages of analog signals.

##### 2. Number System

Binary and hexadecimal number system, conversion from decimal and hexadecimal to binary and viceversa. BCD representation Binary addition, subtraction, multiplication and division including binary points. BC addition. 1's and 2's complement method of addition/subtraction

##### 3. Logic Gates

Concept of negative and positive logic Definition, symbols and truth tables of NOT, AND, OR, NAND, EXOR Gates, NAND and NOR as universal gates.

##### 4. Logic Simplification

Postulates of Boolean algebra, DE Morgan's Theorems, Various identities. Formulation of truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equations with gates Karnaugh map (upto 4 variables) and simple applications in developing combinational logic circuits

##### 5. Logic Families

Logic Family Classification: Definition of SSI, MSI, LSI, VLSI TTL and MOS families and their sub classification Characteristics of TTL and MOS digital gates, delay, speed, noise margin, logic levels, power dissipation, Fan-in, Fan-out, power supply requirement and comparison between TTL and MOS families Interfacing TTL and MOS ICs. Logic Circuits: Open collector, wired OR and totem pole output circuit operation (qualitative) for a TTLNAND gate MOS circuit operation for a standard gate (NOR) Tri state Switch/Buffer

#### UNIT 2

##### 6. Codes and Parity

Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess3 and Gray code. Concept of parity, single and double parity and error detection Alpha numeric codes: ASCII and EBCDIC.

## **7. Arithmetic Circuits**

Half adder and Full adder circuit, design and implementation. Half and full subtracter circuit, design and implementation.

## **8. Decoders, Display Devices and Associated Circuits**

LED, LCD, seven segment display, basic operation of various commonly used types Four bit decoder circuits for 7 segment display/ driver ICs.

## **UNIT 3**

### **9. Multiplexers and De Multiplexers**

Basic functions and block diagram of MUX and DEMUX. Different types.

### **10. Latches and Flip Flops**

Concept and types of latch with their working and applications Operation using waveforms and truth tables of RS, T, D, JK, Master/ Slave JK flip flops. Difference between a latch and a flip flop

### **11. Counters**

Binary counters, Divide by N ripple counters (including design), Decade counter. Pre settable and programmable counters, Down counter, Up-down counter Synchronous counters (only introduction) Difference between Asynchronous and Synchronous counters Ring counter with timing diagram

## **UNIT 4**

### **12. Shift Register**

Introduction and basic concepts including shift left and shift right. Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out. Universal shift register Buffer register, Tristate Buffer register

### **13. Memories**

Basic RAM cell, N X M bit RAM, Expansion of word length and capacity, static and dynamic RAM, basic idea of ROM, PROM, EPROM, AND EEPROM.

### **13. A/D and D/A Convertors**

General principle of A/D and D/A conversion and brief idea of their applications. Binary resistor network and resistor ladder network methods of D/A conversion. Dual slope and successive approximation types of ADCs.

## **Reference Books:**

1. M. Morris Mano and M.D. Ciletti, "Digital Design", 4th Edition, Pearson Education

## **DCS 320P DIGITAL ELECTRONICS LAB**

1. AND, OR, NOT, NAND, NOR AND EXOR ICs Verification and interpretation of truth tables for AND, OR, NOT, NAND, NOR AND Exclusive OR (EXOR) gates
2. Logic functions using universal gates: Realization of logic functions with the help of NAND or NOR gates Construction of a NOR gate latch and verification of its operation
3. Half adder and Full adder circuits: Construction of Half adder using EXOR and NAND gates and verification of its operation Construction of Full adder using EXOR and NAND gates and verify its operation
4. 4 bit adder/subtractor circuit: Construction of a 4 bit adder, 2's complement subtractor circuit using 4 bit adder IC and an EXOR IC and verify the operation of the circuit
5. IC Flip-flop Verification of truth table for positive edge triggered, negative edge triggered, level



triggered IC flip-flops (Atleast one IC each of D latch, D flip-flop, edge triggered JK and master slave JK flip-flops)

6. Display devices and their decoder/ drivers:

Familiarization and use of different types of single LEDs, common anode and common cathode seven segment LED displays. Use of 7447, 7448 (or equivalent) decoder / driver ICs for 7 segment displays

7. Tristate gate ICs: Verification of truth table and study the operation of tri-state buffer IC 74126 or equivalent. Construction of a 4/8 bit directional bus by using an approximate IC.

8. Decoder, encoder, multiplexer and de-multiplexer Verification of truth table for encoder and decoder ICs Verification of truth table for one/two each of multiplexer and de-multiplexer ICs

9. Shift Register Construction of a 4 bit serial-in serial-out/serial-in parallel-out right shift register using JK flip flops and verification of its operation Construction and testing for its operation of a 4 bit ring counter using JK flip flops

10. Universal Shift Registers IC Verification of truth table for any one universal shift register IC

11. Asynchronous Counter ICs Use of 7490 equivalent TTL (a) divide by 2 (a) divide by 5 (c) divide by 10 counter OR Use of 7493 equivalent TTL (a) divide by 2 (b) divide by 8 (c) divide by 16 counter

12. To construct and test 4/8 bit D/A convertor using IC.

13. To construct and test 4/8 bit A/D convertor using IC.

Note: The students should be exposed to different digital ICs, related to the experiments and the data book.

## **DCS 330 OPERATING SYSTEMS**

**L T P**

**Credit-4**

**3 1 0**

### **UNIT 1**

#### **1. Overview of an Operating System**

Software organization, linking, loading and executing control program for batch processing, time sharing and real time O.S. multi programme, multi processing systems. Various functions of operating System.

#### **2. Overview of System Software**

Compilers, assemblers and loaders

### **UNIT 2**

#### **3. Unix Operating System**

Feature of UNIX, directory structure of UNIX, File structure of UNIX, concept of inodes. Logging into UNIX, format of UNIX components, basis operations on files, filters and pipelines mail and communication commands.

### **UNIT 3**

#### **4. Shell Programming**

Types of shells, control structure for shells and I/O for shells.

#### **5. Use of Editors**

VI, EX & Ed.

### **UNIT 4**

#### **6. DOS Commands**

Internal external

## 7. Deadlocks

### Reference Books:

1. Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley
2. Sibsankar Halder and Alex A Aravind, "Operating Systems", Pearson Education
3. Harvey M Dietel, "An Introduction to Operating System", Pearson Education
4. D M Dhamdhere, "Operating Systems: A Concept based Approach", 2<sup>nd</sup> Edition, TMH

## DCS 330P OPERATING SYSTEMS LAB

1. Exercise involving UNIX commands.
2. Exercise involving redirection and piping commands.
3. Exercise involving UNIX communication TCP/IP and <ail).

## DCS 340 PROGRAMMING IN "C"

L T P

Credit-4

3 1 0

### UNIT 1

**Introduction:** Scope of 'C' Language, Distinction and similarities with other HLLs, Special features and Application areas

**Elements of 'C':** Character set, Key words, Data types, Constants and Variables, Operators: unary, binary, ternary Operator precedence

### UNIT 2

**Console Input-Output:** Types of I-O, Console I-O, Unformatted console I-O: getchar(), putchar(), gets(), puts(), getch(), getche(), Formatted I-O: scanf(), printf()

**Control Flow:** Statements and blocks, if, switch, Loops: for, while, do-while, goto and labels, break, continue, exit, Nesting control statements

### UNIT 3

**Arrays:** Basic concepts, Memory representation, One dimensional array, Two dimensional arrays, Three dimensional arrays

**Functions:** Basic concepts, Declaration and prototypes, Calling, Arguments, Scope rules, Recursion, Storage classes types, Library of functions: math, string, system

### UNIT 4

**Pointers:** Basic concepts, &, \* operator, Pointer expression: assignment, arithmetic, comparison,

Dynamic memory allocation, Pointer v/s Arrays, Array of pointers, Pointer v/s Functions

**Structure, Union and Enumerated Data Types:** Basic concepts, Declaration and memory map, Elements of structures, Structure v/s array, Structure v/s function, Union, Enumerated data types: typedef, enum, Self-referential structures

**File Handling:** Types of files, File organization, Opening, reading, writing, closing, Text and binary file.

### Reference Books:

- |                         |                                 |
|-------------------------|---------------------------------|
| 1. 'C' Programming      | Stephen Kochan                  |
| 2. Programming with 'C' | Schaum's Series<br>V.Balguru    |
| 3. 'C' Programming      | Swami<br>Kernighan &<br>Ritchie |
| 4. 'C' Programming      | Yashwant                        |
| 5. Let us 'C'           | Kanetkar                        |

## DCS 340P PROGRAMMING IN "C"

1. Problems based on arithmetic expression, fixed mode arithmetic
2. Problems based on conditional statements and control structures.
3. Problems based on arrays (1-D, 2-D), functions, pointers, files
4. Problems based on string and character manipulation.

## DCS 350 COMPUTER ARCHITECTURE

L T P

3 1 0

Credit-4

### UNIT 1

#### 1. Processor Organization

General structures of CPU registers, stack, operation of stack, ALU and control unit. Instruction format, mathematical operations, fixed point addition, multiplication or division. Principle of arrays and pipe line processors, principle of instruction decoding and implementation, hardwire and micro instruction based control unit

### UNIT 2

#### 2. Design of Controller

Identifying micro instruction, minimizing micro instruction, size, parallelism in microinstruction, encoding control instruction, timing cycle and clock generation, organization of micro programme based control unit

### **UNIT 3**

#### **3. Memory Organization**

Static memory, dynamic memory, memory hierarchies, memory refresh, paging concept of memory compaction, interleave memory and principle of address interleaving associative memory, memory segmentation, block address calculation, concept of cache memory

### **UNIT 4**

#### **4. Data Transfer Technique**

Various I/O devices, IOP, CPU configuration

#### **Reference Books:**

1. Patterson, Computer Organization and Design, Elsevier Pub. 2009
2. William Stalling, " Computer Organization", PHI
3. Vravice, Hamacher & Zaky, "Computer Organization", TMH
4. Mano, " Computer System Architecture", PHI
5. John P Hays, " Computer Organization", McGraw Hill
6. Tannenbaum, " Structured Computer Organization', PHI
7. P Pal Chaudhry, ' Computer Organization & Design', PHI

## SEMESTER IV

### DCS 410 PROGRAMMING IN VISUAL BASIC

L T P  
3 1 0

Credit-4

#### UNIT 1

##### Visual basic environment and overview

Overview of main screen, menu bar, tool bar, tool box using menus, customizing a form, building user control. Command buttons text boxes, labels images controls.

#### UNIT 2

Statements in visual basic, writing codes, dialog box. Variable, type of variable string numbers.

#### UNIT 3

Writing procedures, VB programs structure, projects. forms, modules, and frames, project with multiple forms displaying information on form, picture boxes, and textboxes.

#### UNIT 4

Printer objects controlling program flow. Built in function user defined function and procedures. arrays, grids & records. Object oriented programming, creating object, building classes.

#### Reference Books:

1. Programming with VB 6.0 –Mohammed Azam
2. Mastering VB 6.0
3. Beginning VB 6.0 –Peter Wrig

### DCS 451P PROGRAMMING IN VISUAL BASIC LAB

L T P  
0 0 2

Credit-1

1. Write a program to make a calculator using textbox, command button
2. Write a program to search the record from the source
3. WAP to generate Fibonacci number.
4. WAP to sort the list in ascending numbers.

**DCS 402**  
**DATA STRUCTURE**

**L T P**  
**3 1 0**

**Credit-4**

**UNIT 1**

1. Problem solving concepts, top down and bottom up design, structured programming
2. Concept of data type and data structure, differences between data type and data structures, view of data structures at logical level, implementation level and application level, built in data structures and user defined data structures

**UNIT 2**

3. Concept of dynamic variables, difference between static and dynamic variables, concepts of pointer variables
4. Study of the following of the following user defined data structures using static and Variables built in data structures like arrays, records User defined data structures like stacks, queues, linked lists, circular linked lists, doubly inked list

**UNIT 3**

5. Non-linear data structures: trees, terminology of trees, concepts and applications of binary trees, tree traversal techniques and algorithms.

**UNIT 4**

6. Sorting and searching algorithms and their efficiency considerations
7. Considerations for choice of proper data structure

**Reference Books:**

1. Aaron M. Tenenbaum, Yedidiah Langsam and Moshe J. Augenstein "Data Structures Using C and C++", PHI
2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication
3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill
4. R. Kruse et.al, "Data Structures and Program Design in C", Pearson Education
5. Lipschutz, "Data Structures" Schaum's Outline Series, TMH
6. G A V Pai, "Data Structures and Algorithms", TMH

**DCS 452P**  
**DATA STRUCTURE LAB**

**L T P**

**Credit-1**

**0 0 2**

1. Problems on arrays on insertion, deletion and searching
2. Problems on pointers
3. Problems on structures
4. Creation of dynamic integer array
5. Transformations from infix to postfix, infix to prefix and evaluation
6. Programs on transformations
7. Program on implementation of stacks
8. Programs on implementation of queues such as initialization, insertion, deletion and searching
9. Programs on circular queues
10. Problem on operation of lists
11. Problems on trees as construction of binary trees, insertion, deletion and searching in binary trees
12. Preorder, in-order and post order traversal of trees
13. Programs to count the leaves and to find the height of a binary tree
14. Programs on sorting such as merge sort, quick sort, heap sort, bubble sort
15. Searching a linked list for all records with a particular list
16. Search into a binary search tree

**DCS 403**  
**MICROPROCESSORS**

**L T P**

**Credit-4**

**3 1 0**

**UNIT 1**

**1. Architecture of 8086**

Introduction to 8 bit and 16 bit microprocessors, internal architecture of 8086, internal registers, physical and logical address generation, maximum and minimum modes, clock generation, minimum system, comparison between 8086 and 8088

**2. Programming 8086**

Address modes, instruction format, instruction templates and hand assembly, instruction set, data transfer, arithmetic, bit manipulation, string instructions, program transfer and processor control instructions, assembler and assembler directives

**UNIT 2**

**3. Programming using Assemblies**

Programming exercises based on the instruction set and use of assembler

**4. Memory I/O Interface**

Memory Interface block diagram, I/O interface (direct and indirect)

### UNIT 3

#### 5. Interrupt Interface of 8086

Types of interrupts interrupt masking, software interrupts

### UNIT 4

#### 6. Features of Advanced Microprocessors

Main features of 80386 and Pentium etc

#### Reference Books:

1. Barry B. Brey, "The Intel Microprocessors: Architecture, Programming & Interfacing" PHI, 6<sup>th</sup> Edition, 2003.
2. D. V. Hall, "Microprocessor and Interfacing Programming & Hardware" TMH – 2<sup>nd</sup> Edition.
3. Uffenback, "The 8086 Family Design" PHI, 2<sup>nd</sup> Edition.
4. Lice & Gibson, "Microcomputer System 8086 / 8088" PHI, 2<sup>nd</sup> Edition.
5. H. P. Messmer, "Family Architecture Programing & Design: The Indispensible PC Hardware Book" Addison Wesley, 1997.

### DCS 453P MICROPROCESSORS LAB

L T P

0 0 2

Credit-1

1. Study of instructions of 8086 using Debug
2. Addition and subtraction of multibyte numbers
3. Multiplication of unsigned/signed numbers
4. Division strings in ascending and descending order
5. Sorting strings in ascending and descending order
6. Modular programming using subroutines

### DCS 404 SYSTEM ANALYSIS AND DESIGN

L T P

3 1 0

Credit-4

### UNIT 1

#### 1. Introduction

Concepts of a system, examples of systems, types of systems open and closed, static and dynamic with examples.



## **2. Overview of System Analysis and Design**

System Development life cycle, brief introduction to analysis, design, implementation and testing and maintenance

### **UNIT 2**

#### **3. Preliminary Investigation**

Project selection, scope definition and preliminary investigation

#### **4. Feasibility Study**

Technical and economic and operational feasibility cost and benefit analysis

### **UNIT 3**

#### **5. Requirement Specification and Analysis**

Fact finding techniques, data flow diagrams, data dictionaries, decision trees and tables.

#### **6. Detailed Design**

Module Specification, file design, data base design.

### **UNIT 4**

#### **7. Testing and Quality Assurance**

Maintenance, unit and integration testing techniques, design objectives, quality factors such as reliability correctness etc.

#### **8. User Education and Training**

Issues in user education and training, method of educating and training the user

### **Reference Books:**

1. Satzinger, Jackson, Burd; Systems analysis & Design In a Changing World; fifth Edition
2. John Wiley & Sons , Charles S. Wasson, System Analysis, Design, and Development: Concepts, Principles, and Practices
3. Maciaszek, L.A Requirements analysis and systems design: developing information systems with UML, Addison-Wesley (3rd edition) 2007
4. Yeates, D (editor) Business Analysis, The British Computer Society 2006, ISBN-13978-1-902505-70-1

## **DCS 405**

### **DATABASE MANAGEMENT SYSTEM**

**L T P**

**Credit-4**

**3 1 0**

### **UNIT 1**

#### **1. Introduction**

Purpose of database, data abstraction, data models, instances & schemas, data independence, data definition language, data manipulation language, database manager, database administration

### **UNIT 2**

#### **2. Entity Relationship Model**

Entity & Entity sets, relationship sets, mapping constraints, candidate & primary key, entity relationship diagram, reducing ER diagram to tables.

### **3. Relational Model**

Concepts of relational model, integrity constraints, extension & intension, relational algebra, relational calculus, commercial query language, modifying the database, comments on relational model.

### **4. DBMS based on Relational Model**

Introduction, the mapping operation, data manipulation facility, data definition facility, data control facility.

## **UNIT 3**

### **5. Normalization**

Introduction to functional dependence, normalization 1NF, 2NF, 3NF, BCNF, 4NF, 5NF

## **UNIT 4**

### **6. Oracle Ingress or Sybase**

Creation of tables, modification of tables, DDL command for RDBMS, SQL command for RDBMS, command language

### **Reference Books:**

1. Date C J, " An Introduction to Database Systems", Addison Wesley
2. Korth, Silbertz, Sudarshan, " Database Concepts", McGraw Hill
3. Elmasri, Navathe, "Fundamentals of Database Systems", Addison Wesley O'Neil, Databases, Elsevier Pub.
4. Leon & Leon, "Database Management Systems", Vikas Publishing House
5. Bipin C. Desai, " An Introduction to Database Systems", Gagotia Publications

## **DCS 455P**

### **DATABASE MANAGEMENT SYSTEM LAB**

**L T P**

**Credit-1**

**0 0 2**

Development of application or any RDBMS package based upon the syllabus.

## SEMESTER V

### DCS 501 INDUSTRIAL MANAGEMENT

L T P

Credit-4

3 1 0

#### UNIT 1

##### 1. Principles of Management

Management, different functions of management planning, organizing, coordination and control. Structure of an industrial organization. Functions of different departments. Relationship between individual departments.

##### 2. Human and Industrial Relations.

Human relations and performance in organization. Understand self and others for effective behavior. Behavior modification techniques. Industrial relations and disputes. Relations with subordinates, peers and superiors. Characteristics of group behavior and trade unionism Mob psychology. Grievance, Handling of grievances. Agitations, strikes, Lockout, Picketing and Gherao Labour Welfare Workers participation in management.

##### 3. Professional Ethics

Concept of Ethics. Concept of professionalism. Need for professional ethics. Code for professional ethics. Typical problems of professional engineers. Professional bodies and their role.

#### UNIT 2

##### 4. Motivation

Factors determining motivation. Characteristics of motivation. Methods for improving motivation. Incentives, pay promotion, rewards. Job satisfaction and job enrichment.

##### 5. Leadership.

Need for Leadership. Functions of a Leader. Factors for accomplishing effective leadership. Manager as a leader.

##### 6. Communication

Importance of communication. The communication process. Barriers to communication. Making communication effective. Listening in communication.

##### 7. Human Resource Development

Introduction. Staff development and career development. Training strategies and methods.

#### UNIT 3

##### 8. Wage Payment

Introduction to wages. Classification of wage payment scheme.

##### 9. Labour, Industrial and Tax Laws.

Importance and necessity of industrial legislation. Types of labour laws and disputes. Brief description of the following Acts The Factory Act 1948, Payment of Wages Act 1936, Minimum Wages Act 1948, Workmen's Compensation Act 1923. Industrial Dispute Act 1947, Employee's state Insurance Act

1948, Provident fund Act. Various types of Taxes Production Tax, Local Tax, Sales Tax, Excise duty, Income Tax. Labour Welfare schemes.

### **10. Accidents and Safety**

Classification of accidents; According to nature of injuries i.e. fatal, temporary, According to event and According to place. Causes of accidents – psychological, physiological and other industrial hazards. Effects of accidents. Accidents prone workers.

Action to be taken in case of accidents with machines, electric shock, road accident, fibers and erection and correction accidents. Safety consciousness. Safety procedures. Safety measures do's and Don'ts. Safety publicity. Safety measures during executions of engineering works.

## **UNIT 4**

### **11. Environmental Engineering.**

Ecology. Factors causing pollution. Effects of Pollution on Human Health. Air pollution and control act. Water Pollution and control act. Pollution control equipment. Solid waste management. Noise pollution and its control.

### **12. Entrepreneurship Development**

Concept of Entrepreneurship. Need of Entrepreneurship in the context of prevailing employment conditions of the country. Successful entrepreneurship. Preparation of project report. Training for entrepreneurs development.

### **Reference Books:**

1. Managerial Economics: Maheshwari.
2. Khanna O.P.: Industrial Engineering
3. T.R. Banga: Industrial Engineering and Management

**DCS 551P**  
**PROGRAMMING IN FOXPRO LAB**

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

**Credit-1**

**Module 1**

This module is designed to teach the new user how to create, edit and manipulate Database, enter data, search for and sort data and generate reports and mailing labels. FoxPro Terminology Command window Creating and opening database Adding records Viewing records in Browse mode Editing records Moving and resizing FoxPro windows Modifying the structure of a database Customizing the environment Sorting and indexing Creating simple indexes Creating multiple field indexes Querying a database Creating logical queries Saving query results Generating and enhancing reports Mailing labels (if time allows)

**Module 2**

This module is designed help the experienced participants become comfortable with creating and manipulating relationships between tables, creating calculations. Using relationships Linking Terminology Indexing tables Creating relationships in queries Creating integrity for a relationship Creating relationships in queries with multiple conditions Creating expressions in queries Screens ( if time allows) Reports.

**Module 3**

This module is designed to give the user a hand on experience to the FoxPro programming language as well as general programming concepts and FoxPro specifics. Steps in writing a program. Programming tips Display data Positioning the record pointer Creating loops Developing IF statements Prompting the user input Error checking Using memory variables Locating data Using functions Calling programs (Branching) Using Macro substitution

**DCS 502**  
**ECOMMERCE AND ITS APPLICATION**

**L T P**  
**3 1 0**

**Credit-4**

**UNIT 1**

**Architectural framework of ecommerce**

Web architecture, web browser, HTTP, TCP/IP, web server, HTML, CGI, scripts standards: EDIFACT, edi.

**UNIT 2**

**Security issue**

introduction to viruses, worms, bombs and protective measure , and security issue, firewalls, and proxy application gateways ,secure, electronic transaction, public and private key encryption. digital signature and digital certificate

**UNIT 3**

**Electronic payments systems.:** digital cash, electronic signature, debit cards at point of scale, smart cards, online, credit cards, based systems, electronic fund EFT, payment gateways.

#### **UNIT 4**

**Electronic commerce application:** e-commerce banking , online shopping, business, models, and revenue models,, online publishing, e-commerce, in retail industry, CBS, digital copyrights, electronic data interchange, electronic fund transfer, electronic display board, electronic catalogue.

#### **Reference Books:**

1. Managerial Economics: Maheshwari.
2. Khanna O.P.: Industrial Engineering
3. T.R. Banga: Industrial Engineering and Management
4. Doing Business on the Internet E-COMMERCE (Electronic commerce for Business): S. Jaiswal, Galgotia Publications. 3
5. E-Commerce An Indian Perspective: P.T.Joseph, S.J., PHI.
6. E-Commerce Business. Technology. Society, Kenneth C. Laudon, Carol GuericoTraver, Pearson Education.
7. E-Commerce: Schneider, Thomson Publication

### **DCS 552P**

#### **ECOMMERCE AND ITS APPLICATION LAB**

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

**Credit-1**

1. Visit most popular e-commerce sites on the internet and comment on their design related issue.
2. Create a site which enables the connectivity with the commerce site.
3. List down the security level of various sites their strengths and limitations.
4. How you can integrate an e-commerce site with other sites to make distributed network site.

### **DCS 503**

#### **COMPUTER NETWORKS**

**L T P**  
**3 1 0**

**Credit-4**

#### **UNIT 1**

##### **1. Networking Basics**

What is network Models of network computing LAN, MAN & WAN Network services

##### **2. OSI Model**

Standards OSI Reference Model OSI Physical layer concepts OSI Data link layer concepts OSI Network layer concepts OSI Transport layer concepts OSI Session layer concepts OSI Presentation layer concepts OSI Application layer concepts.

## **UNIT 2**

### **3. Transmission Media**

Transmission frequencies Cable Media Wireless media Public and Private network services connecting hardware

### **4. Network Topologies**

Data Transmission Digital & Analog signaling Bit synchronization Based band & Broad transmission Multiplexing

### **5. Protocol Suites**

Models & Protocols Network IPX/SPX Internal Protocols Apple Talk Digital Network Architecture

## **UNIT 3**

### **6. Network Architecture**

ARC net specifications Ethernet specifications Token Ring specifications

### **7. Network Connectivity**

Network Connectivity Devices NICs Hubs Repeaters Multiplexers Modems Routers

## **UNIT 4**

### **8. Network Printing**

Print Services

### **9. Network Administration**

Keeping Records Protecting data

### **10. Network Trouble Shooting Techniques**

Trouble shooting process Trouble shooting tools

## **Reference Books:**

1. Forouzan, "Data Communication and Networking", TMH A.S. Tanenbaum, Computer Networks, Pearson Education
2. W. Stallings, Data and Computer Communication, Macmillan Press Anuranjan Misra, "Computer Networks", Acme Learning
3. G. Shanmugarathinam, "Essential of TCP/ IP", Firewall Media

**DCS 553P**  
**COMPUTER NETWORKS LAB**

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

**Credit-1**

1. Interfacing with the network card (Ethernet)
2. Preparing of network cables including hubs. Connectors etc.
3. Establishment of LAN network for homogeneous systems
4. Establishment of LAN network for heterogeneous systems
5. Use of protocols and gateways in establishment LAN
6. Writing small programs such as file security, file transfer, remote testing.
7. Trouble shooting of networks
8. Writing Logic scripts.

**DCS 556P**  
**COMPUTER WORKSHOP LAB**

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

**Credit-1**

**UNIT 1**

1. Loading of various operating systems, UNIX, LINUX, Novel netware, windows NT, windows 85 and 98, Familiarization of their features with practical illustrations. Changing settings.

**UNIT 2**

2. Virus detection, prevention and cure. Use of PC tools. Learning various types of virus such as polymorphic virus, stealth virus, boot sector virus, position table viruses.

**UNIT 3**

3. Structure of Floppy disk and hard disk, writing to boot sector and reading from it.
4. Exposure to RDBMS languages, their features and handling each one of them

**DCS 504**  
**NUMERICAL ANALYSIS**

**L T P**  
**3 1 0**

**Credit-4**

**UNIT 1**

**Introduction:** Approximation, Representation of numbers: fixed-point and floating-point, Rounding of numbers, Types of errors

**Interpolation:** Finite differences: Forward, Backward, Central, Newton's formulas: Forward, Backward, Central, Spline

**UNIT 2**

**Numerical Calculus:** Numerical differentiation: Cubic Spline method, Numerical integration: Trapezoidal, Simpsons' 1/3 and 3/8 Rules.



### UNIT 3

**Solution of Equation:** Algebraic and transcendental equations: Graphical, Regular Falsi Newton Rapson method, Simultaneous Algebraic equation :, Gauss elimination, Gauss Jordan, Gauss Seidel Method, Differential equations of first order :, Euler's, Euler's modified, Taylor's series, Picard's and, Runge - kutta method (Second and Fourth order Runge kutta), Higher order differential equations : Simultaneous, Second order equations, Determinants and its property, Solutions of linear equations by determinants

### UNIT 4

**Matrix:** Types of matrix, Matrix inverse : Gauss elimination, Gauss-Jordan method, Transpose, Solution of simultaneous equations by inverse technique, Eigen values, Eigen vectors, Matrix inversion by Cayley Hamilton theorem

#### Reference Books:

- |   |  |
|---|--|
| 1. Numerical Analysis                         | Bansal,Ojha                            |
| 2. Numerical Analysis                         | H.C.Saxena                             |
| 3. Numerical Recipe's (in C)                  | Press, Flannery, Teukolrky& Vetterling |
| 4. Numerical Methods                          | E. Balagurusami, TMH                   |
| 5. Numerical Techniques in 'C'                | E.V. Kameshwar, BPB                    |
| 6. Comp. Oriented Numerical Methods           | V.Rajaraman                            |
| 7. Computational Mathematics                  | Demidorich,B.P.                        |
| 8. Introductory Methods of Numerical Analysis | S.S. Sastry, PHI                       |
| 9. Applied Numerical Analysis                 | Gerald, AW/Pearson                     |
| 10. Elements of Computer Science              | R. Agor                                |

## DCS 505

### AUTOMATA THEORY

L T P

Credit-4

3 1 0

#### UNIT 1

Definition of an Automaton, Definition of finite Automaton, Block diagram of finite Automaton, Transition system, Properties of Transition Functions, Acceptability of a string by Finite Automaton. Definition of DFA and N DFA, The equivalence of DFA and N DFA, A theorem on equivalence of DFA and N DFA. (Including Applications) Mealy and Moore machine, Procedure for Transforming a Mealy Machine into a Moore Machine (with applications), Procedure for Transforming a Moore Machine to a Mealy Machine (with applications).Concept of a language, Definition of a grammar, Language generated by a grammar (definition with application). Chomsky classification of languages (definition), Relation between the classified languages.

## **UNIT 2**

Definition of Regular expression and regular set, Identities of regular expressions, Arden's theorem (statement & application) Relation between regular expression and finite automata, Transition system containing  $\wedge$ -mores (application), Conversion of Non-deterministic systems to deterministic system (application), Construction of finite automata equivalent to a regular expression (with application), Equivalence of two finite automata (application), Equivalence of two regular expressions; Pumping lemma (Statement & application), Closure properties of regular sets, Construction of regular grammar for a given DFA and a transition system for a given regular grammar G.

## **UNIT 3**

Context free grammars: Introduction – Definition – Derivation trees (Definitions & application) – Ambiguity in CFG.

## **UNIT 4**

Push down automata and turning machine: Basic definition of PDA – Turning machine model & its representation.

### **Reference Books:**

1. Introduction to Automata Theory, languages & computation / J.E. Hopcroft & J.D. Ullman / Narosa
2. Theory of Computer Science / K.L.P. Mishra & N. Chandrasekharan / PHI
3. Theory of Automata and Formal Language / Kain / TMH
4. Switching and Finite Automata / Z.V.I. Kohavi / TMH.

## SEMESTER VI

### DCS 601 COMPUTER GRAPHICS

L T P

Credit-4

3 1 0

#### UNIT 1

##### 1. Graphic Systems

Display devices, physical input and output devices, display processors graphics software coordinate representation, graphics functions and standards

##### 2. Output Primitives

Point plotting, line drawing algorithms DDA algorithms, bresenham's line algorithms, circle generating algorithms, ellipses, attributes and construction techniques

#### UNIT 2

##### 3. Two Dimensional Transformations

Basic transformations translations, rotation, matrix representation and homogeneous coordinates, composite transformations scaling relative to a fixed pivot, rotation about a pivot point, general transformation equations, other transformation – reflection.

#### UNIT 3

##### 4. Windowing and Clipping Techniques

Windowing concepts clipping algorithms, area clipping, line clipping, polygon clippings, text clipping, blanking, window to viewpoint transformation, Cohen Sutherland algorithm

#### UNIT 4

##### 5. Animation Techniques

Animation perspectives, computer animation hardware, computer animation software and applications, PC animation, concept of simulations

#### Reference Books:

1. Foley, Vandam, Feiner, Hughes-"Computer Graphics principles (2ndEd.)-Pearson Education.
2. W.M.Newman, R.F.Sprou-"Principles of Interactive computer Graphics"-TMH.

### DCS 602 PC ORGANISATION

L T P

Credit-4

3 1 0

#### UNIT 1

##### 1. Hardware Organization of PC

Micrometer organization, 8086/8088 microprocessor, its architecture, instruction set, memory address and addressing techniques and I/O addressing. The mother board of the PC: memory

organization, system timers/counters, interrupt vectoring, Interrupt controller, DMA controller and its channels, PC bus slots, various types of digital buses. Serial I/O ports e.g. COM 1 and 2, parallel ports

## **2. The Video display of The PC**

The basic principles of the working of Video monitors, video display adapters (monochrome and colour graphic). Video modes

## **UNIT 2**

### **3. The Keyboard of the PC**

The basic principles of the working of a PC Keyboard. Scan modes

### **4. Disk Drives:**

Constructional features of Hard disk, Floppy disk and their drives (HDD and FDD). Logical structure of a disk and its organization: Boot Record, File Allocation Table (FAT), Disk Directory, Data source

## **UNIT 3**

### **5. Peripheral Devices**

Basic features of various other peripheral devices e.g. mouse, printer (DMP, Inkjet, Laser), scanner, plotter, digitizer and Modem

### **6. Power Supplies**

SMPS used in PC and its various voltages. Basic idea of constant voltage transformer (CVT) and uninterrupted power supply (UPS) off line and Online.

## **UNIT 4**

### **7. The Bios and Dos Services**

The basic idea of BIOS and DOS services for diskette, Serial Port, Keyboard, Printer and Misc. services.

### **8. Advanced Microprocessors:**

Basic features of 32bit Intel microprocessor 80386, 80486 and Pentium.

### **Reference Books:**

1. Patterson, Computer Organization and Design, Elsevier Pub. 2009
2. William Stalling, " Computer Organization", PHI
3. Vravice, Hamacher & Zaky, "Computer Organization", TMH

## **DCS 603**

### **INSTALLATION AND MAINTENANCE OF COMPUTERS**

**L T P**

**Credit-4**

**3 1 0**

## **UNIT 1**

### **1. Site Preparation**

Design of computer room, specification for flooring materials, falls roofing, disk tape library room, air conditioning requirements and its maintenance. Temperature and humidity factor, need for dust proofing, different types of air conditioners and their application, Design of computer, power requirement of computer room, Need of stabilizer, CVT, UPS, simple

principle of UPS and its advantages over normal power supply, earthing and its advantages, distribution board, fire detection and prevention of computer room.

## **UNIT 2**

### **2. Installation**

Layout planning of computer system, knowledge of installation procedure and manuals, cracking offline equipment, act all testing computer system, using manufacture specified procedure, training the operator for small systems like Pc, Installation of various kinds of printers. Installation of hubs and switches. Installation of network cable, fiber optic and UTP cabling

## **UNIT 3 & D**

### **3. Maintenance**

Types of maintenance, preventive and corrective maintenance, site audit, importance of preventive maintenance, Use of diagnostic software like Pc tools, QA++, Norton commander, Macaceffe, Smartdog, Typical symptoms of common hardware and software fault and understand the error messages some aid to chip level fault detection and its rectification, failure of equipment, knowledge of local parts substitution. Maintenance of printers

## **DCS 604 OPERATIONAL RESEARCH**

**L T P**  
**3 1 0**

**Credit-4**

## **UNIT 1**

### **INTRODUCTION**

Origin and Development of O R - Meaning of O R, Scope of O R, Characteristics of O R, Uses and limitation of O R.

## **UNIT 2**

### **LINEAR PROGRAMMING**

Introduction, Formulation of the L.P.P., Graphical solution method (only introduction), Canonical & Standard form of L.P.P.

Linear Programming Method: Basic solution, Degenerate solution, Basic Feasible solution, Associated Cost vector, Improved Basic Feasible solution, Optimum Basic Feasible solution. (Definitions only) — Simplex method, Artificial Variable technique up to optimality, (Big M method).

Duality in Linear Programming: Concept of duality, Primal problem, Dual problem (Definitions only), Writing Dual problem from Primal problem and vice versa. Dual Simplex Method Revised Simplex Method: Introduction, standard form of Revised Simplex method, computational procedure, Revised Simplex method vs. Simplex method.

## **UNIT 3**

### **TRANSPORTATION PROBLEM**

Mathematical formulation, Initial basic feasible solution (North–West corner rule), row minima, column minima, matrix minima method, Vogel’s Approximation method (VAM). Optimality test (U-V method), Unbalanced T.P (Definition only).

**ASSIGNMENT PROBLEM**

Mathematical formulation; Optimality test; Unbalanced A.P. (Definition only)

**UNIT 4**

**PROJECT MANAGEMENT**

Introduction to network analysis – Definitions of project, job, events, and networks – Construction of the arrow diagram (network) – Critical Path Method: Determination of critical paths & calculation of floats – Project Evaluation & Review Technique – Resource Allocation Technique: Project scheduling with constraints resources.

**DCS 656P  
MAJOR PROJECT WORK**

**L T P**

**Credit-8**

**0 0 8**

Some of the project activities are given below:

1. Projects related to repair and maintenance of computers
2. Projects related to design of PCBs
3. Projects related to setting up of small computer centre
4. Projects related to Programming
5. Projects related to assembly and fabrication of a PC
6. Software projects related to industry (by using any RDBMS)
7. Software projects related to industry (by using FoxPro)
8. Projects related to multimedia
9. Projects related to system software e.g. writing of device drivers
10. Projects related to testing, fault diagnosis and repair of Motherboards SMPS HDD CD Printers Monitors Plotters
11. Projects related to maintenance of common faults in Pc range of computers and Various fault diagnosis procedure
12. Projects related to networking e.g. set up and diagnosis faults in small LANs
13. Projects related to process control, data acquisition system
14. Projects related to instrumentation, robotics etc
15. Projects related to computer graphics, object oriented programming and artificial intelligence