



**UTTARAKHAND BOARD OF TECHNICAL EDUCATION**  
**JOINT ENTRANCE EXAMINATION AND TRAINING, RESEARCH DEVELOPMENT CELL, DEHRADUN**  
**STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME**

**BRANCH NAME- INFORMATION TECHNOLOGY**

**SEMESTER – III**

Subject Code	Subject	L	T	P	T O T	EVALUATION SCHEME						Total Marks	Credit Point
						Internal		External					
						Theory	Practical	Theory		Practical			
						Max Marks	Max Marks	Max Marks	Hrs.	Max Marks	Hrs.		
Period/Weeks													
053006	Programming in C	4	-	5	9	30	30	70	2.5	60	3.0	190	5
053003	Digital Techniques	4	-	-	4	30	-	70	2.5	-	-	100	4
053005	Operating System	4	-	4	8	30	30	70	2.5	60	3.0	190	5
053001	Internet of Things	4	-	5	9	30	30	70	2.5	60	3.0	190	5
053002	Data Communication	4	-	4	8	30	30	70	2.5	60	3.0	190	5
053004	Office Application	-	-	6	6	-	30	-	-	60	3.0	90	3
053052	Industrial Exposure (Assessment at Inst. Level)+	-	-	-	-	-	25	-	-	-	-	25	2
013054	General Proficiency #	-	-	4	4	-	25	-	-	-	-	25	1
<b>Total</b>		<b>20</b>	<b>-</b>	<b>28</b>	<b>48</b>	<b>150</b>	<b>200</b>	<b>350</b>	<b>-</b>	<b>300</b>	<b>-</b>	<b>1000</b>	<b>30</b>

# Student Centered Activities will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS and cultural activities etc.

+ Industrial visit compulsory at minimum 2 Industries or Department.

**Note:** 1- Each period will be 50 minutes. 2- Each session will be of 16 weeks. 3- Effective teaching will be at least 12.5 weeks.

**Branch Code - 12**



**THIRD SEMESTER  
INFORMATION TECHNOLOGY**



# PROGRAMMING IN C

Subject Code : 053006

L	T	P
4	-	5

## RATIONALE

C is the most widely used computer language, which is being taught as a core course. C is general purpose structural language that is powerful, efficient and compact, which combines features of high level language and low-level language. It is closer to both Man and Machine. Due to this inherent flexibility and tolerance it is suitable for different development environments. Due to these powerful features, C has not lost its importance and popularity in recently developed and advanced software industry. C can also be used for system level programming and it is still considered as first priority programming language. This course covers the basic concepts of C. This course will act as “Programming concept developer” for students. It will also act as “Backbone” for subjects like OOPS, Visual Basic, Windows Programming, JAVA etc.

## OBJECTIVES

At the end of the Course, the students will be able to

- Define Program, Algorithm and flowchart
- List down and Explain various program development steps
- Write down algorithm and flow chart for simple problems.
- Describe the concepts of Constants, Variables, Data types and operators.
- Develop programs using input and output operations.
- Use of command line arguments.
- Explain compiler controlled directives.
- Understand the structure and usage of different looping and branching statements.
- Define arrays and string handling functions.
- Explain user-defined functions, structures and union.
- Define pointers and using the concept of Pointers.
- To understand the dynamic data structure and memory management

## DETAILED CONTENTS

### 1. Program Algorithm & flow chart:

(4 Periods)

Program development cycle- Programming language levels & features. Algorithm – Properties & classification of Algorithm, flow chart – symbols, importance & advantage of flow chart.

**2. Introduction C :****(4 Periods)**

History of C – features of C structure of C program–Compiler, Interpreter link & run a program. Diagrammatic representation of program execution process.

**3. Variables, Constants & Data types :****(4 Periods)**

C character set-Tokens- Constants- Key words – identifiers and Variables – Data types and storage – Data type Qualifiers – Declaration of Variables – Assigning values to variables- Declaring variables as constants-Declaration – Variables as volatile- Overflow & under flow of data

**4. C operators :****(4 Periods)**

Arithmetic, Logical, Assignment .Relational, Increment and Decrement, Conditional, Bitwise, Special Operator precedence and Associativity. C expressions – Arithmetic expressions – Evaluation of expressions- Type cast operator

**5. I/O statements :****(2 Periods)**

Formatted input, formatted output, Unformatted I/O statements

**6. Branching :****(4 Periods)**

Introduction – Simple if statement – if – else – else - if ladder, nested if - else - Switch statement – go statement – Simple programs.

**7. Control statements :****(6 Periods)**

While, do-while statements, for loop, break & continue statement – Simple programs

**8. Arrays :****(6 Periods)**

Declaration and initialization of One dimensional, Two dimensional and Character arrays – Accessing array elements – Programs using arrays

**9. Strings :-****(6 Periods)**

Declaration and initialization of string variables, Reading String, Writing Strings–String handling functions, – String manipulation programs

**10. User defined functions :-****(6 Periods)**

Defining functions & Needs-, Scope and Lifetime of Variables, Function call, return values, Storage classes, Category of function – Recursion – Simple programs

## **11. Structures and Unions :**

**(6 Periods)**

Structure – Definition, initialization, arrays of structures, Arrays with in structures, structures within structures, Structures and functions – Unions – Structure of Union – Difference between Union and structure – Simple programs.

## **12. Pointers :**

**(6 Periods)**

Definition – advantages of pointers – accessing the address of a variable through pointers - declaring and initializing pointers - pointers expressions, increment and scale factor- array of pointers - pointers and array - pointer and character strings – function arguments – pointers to functions – pointers and structures – programs using pointer.

## **13. File Management :**

**(6 Periods)**

Introduction-Defining and opening a file - closing a file - Input/ Output operations on files—Error handling during I/O operations – Random Access to files—Programs using files

## **TEXT BOOK**

1. Programming in ANSI C 4E by Prof. E. BALAGURUSAMY, The TATA Mc GRAW –HILL Publications.

## **REFERENCE BOOK**

1. Programming and Problem solving using CISRD Group, Lucknow Tata Mc-Graw Hill, New Delhi, Sixth Reprint 2010
2. Let us C Yeswanth Kanetkar BPB Publications, Fourth Revised
3. A Text Book on C, E. Karthikeyan PHI Private Limited, New Delhi 2008
4. Programming in C, D. Ravichandran New Age International Publishers, Chennai, First Edition 1996, Reprint 2011
5. Computer Concepts and Dr. S. S. Khandare S. Chand & Company Ltd. New Delhi First Edition 2010
6. Complete Knowledge in C Sukhendu Dey, Debobrata Dutta Narosa Publishing House, New Delhi Reprint 2010
7. Programming in C Reema Theraja Oxford University Press First Edition 2011
8. Practical C Programming Steve Oualline O’ Reilly, Shroff Eleventh Indian Reprint Oct 2010

## LAB EXERCISES

### Part – A

1. Write a simple C program.
  - a. Print your name and address.
  - b. Find simple and compound interest
2. Write a C program to swap two variable's using (i) third variable and (ii) without using a third variable.
3. Write a program to convert a given number of days into months and days using integer arithmetic operators.
4. Write a program the use of variables in expression and their evaluation.
5. Write a program converts the given temperature in Fahrenheit to Celsius using preprocessor.
6. Write a program to find the largest number between given three numbers.
7. Write a program to perform following tasks
  - a. Find factorial of a number
  - b. Print prime numbers up N times.
8. Write a program to prepare the total marks for N students by reading the Reg. No, Name, Mark1 to Mark 6 by using array of structures.
9. Write a program using the function power (a, b) to calculate the value of a raised to b.
10. Write a program to find the length of the given string using pointers.

### Part – B

1. Read an integer number, find the number of digit and sum of all individual digits and also print the above number in reverse order.
2. Write a program to perform following tasks
  - a. Print Fibonacci series up to N terms and its sum.
  - b. Print whether a given year is leap or not.
3. Read a sentence through command line argument. Write a program to write out the string arguments to main in reverse order.
4. Write a program to arrange the given N names in alphabetical order.
5. Write a program to count the numbers and chars in the string.
6. Write a program that uses a function to sort an array of integers.
7. Write a program to calculate the subject wise and student wise totals and store them as a part of the structure.
8. Write a program to read 10 values to an array variable. Use pointers to locate and display each value.
9. Write a program that uses a table of integers whose size will be specified interactively at runtime.

10. Write a program to store a character string in a block of memory space created by MALLOC and then modify the same to store a larger string.

### SCHEME OF VALUATION

Writing any one program from PART – A	10 Marks
Writing any one program from PART – B	10 Marks
Executing program (PART – A)	10 Marks
Executing program (PART – B)	10 Marks
Result with printout ( PART – A)	05 Marks
Result with printout ( PART – B)	05 Marks
VIVA – VOCE	10 Marks
<b>Total</b>	<b>60 Marks</b>

**Note:** student: computer ratio in lab should be strictly 1:1

### HARDWARE REQUIREMENT

- Desktop Computers with LAN – 40Nos
- Laser Printer – 1No

### SOFTWARE REQUIREMNT

- C – Compiler with Editor

### SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	4	5
2	4	5
3	4	5
4	4	5
5	2	5
6	4	5
7	6	7
8	6	6
9	6	6
10	6	6
11	6	5
12	6	5
13	6	5
<b>Total</b>	<b>64</b>	<b>70</b>

Subject Code : 053003

L	T	P
4	-	-

**RATIONALE**

Diploma Engineers from all branches of engineering are expected to have some basic knowledge of electronics engineering. Also the technicians working in different engineering fields have to deal with Various types of electronic circuit. Hence it is necessary to study electronic devices their principles and working characteristics. The basic concepts studied in this subject will be very useful for understanding of higher level subjects in further study.

**DETAILED CONTENTS****1. Semi Conductors Basics:****(6 Periods)**

Conductors, Insulators, Semiconductors, Idea of energy, Energy Band Diagrams, Effect of temperature, Distinction between analog and digital signal, Applications and advantages of digital signals

**2. Number representation:****(8 Periods)**

Decimal, Binary, Octal and Hexa decimal number systems- Conversion of number from one number system to another (without decimal point) -1's , 2's AND 9's complement method of addition/subtraction, sign magnitude method of representation, floating point representation

BCD CODE – ASCII Codes - Parity bit – Use of a parity bit – Odd parity and Even parity

**3. Logic gates:****(8 Periods)**

Positive and Negative logic System - Definition, Truth table, Symbol and Logical equations of AND – OR - NOT – EXOR - EXNOR (Only 2- inputs) gates – Universal gates - NAND - NOR – Symbol and truth table . Logic family classification:- Definition of SSI, MSI, LSI, VLSI, TTL and C MOS families and their sub classification

**4. Boolean Algebra :****(8 Periods)**

Basic laws of Boolean algebra – Demorgan's Theorem and proofs – Duality theorem - Simplification of logical equations using Boolean laws - De-Morgan's theorem – Two and three variable Karnaughmap (upto 4 variables) and simple application in developing combinational logic circuits



**5. Arithmetic Circuits:****(8 Periods)**

Half Adder and full adder- Truth table, Circuit diagram –

Half subtractor and Full subtractor - Truth table, Circuit diagram.

**6. Combinational logic circuits:****(8 Periods)**

Parity generator and checker - Multiplexer - De multiplexer – Encoder - Decoder (Definition and Basic Circuits only) – Comparator Circuit for two bit words.

**7. Flip flops:****(8 Periods)**

Basic principle of operation - S-R, D flip-flop – Operation and truth table - Race Condition – JK flip flop – T flip flop – Toggling - Edge Triggered Flip-flop – Level Triggered flip flop - Need for a Master-slave flip flop - J-K Master Slave flip flop.

**8. Counters:****(5 Periods)**

Need- Types of counters- 4 bit Asynchronous counter-Mod N counter-Decade Counter- 4 bit Synchronous counter-Distinguish between Synchronous and Asynchronous counter-Application of counters

**9. Registers:****(5 Periods)**

Shift register - Block diagram representation and waveform of serial – in Serial out, Serial – in Parallel – out, Parallel in -parallel out Applications of ShiftRegisters.

**TEXT BOOK :-**

1. Electrical Technology Vol I and II., B. L. Theraja, S. Chand & Co, New Delhi Multiple Colour Revised First Edition, 2012
2. Modern Digital Electronics R.P. Jain Tata Mc- GrawHill, New Delhi Third Reprint 2010
3. Principles of Digital electronics K. Meena PHI learning Private Ltd 2009

**REFERENCE BOOK**

1. Digital Electronics and Logic Design Jaydeep Chakravarthy University Press, Hyderabad First Edition 2012

2. Basic Electrical and Electronics Engineering R, Muthusubramanian R. Salivajanan Tata Mc-Graw Hill, New Delhi Seventh Reprint 2011
3. Principles of Electronics V. K. Mehta S. Chand & Co, New Delhi Second Edition
4. Digital Electronics G. K. Kharate Oxford University Press 2010

### INSTRUCTIONAL STRATEGY

The digital systems in microprocessors have significant importance in the area of electronics. Adequate competency needs to be developed by giving sufficient practical knowledge in microprocessors (programming as well as interfacing), Help may be taken in the form of charts, simulation packages to develop clear concepts of the subject. Programming exercises other than the tested in circulation may be given to the students

### SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	6	8
2	8	8
3	8	8
4	8	8
5	8	8
6	8	8
7	8	8
8	5	7
9	5	7
<b>Total</b>	<b>64</b>	<b>70</b>

# OPERATING SYSTEMS

Subject Code : 053005

L	T	P
4	-	4

## RATIONALE

The course provides the students with an understanding of human computer interface existing in computer system and the basic concepts of operating system and its working. The students will also get hand-on experience and good working knowledge to work in DOS and Windows environments. The aim is to gain proficiency in using various operating systems after undergoing this course.

## OBJECTIVES

- Understand the purpose, goals, functions and evolution of Operating Systems.
- Understand the concept of process, various states in the process and their scheduling.
- Classify different types of schedulers and scheduling algorithms.
- Identify the significance of inter-process communication and synchronization.
- Discuss the usage of semaphore in inter-process communication.
- Understand the conditions for a deadlock.
- Describe the ways to recover from the deadlock.
- Know about memory protection against unauthorized access and sharing.
- Compare and contrast paging and segmentation techniques.
- Define virtual memory and its underlying concepts.
- Describe the page replacement policies like Optimal, FIFO and LRU.

## DETAILED CONTENTS

### 1. Basics of Operating Systems: (8 Periods)

Definition – Generations of Operating systems– Types of Operating Systems, Multi-programming, Real time, Embedded and Time Sharing.

### 2. Operating System Components: (6 Periods)

Process Management component – Memory Management component - I/O Management component – File Management component - Protection System.

**3. Processes: (6 Periods)**

Definition – Process Relationship - Process states – Process State transitions - Process Control Block – Context switching.

**4. Process Scheduling: (8 Periods)**

Definition – Scheduling objectives – Types of Schedulers – Scheduling criteria – CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) – Scheduling algorithms – Pre-emptive and Non- preemptive - FCFS – SJF – RR - Multiprocessor scheduling – Types - Performance evaluation of the scheduling.

**5. Inter-process Communication and Synchronization: (6 Periods)**

Definition – Shared Memory System – Message passing – Critical section – Mutual Exclusion - Semaphores.

**6. Deadlocks: (6 Periods)**

Definition – Deadlock characteristics – Deadlock Prevention –Deadlock Avoidance – Deadlock detection and Recovery.

**7. Memory Management : (8 Periods)**

Definition – Logical and Physical address map – Memory allocation – Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction – Paging – Principle of operation – Page allocation –

**8. Virtual Memory : (8 Periods)**

Basics of Virtual Memory –Page fault , Working Set , Dirty page/Dirty bit – Demand paging ( Concepts only) – Page Replacement policies – Optimal (OPT), First in First Out (FIFO), and Least Recently used(LRU)

**9. File Management: (8 Periods)**

File concept – File attributes –File Operations - Directory Structure –Tree Structure – Disk space allocation methods– Contiguous, Linked, Indexed. Access Methods – Sequential, Random access – File system

## **TEXT BOOKS**

1. Operating System concepts, Abraham Siberschatz Galvin, Gagne Wiley 9th Edition
2. Operating System Internal and Design Principles, William Stallings Pearson Education 7th Edition

## **REFERENCE BOOK**

1. Operating system, Principals & Design, Pal Chaudhury PHI Learning First Edition
2. Operating System, William stalling Pearson Education, New Delhi. 2003
3. Operating Systems Deitel and Deitel, Pearson Education, New Delhi. Third Edition, 2007
4. Operating System, RohitKhurana ITLESE, Vikas Publishing Ltd, First Edition 2011

## **LAB EXERCISES**

### **PART – A**

### **DOS COMMANDS**

Write down the syntax and usage of the following exercise with all options.

Check the commands with the system

- 1 (a) Booting Procedure
- (b) DOS Commands, BAT file etc

### **PART – B**

### **LINUX COMMANDS**

- 1 (c) Logon to LINUX and log off.
- (d) Usage of directory management commands: ls, cd, pwd, mkdir, rmdir
- (e) Usage of File Management commands: cat, chmod, cp, mv, rm, more, file commands
- 2 Use the general purpose commands: wc, od, lp, cal, date, who, tty, ln
- 3 Using the simple filters: pr, head, tail, cut, paste, nl, sort
- 4 Advanced filters : Search for a pattern using grep, egrep & fgrep
- 5 To know the details of process status-pscommand, Process management commands: &, nohup, kill, nice
- 6 Communication Commands: news, write, mail, wall, calendar

## PART – C

### WINDOWS Features and Administration

1. Introduction to GUI OS; Features and various versions of GUI OS & its use; Working with GUI OS; My Computer & Recycle bin ; Desktop, Icons and Explorer; Screen description & working styles of GUI OS; Dialog Boxes & Toolbars; Working with Files & Folders; simple operations like copy, delete, moving of files and folders from one drive to another, Shortcuts & Auto start; Accessories and Windows Settings using Control Panel- setting common devices using control panel, modem, printers, audio, network, fonts, creating users, internet settings, Start button & Program lists; Installing and Uninstalling new Hard ware & Software program on your computer - Copying in CD/DVD settings – Recording Audio files.
2.
  - a. Installing screen saver and change the monitor resolution by 1280X960
  - b. Setting wallpapers
  - c. Creating, moving, deleting and renaming a folder
  - d. Copy, paste and cut a folder/file
  - e. Displaying the properties for a file or folder
3.
  - a. Restoring files and folders from Recycle bin
  - b. Creating short cuts for folder/file
  - c. Finding a file or folder by name
  - d. Selecting and moving two or more files/folders using mouse Sorting folders/files
4. Anti viruses, Zip files, Compressions, Windows supported file formats etc

### SCHEME OF VALUATION

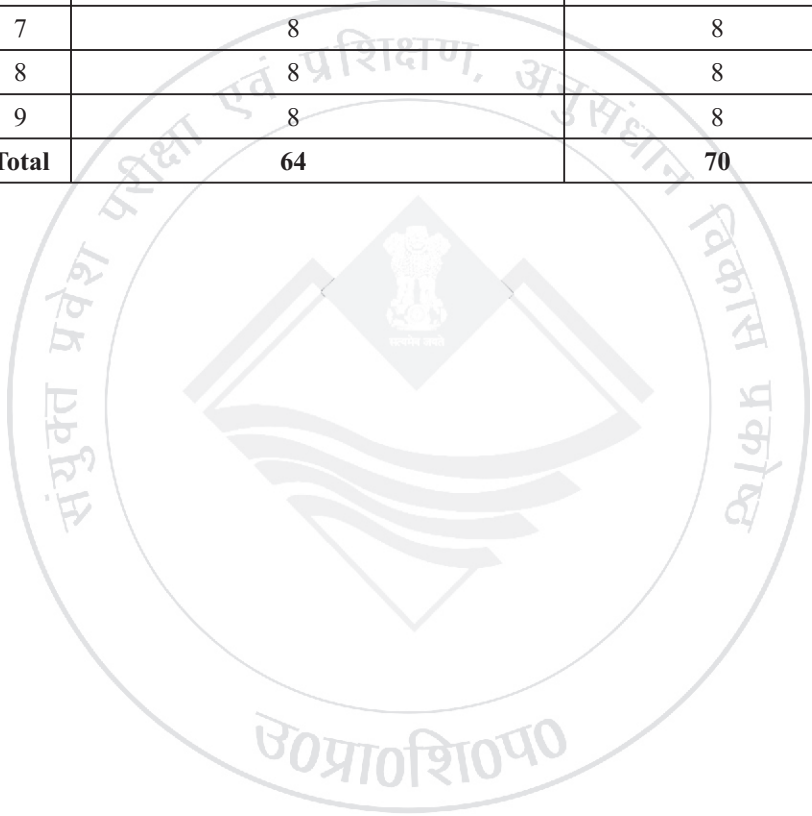
Commands in Part-A	10 Marks
Execution of Commands in Part-A	10 Marks
Commands in Part-B	10 Marks
Execution of program in Part-B	10 Marks
Commands in Part-c	10 Marks
Execution of program in Part-c	10 Marks
<b>TOTAL</b>	<b>60 Marks</b>

### INSTRUCTIONAL STRATEGY

As per the above information, it is clear that the subject is both theory and practical oriented. Therefore, the stress must be given on both the theory and practical teaching. In the practical classes, the laboratory must be equipped with all the basic operating system software i.e DOS, UNIX, LINUX, WINDOWS etc. While imparting instructions, the teachers are expected to lay more emphasis on concepts and principles of operating systems, its features and practical utility.

## SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	8	8
2	6	7
3	6	7
4	8	8
5	6	8
6	6	8
7	8	8
8	8	8
9	8	8
<b>Total</b>	<b>64</b>	<b>70</b>



Subject Code : 053001

L	T	P
4	-	5

**RATIONALE**

A computer engineer should be able to interface and maintain key-board, printer, and mouse, monitored along with the other computer system related device. The course provides the necessary knowledge and skills regarding working construction and interfacing aspects of peripherals and IoT. Students will understand the concepts of Internet of Things and can be able to build IoT applications.

**Objectives:**

- Understand the concepts of Internet of Things
- Analyze basic protocols in wireless sensor network
- Design IoT applications in different domain and be able to analyze their performance
- Implement basic IoT applications on embedded platform.

**DETAILED CONTENTS**

- 1. Introduction to IoT (10 Periods)**  
Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs
- 2. IoT & M2M (8 Periods)**  
Machine to Machine, Difference between IoT and M2M, Software define Network
- 3. Network & Communication aspects (12 Periods)**  
Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination
- 4. Challenges in IoT (10 Periods)**  
Design challenges, Development challenges, Security challenges, Other challenges
- 5. Domain specific applications of IoT (8 Periods)**  
Home automation, Industry applications, Surveillance applications, Other IoT applications



## 6. Developing IoTs

(16 Periods)

Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python

### RECOMMENDED BOOKS

1. Vijay Madiseti, Arshdeep Bahga, "Internet of Things: A Hands-On Approach"
2. Walteneus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

### LIST OF PRACTICALS

1. Study and Install Python in Eclipse and WAP for data types in python
2. Write a Program for arithmetic operation in Python
3. Write a Program for looping statement in Python.
4. Study and Install IDE of Arduino and different types of Arduino
5. Write program using Arduino IDE for Blink LED.
6. Write Program for RGB LED using Arduino.

### INSTRUCTIONAL STRATEGY

At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.

### SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	10	15
2	8	8
3	12	15
4	10	12
5	8	8
6	16	12
<b>Total</b>	<b>64</b>	<b>70</b>

Subject Code : 053002

L	T	P
4	-	4

**RATIONALE**

The course provides the student with:

1. Principles of Computer Communication, types of Network Topologies and Network Softwares.
2. Principle of digital data transmission, Errors in Communication and deal it.
3. Network Device involved in Data Communication.
4. Communication methods and equipment used in data transmission.

**DETAILED CONTENTS****1. Introduction To Computer Networks : (12 Periods)**

Introduction: Definition of a Computer Network; What is a Network?, Components of a computer network: Use of Computer networks; Networks for companies, Networks for people, Social Issues: Classification of networks; Based on transmission technology, Based on the their scale, Local area networks, Metropolitan area networks, Wide area networks, Wireless networks:

**Network Software & Network Model :**

Introduction: Networks Software; Protocol hierarchy, Reference models; The OSI Reference Model, The TCP/IP Reference Model, Comparison of the OSI & the TCP/IP Reference Models:

**2. Physical Layer: (12 Periods)**

Introduction: Network topologies; Linear Bus Topology, Ring Topology, Star Topology, Hierarchical or Tree Topology, Topology Comparison, Considerations when choosing a Topology: Switching; Circuit switching, Message switching, Packet switching, Implementation of packet switching, Relationship between Packet Size and Transmission time, Comparison of switching techniques: Multiplexing; FDM – Frequency division multiplexing, WDM–Wavelength division multiplexing, TDM – Time division multiplexing:

**3. Data Link Layer: (12 Periods)**

Introduction; Goal of DLL: Design issues of DLL; Services provided to the

Network layer, Framing, Error control, Flow control, Link Management, ARQ strategies: Error Detection and correction; Parity bits, Importance of framing distance for error correction, Single bit error correction or (n, m) framing code, Error Detection or Cyclic Redundant Code (CRC): Data Link layer protocols; Transmission control protocols, HDLC:

#### **4. Network Layer: (14 Periods)**

Introduction: Design issues of Network layer; Nature of the service provided, Internal organization, Routing, Congestion control, Internetworking: Principles of Routing; Types of routing algorithms, Classes of routing algorithms, Properties of routing algorithms, Optimality principle: Routing algorithms; Shortest path algorithm, Flooding, Distance vector routing, Hierarchical routing, Link state routing, Comparison of routing algorithms: Congestion; Factors of congestion, Comparison of flow control and congestion control, General principles of congestion control, Closed loop solution: IP protocol (IPV4):

#### **5. Transport Layer: (14 Periods)**

Introduction: Services of Transport layer; Service primitives: Connection establishment: Connection Release: Transport Protocols; TCP protocol, UDP protocol:

**Networking Devices:** Introduction; Goal of networking devices: Repeaters; Uses of Repeaters: Hubs; Classification of Hubs, Stackable Hubs, USB Hub: Switches; Switching Methods, Comparison of switching methods, Working with Hubs and Switches, Cables Connecting Hubs and Switches, Managed Hubs and Switches, Port Density: Bridges; Bridge Implementation Considerations, Types of Bridges: Routers; Dedicated Hardware versus Server-Based Routers, Advantages and Disadvantages of dedicated hardware routers, Drawbacks of Routers: Gateways; Advantages of gateways, Gateways Functionality: Other Devices; Modems, Proxy Server, Wireless router, Brouter, Wireless Access Point (WAPs).

### **INSTRUCTIONAL STRATEGY**

As the subject provides only theoretical concepts, the teacher must explain with reference to practical situations

### **RECOMMENDED BOOK**

1. Data Communication and Networking 2nd edition by Forouzan; Tata Mc Graw Hill Publishing Co, New Delhi
2. Data and Computer Communications by William Stallings, Prentice Hall of India, New Delhi

3. Data Communication by Schwaber, William; Mc Graw Hills.
4. Digital, Analog and Data Communications by William, Sinnema and Tom; McGraw Hill
5. Data Communication by Tenanbaum, Prentice Hall of India, New Delhi
6. Data Communication by FredHalsall Addison Wesley (Singapore) Pvt. Ltd., New Delhi
7. Data Communication by Keshav, Addison Wesley (Singapore) Pvt. Ltd., New Delhi
8. Understanding Data Communication, 4th Ed, Gilbert Held, Prentice Hall of India, New Delhi
9. Data Communication by Schweber
10. Data Communication and Network by Black

### LIST OF PRACTICALS

1. Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.
2. Recognition and use of various types of connectors RJ-45, RJ-11, BNC and SCST
3. Recognition of network devices (Switches, Hub, Routers of access points for Wifi
4. Making of cross cable and straight cable
5. Install and configure a network interface card in a workstation.
6. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
7. Managing user accounts in windows and LINUX
8. Study.

### SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Period)	Marks Allocation
1	12	12
2	12	15
3	12	15
4	14	14
5	14	14
<b>Total</b>	<b>64</b>	<b>70</b>

# OFFICE APPLICATION

Subject Code : 053004

L	T	P
-	-	6

## RATIONALE

The application of Computer knowledge is essential the students of all disciplines of Engineering in addition to their respective branch of study. The Computer Application Practical course facilitates the necessary knowledge and skills regarding creating, working and maintaining the documents and presentation of documents with audio visual effects in computer and produces necessary skills in E- Learning and Chatting tools..

## OBJECTIVES

On completion of the following exercises, the students will be able to

- Use the GUI operating systems
- Familiarize and customize the desktop
- Use the different facilities available in the word processor
- Prepare Power Point presentation with different formats
- Expose E-learning tools and chatting tools
- Analyze the datasheet
- Create and manipulate the database
- Create different types of charts
- Prepare PowerPoint presentation
- Understand Internet concepts and usage of e-mail

## GUIDELINES

- All the experiments given in the list of experiments should be completed and all the experiments should include for the end semester practical examination.
- The computer systems should be 1:1 ratio for practical classes

## LAB EXERCISES

### SECTION - A

#### WORD PROCESSING

1. Introduction to Word Processing – Examples- Creation of new documents, opening document, insert a document into another document. Page setup, margins, gutters, font properties, Alignment, page breaks, header footer deleting, moving, replace, editing text in document. Saving a document, spellchecker.

Printing a document. Creating a table, entering and editing, Text in tables. Changing format of table, height width of row or column. Editing, deleting Rows, columns in table. Borders, shading, Templates, wizards, drawing objects, mail merge.

## Exercises

2. Create the following table and perform the operations given below

DAYS	1	2	3	4	5	6	7	8
MON	TEST		A : JPP			CA	RDBMS	TUT
			B : RDBMS					
TUE	CA	OOP	CN	RDBMS	A : RDBMS			
					B : JPP			
WED	CN	RDBMS	OOP	RDBMS	COMMUNICATIO N	CN	CA	
THU	OOP	A : JPP			CA	RDBMS	CN	OOP
		B : RDBMS						
FRI	COMMUNICATIO N		A : JPP		OOP	CN	RDBMS	CA
			B : RDBMS					
SAT	OOP	RDBMS	CN	CA	.....			

3. Create a standard covering letter and use mail merge to generate the customized letters for applying to a job in various organizations. Also, create a database and generate labels for the applying organizations.
4. Create a news letter of three pages with two columns text. The first page contains some formatting bullets and numbers. Set the document background colour and add 'confidential' as the watermark. Give the document a title which should be displayed in the header. The header/ footer of the first page should be different from other two pages. Also, add author name and date/ time in the header. The footer should have the page number.

## SPREADSHEET

Introduction to Analysis Package – Examples - Concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Different Views of Worksheets; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook & Worksheets with various options.

5. Create a result sheet containing Candidate's Register No., Name, Marks for six subjects. Calculate the total and result. The result must be calculated as below and failed candidates should be turned to red.

Result is Distinction if Total  $\geq 70\%$  First Class if Total  $\geq 60\%$  and  $< 70\%$   
Second Class if Total  $\geq 50\%$  and  $< 60\%$  Pass if Total  $\geq 35\%$  and  $< 50\%$   
Fail otherwise

Create a separate table based on class by using auto filter feature.

6. Create a table of records with columns as Name and Donation Amount. Donation amount should be formatted with two decimal places. There should be at least twenty records in the table. Create a conditional format to highlight the highest donation with blue color and lowest donation with red colour. The table should have a heading.
7. Create line and bar chart to highlight the sales of the company for three different periods for the following data.

### SALES BAR CHART

Period	Product1	Product2	Product3	Total
JAN	35	40	50	125
FEB	46	56	40	142
MAR	70	50	40	160

### SECTION – B

#### DATABASE

Introduction – Menus – Tool bar – Create – Edit – Save – Data types – Insert – Delete – Update – View – Sorting and filtering – Queries – Report – Page setup – Print.

#### Exercises

8. Create Database to maintain at least 10 addresses of your class mates with the following constraints
- Roll no. should be the primarykey.
  - Name should be notnull
9. create a students table with the following fields: Sr. No, Reg. No, Name, Marks in 5 subjects. Calculate total and percentage of 10 students. Perform the following queries.
- To find the details of distinction student
  - To find the details of first class students
  - To find the details of second class students

Design a report for the above exercise to print the consolidated result sheet and mark card for the student.

## PRESENTATION

Introduction - Opening new presentation, Parts of PowerPoint window – Opening -Saving and closing presentations - Features of PowerPoint, Background design, Word art, Clip art, Drawings,3D settings - Animations, Sound, Views, types of views - Inserting and deleting slides, arranging slides, slides show, rehearsal, setup show, custom show - Creating custom presentations, action setting, auto content wizard, working with auto content wizard

### Exercises

10. Make a marketing presentation of any consumer product with at least 10 slides. Use different customized animation effects on pictures and clip art on any four of the ten slides.
11. Create a Presentation about our institution or any subject with different slide transition with sound effect.

## INTERNET

Introduction – Getting acquainted with Internet Connection - Browsers – Website URL - Open a website – Net Browsing - Email: Creating E-mail id – Sending, receiving and deleting E-mail - Email with Attachments – CC and BCC - Chatting – Creating Group mail - Google docs – Search Engines – Searching topics .

**Most Popular Social Networking Sites :** History – Features – Services – Usage of Face book , Twitter and Linkdln. Transferring data through wifi / Bluetooth among different devices.

**Introduction to cybercrime** – Software Piracy – Viruses – Antivirus Software

### Exercises

12. Create an e-mail id and perform the following
  - Write an e-mail inviting your friends to your Birthday Party.
  - Make your own signature and add it to the e-mail message.
  - Add a word attachment of the venue route
  - Send the e-mail to at least 5 of your friends.
13. Create a presentation on Google docs. Ask your friend to review it and comment on it. Use “Discussion” option for your discussions on the presentation.

## Hardware and Software Requirements

### Hardware Requirements:

- Computers –36 Nos
- Intel Core i3 Processor



- 500 GB Hard Disk
- 14” Monitor
- Projector – 1 Nos
- Laser Printer – 1 No
- Internet Connection – Minimum of 512KBPS

### Software Requirement

- Any GUI Operating System
- Open Source Software / MS-Office

#### 1. Semester End Examination– 60 Marks

Content	Max. Marks
Writing Procedure – One Question from Section A	10
Demonstration	10
Results with Printout	5
Writing Procedure – One Question from Section B	10
Demonstration	15
Results with Printout	5
Viva voce	5
<b>Total</b>	<b>60MARK</b>