

## 4.1 GENERIC SKILLS AND ENTREPRENEURSHIP DEVELOPMENT

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### RATIONALE

Generic Skills and Entrepreneurship Development is one of the courses from “Human Science” subject area. Generic skills have emerged as an important component of employability skills, which enable an individual to become and remain employable over lifetime and to lead happy and prosperous life. Entrepreneurship development aim at developing conceptual understanding for setting-up one’s own business venture/enterprise. This aspect of Human Resource Development has become equally important in the era, when wage employment prospects have become meager.

Both the subject areas are supplementary to each other and soft skills are required to be developed in diploma passouts for enhancing their employability and self confidence.

### DETAILED CONTENTS

1. Introduction to Generic Skills (04 hrs)
  - 1.1 Importance of Generic Skill Development (GSD)
  - 1.2 Global and Local Scenario of GSD
  - 1.3 Life Long Learning (LLL) and associated importance of GSD.
  
2. Managing Self (08 hrs)
  - 2.1 Knowing Self for Self Development  
Self-concept, personality, traits, multiple intelligence such as language intelligence, numerical intelligence, psychological intelligence etc.
  - 2.2 Managing Self - Physical  
Personal grooming, Health, Hygiene, Time Management
  - 2.3 Managing Self – Intellectual development
    - Information Search: Sources of information
    - Reading: Purpose of reading, different styles of reading, techniques of systematic reading.
    - Note Taking: Importance of note taking, techniques of note taking
    - Writing: Writing a rough draft, review and final draft.
  - 2.4 Managing Self – Psychological
    - Stress, Emotions, Anxiety-concepts and significance
    - Techniques to manage the above

3. Managing in Team (06 hrs)
- 3.1 Team - definition, hierarchy, team dynamics
  - 3.2 Team related skills- sympathy, empathy, co-operation, concern, lead and negotiate, work well with people from culturally diverse background
  - 3.3 Communication in group - conversation and listening skills
4. Task Management (03 hrs)
- 4.1 Task Initiation, Task Planning, Task execution, Task close out
  - 4.2 Exercises/case studies on task planning towards development of skills for task management
5. Problem Solving (05 hrs)
- 5.1 Prerequisites of problem solving- meaningful learning, ability to apply knowledge in problem solving
  - 5.2 Different approaches for problem solving.
  - 5.3 Steps followed in problem solving.
  - 5.4 Exercises/case studies on problem solving.
6. Entrepreneurship
- 6.1 Introduction (22 hrs)
- Concept/Meaning and its need
  - Competencies/qualities of an entrepreneur
  - Entrepreneurial Support System e.g., District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institute (SISIs), Small Industries Development Bank of India (SIDBI), National Bank of Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State/National level.
- 6.2 Market Survey and Opportunity Identification (Business Planning)
- How to start a small scale industry
  - Procedures for registration of small-scale industry
  - List of items reserved for exclusive manufacture in small-scale industry
  - Assessment of demand and supply in potential areas of growth.
  - Understanding business opportunity
  - Considerations in product selection
  - Data collection for setting up small ventures.
- 6.3 Project Report Preparation
- Preliminary Project Report
  - Techno-Economic Feasibility Report
  - Exercises regarding "Project Report Writing" for small projects

## INSTRUCTIONAL STRATEGY

This subject will require a blend of different teaching and learning methods beginning with lecture method. Some of the topics may be taught using question answer, assignment, case studies or seminar. In addition, expert lectures may be arranged from within the institution or from management organizations. Conceptual understanding of Entrepreneurship, inputs by teachers and outside experts will expose the students so as to facilitate in starting ones own business venture/enterprise. The teacher will discuss success stories and case studies with students, which in turn, will develop managerial qualities in the students. There may be guest lectures by successful diploma holding entrepreneurs and field visits also. The students may also be provided relevant text material and handouts.

## RECOMMENDED BOOKS

1. Generic skill Development Manual, MSBTE, Mumbai.
2. Lifelong learning, Policy Brief ([www.oecd.org](http://www.oecd.org))
3. Lifelong learning in Global Knowledge Economy, Challenge for Developing Countries – World Bank Publication
4. Towards Knowledge Society, UNESCO Paris Publication
5. Your Personal Pinnacle of Success by DD Sharma, Sultan Chand and Sons, New Delhi
6. Human Learning, Ormrod
7. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
8. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
9. Handbook of Small Scale Industry by PM Bhandari.

## SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr No	Topic	Time Allotted (hrs)	Marks Allotted (%)
1.	Introduction to Generic Skills	4	5
2.	Managing Self	8	15
3.	Managing in Team	6	10
4.	Task Management	3	10
5.	Problem Solving	5	10
6.	Entrepreneurship	22	50
<b>Total</b>		<b>48</b>	<b>100</b>

## 4.2 DATA STRUCTURES USING 'C'

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### RATIONALE

Data structures are the techniques of designing the basic algorithms for real-life projects. Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of 'C' language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

### DETAILED CONTENTS

1. Fundamental Notations (04 hrs)
 

Problem solving concept, top down and bottom up design, structured programming, Concept of data types, variables and constants, Concept of pointer variables and constants
2. Arrays (06 hrs)
 

Concept of Arrays, Single dimensional array, Two dimensional array storage strategy of multidimensional arrays, Operations on arrays with Algorithms (searching, traversing, inserting, deleting)
3. Linked Lists (12 hrs)
 

Introduction to linked list and double linked list, Representation of linked lists in Memory, Traversing a linked list, Searching linked list, Insertion and deletion into linked list, Application of linked lists, Doubly linked lists, Traversing a doubly linked lists, Insertion and deletion into doubly linked lists
4. Stacks, Queues and Recursion (08 hrs)
 

Introduction to stacks, Representation of stacks, Implementation of stacks, Uses of stacks, Introduction to queues, Implementation of queues (with algorithm), Circular Queues, De-queues, Recursion
5. Trees (08 hrs)
 

Concept of Trees, Concept of representation of Binary tree, Binary search trees Traversing Binary Trees (Pre order, Post order and In order), Searching, inserting and deleting binary search trees
6. Sorting and Searching (10 hrs)
 

Introduction, Search algorithm (Linear and Binary), Concept of sorting, Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort) and their comparisons.

## LIST OF PRACTICALS

*Write programmes in C to implement*

1. Inserting and deleting elements in an array
2. Insertion and deletion of elements in linked list
3. Insertion and deletion of elements in double linked list
4. Stack implementation using arrays
5. Stack implementation using pointers
6. Queue implementation using arrays
7. Queue implementation using pointers
8. Linear search in a given list
9. Binary search in a given list
10. Implementation of binary search tree
11. Implementation of bubble sort algorithm
12. Implementation of insertion sort algorithm
13. Implementation of quick sort algorithm
14. Implementation of selection sort algorithm
15. Conversion from infix and post-fix notation
16. Implementation of factorial of a number using recursion
17. Implementation of fibonacci series using recursions

## INSTRUCTIONAL STRATEGY

This subject clears all fundamentals of programming techniques. Teachers should stress on explaining all the techniques and algorithm in detail in theory sessions. The students should be asked to convert their ideas about a problem into algorithms in theory class and then write programs for the algorithms. Finally all the programmes should be run on computers. This will help the students to have clear concepts of programming.

## RECOMMENDED BOOKS

1. Data Structures using C and C++ by Rajesh K. Shukla, Wiley-India Pvt Ltd. Daryaganj, New Delhi
2. Data Structures and Algorithm Using C by RS Salaria, Khanna Book Publishing Co. (P) Ltd. New Delhi
3. Data Structure using C by Manoj Kumar Jambla, Eagle Publishing House, Jalandhar
4. Data Structure using C by ISRD Group, Tata McGraw Hills Education Pvt Ltd, New Delhi
5. Data Structures by Sanjiv Sofat, Khanna Publishers, New Delhi
6. Expert Data Structures with C by R.B. Patel – Khanna Publishers, New Delhi.
7. Data structures – Schaum's Outline Series – by Lipschutz, McGraw Hill Education Pvt Ltd, New Delhi
8. Data structures – O.G. Kakde and U.A. Deshpande
9. Data Structures by Kruse
10. Data Structure using Pascal by Tenenbaum, Prentice Hall of India
11. Data Structure using C by Robert Kruse, Prentice Hall of India

12. Data Structure through C by Yashwant Kanekar, BPB Publications
13. Data Structure through C in depth by SK Srivastava, Deepali Srivastava, BPB Publications
14. Introduction to Data Structure and Algorithm with C++ by Glenn W. Rowe, Prentice Hall of India
15. Data Structure through "C" Language by Sameeran Chattopadhyay, Matangini Chottopadhyay, BPB Publications
16. Data Structure through "C" Language by DOEACC, , BPB Publications
17. Data Structure using "C" Lab Workbook by Shukla, , BPB Publications

#### **SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER**

<b>Sr No</b>	<b>Topic No.</b>	<b>Time Allotted (Hrs)</b>	<b>Marks Allotted (%)</b>
1	Fundamental Notations	4	10
2	Arrays	6	12
3	Linked Lists	12	25
4	Stacks, Queues and Recursion	8	18
5	Trees	8	15
6	Sorting and Searching	10	20
<b>Total</b>		<b>48</b>	<b>100</b>

### 4.3 OBJECT ORIENTED PROGRAMMING USING C++

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#### RATIONALE

Object orientation is a new approach to understand the complexities of the real world. In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. The students are already familiar with this concept of programming in C which is the basic for C++. This course offers the modern programming language C++ that shall help the students to implement the various concept of object orientation practically. The students will be able to programme in the object oriented technology with the usage of C++.

#### DETAILED CONTENTS

1. Introduction and Features (06 hrs)  
Fundamentals of object oriented programming – procedure oriented programming Vs. object oriented programming (OOP). Object oriented programming concepts – Classes, reusability, encapsulation, inheritance, polymorphism, dynamic binding, message passing, data hiding
2. Language Constructs (12 hrs)  
Review of constructs of C used in C++ : variables, types and type declarations, user defined data types; increment and decrement operators, relational and logical operators; if then else clause; conditional expressions, input and output statement, loops, switch case, arrays, structure, unions, functions, pointers; preprocessor directives
3. Classes and Objects (06 hrs)  
Creation, accessing class members, Private Vs Public, Constructor and Destructor Objects
4. Member Functions (06 hrs)  
Method definition, Inline functions implementation, Constant member functions, Friend Functions and Friend Classes, Static functions
5. Overloading Member Functions (06 hrs)  
Need of operator overloading, operator overloading, instream / ostream operator overloading function overloading, constructor overloading
6. Inheritance (10 hrs)  
Definition of inheritance, protected data, private data, public data, inheriting constructors and destructors, constructor for virtual base classes, constructors and destructors of derived classes, and virtual functions, size of a derived class, order of invocation, types of inheritance, single inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance, multilevel inheritance

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| 7. | Polymorphism and Virtual Functions  | (06 hrs) |
|    | Importance of virtual function, function call binding, virtual functions, implementing late binding, need for virtual functions, abstract base classes and pure virtual functions, virtual destructors  |          |
| 8. | File and Streams  | (08 hrs) |
|    | Components of a file, different operation of the file, communication in files, creation of file streams, stream classes, header files, updating of file, opening and closing a file, file pointers and their manipulations, functions manipulation of file pointers, detecting end-of-file. |          |
| 9. | Introduction to Standard Template Library(STL)  | (04 hrs) |

### LIST OF PRACTICALS

- 1 Programming exercises on control flow statements in C++
- 2 Programming exercises on arrays, strings, function and pointers in C++
- 3 Writing programs to construct classes and deriving objects
- 4 Writing programs for constructors, destructors, using public and private access specifiers
- 5 Programming exercises on operator overloading, type conversions and inheritance
- 6 Programming exercises on functional overloading
- 7 Writing programs on steam computation and life operations
- 8 Implementation of a mini project in C++
- 9 Introduction to latest ANSI C++ Compiler and elaboration of short comings of Turbo C++ Compiler

### INSTRUCTIONAL STRATEGY

Since the entire course is totally practical oriented, it is strongly intended that after discussing the individual concepts in class, the students shall be asked to write the programmes for the same in the practical class. The theory and practical shall go hand in hand. It is required that the students make a file of practical exercises which may include the problem definition, algorithms flow charts (wherever required) and the print outs for each listed practical

### RECOMMENDED BOOKS

- 1) Mastering C++ by KR Venugopal and Rajkumar, T Ravishankar; Tata McGraw Hill Education Pvt Ltd , New Delhi
- 2) Object Oriented Programming in C++, W/CD by Rajesh K. Shukla, Wiley-India Pvt Ltd. Daryaganj, New Delhi
- 3) Object Oriented Programming in C++ by E. Balaguruswamy, Tata McGraw Hill Education Pvt Ltd , New Delhi
- 4) C++ by Robert Lafore, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi
- 5) Object Oriented Programming and C++ by R Rajaram; New Age International (P) Ltd., Publishers, New Delhi
- 6) Schaum's Outline of Programming with C++ by John R. Hubbard
- 7) Object Oriented Programming using C++ by Vipin Arora, Eagle Publication, Jalandhar
- 8) Object Oriented Programming using C++ by RS Salaria

- 9) Object Oriented Programming by D Ravi Chandran Tata McGraw Hill

**SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER**

<b>Sr No</b>	<b>Topic</b>	<b>Time Allotted (hrs)</b>	<b>Marks Allotted (%)</b>
1.	Introduction and Features	6	10
2.	Language Constructs	12	20
3.	Classes and Objects	6	10
4.	Member Functions	6	10
5.	Overloading Member Functions	6	10
6.	Inheritance	10	16
7.	Polymorphism and Virtual Functions	6	16
8.	File and Streams	8	12
9	Standard Template Library(STL)	4	6
<b>Total</b>		<b>64</b>	<b>100</b>

## 4.4 SOFTWARE ENGINEERING

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### RATIONALE

This subject will enable the diploma students to have awareness about software engineering, various matrices, planning about software, cost estimation, software design etc.

### DETAILED CONTENTS

1. Introduction to Software (S/W) Engineering (8 hrs)  
Introduction, size factors. Quality and productivity factors. Management issues, Models: waterfall, spiral, prototyping, fourth generation techniques, s/w process, Introduction to agile technologies
2. Software Metrics Engineering (6 hrs)  
Size, function and design oriented metrics, halstead software science, McCabe's complexity
3. Planning (8 hrs)  
The development process, an organizational structure, other planning activities
4. Software Cost Estimations (8 hrs)  
Cost factors, cost estimations techniques. Staffing level estimation, estimating software maintenance costs, COCOMO
5. Software Requirements Definition (8 hrs)  
Problem analysis, requirement engineering. The software requirements specifications (SRS), formal specifications techniques, characteristics of a good SRS
6. Software Design and Implementation Issue (8 hrs)  
Fundamental design, concept design notations, design techniques, structured coding techniques coding styles, documentation guidelines
7. Verification and Validation Techniques (6 hrs)  
Quality assurance work through and inspections static analysis, symbolic execution unit testing, formal verifications. Black box and white box testing techniques
8. Maintenance Overview, Configuration Management (6 hrs)
9. Software Quality: CMM, ISO 9000 series, ISO 9126, Six Sigma (6 hrs)

### RECOMMENDED BOOKS

1. Software Engineering by Rajib Mall, PHI Publishers, New Delhi

2. An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002
3. Software Engineering, Sangeeta Sabharwal, New Age International, Delhi
4. Software Engineering by KK Aggarwal and Yogesh Singh
5. Software Engineering – A Practitioner’s Approach by RS Pressman, Tata McGraw Hill Publishers, New Delhi

#### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1.	8	12
2.	6	10
3.	8	12
4.	8	12
5.	8	12
6.	8	12
7.	6	10
8.	6	10
9.	6	10
<b>Total</b>	<b>64</b>	<b>100</b>

## 4.5 MICROPROCESSORS

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### RATIONALE

The study of microprocessors in terms of architecture, software and interfacing techniques leads to the understanding of working of CPU in a microcomputer. The development in microprocessors of 32 bit architecture brings them face-to-face with mainframe finding employment in R&D, assembly, repair and maintenance of hardware of microprocessors and computers. Microprocessors find application in process control industry. They also form a part of the electronic switching system between source and destination in long distance telecommunications. Thus the microprocessor is an area of specialization. Students of electronics and related engineering branches often use microprocessors to introduce programmable control in their projects, in industrial training.

### DETAILED CONTENTS

1. Evolution of Microprocessor (04 hrs)  
 Typical organization of a microcomputer system and functions of its various blocks. Microprocessor, its evolution, function and impact on modern society
2. Architecture of a Microprocessor (With reference to 8085 microprocessor) (12 hrs)  
 Concept of Bus, bus organization of 8085, Functional block diagram of 8085 and function of each block, Pin details of 8085 and related signals, Demultiplexing of address/data bus generation of read/write control signals, Steps to execute a stored programme
3. Programming (with respect to 8085 microprocessor) (16 hrs)  
 Brief idea of machine and assembly languages, Machines and Mnemonic codes. Instruction format and Addressing mode. Identification of instructions as to which addressing mode they belong. Concept of Instruction set. Explanation of the instructions of the following groups of instruction set. Data transfer group, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group. Programming exercises in assembly language. (Examples can be taken from the list of experiments).
4. Memories and I/O interfacing (10 hrs)  
 Memory organization, Concept of memory mapping, partitioning of total memory space. Address decoding, concept of I/O mapped I/O and memory mapped I/O. Interfacing of memory mapped I/O devices. Concept of stack and its function. 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.
5. Instruction Timing and Cycles (08 hrs)  
 Instruction cycle, machine cycle and T-states, Fetch and execute cycle.

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| 6. | Interrupts  | (04 hrs) |
|    | Concept of interrupt, Maskable and non-maskable, Edge triggered and level triggered interrupts, Software interrupt, Restart interrupts and its use, Various hardware interrupts of 8085, Servicing interrupts, extending interrupt system |          |
| 7. | Data transfer techniques  | (04 hrs) |
|    | Concept of programmed I/O operations, sync data transfer, async data transfer (hand shaking), Interrupt driven data transfer, DMA, Serial output data, Serial input data  |          |
| 8. | Peripheral devices  | (06 hrs) |
|    | 8255 PPI and 8253 PIT, 8257 DMA controller, 8279 Programmable KB/Display Interface, 8251 Communication Interface Adapter, 8155/8156   |          |

### LIST OF PRACTICALS

1. Familiarization of different keys of 8085 microprocessor kit and its memory map
2. Steps to enter, modify data/program and to execute a programme on 8085 kit
3. Writing and execution of ALP for addition and sub station of two 8 bit numbers
4. Writing and execution of ALP for multiplication and division of two 8 bit numbers
5. Writing and execution of ALP for arranging 10 numbers in ascending/descending order
6. Writing and execution of ALP for 0 to 9 BCD counters (up/down counter according to choice stored in memory)
7. Interfacing exercise on 8255 like LED display control
8. Interfacing exercise on 8253 programmable interval timer
9. Interfacing exercise on 8279 programmable KB/display interface like to display the hex code of key pressed on display
10. Study and use of interfacing 8 bit A/D card and D/A card in sampling, wave generation, multiplexer, de-multiplexer and counter
11. Use of 8085 emulator for hardware testing

### 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 given in the list may be given to the students.

### RECOMMENDED BOOKS

1. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Gaonker, Willey Eastern Ltd. New Delhi
2. Introduction to Microprocessor by Mathur, Tata McGraw Hill Education Pvt Ltd, New Delhi
3. Microprocessor and Microcontrollers by Dr BP Singh, Galgotia Publications, New Delhi

4. Microprocessor and Applications by Badri Ram: Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Microprocessor and Microcomputers by Refiquzzaman, Prentice Hall of India Ltd., New Delhi.
6. Digital Logic and Computer Design by Mano, M Morris; Prentice Hall of India, New Delhi
7. Digital Electronics and Applications by Malvino Leach; Publishers McGraw Hills, New Delhi
8. Digital Integrated Electronics by Herbert Taub and Donals Sachilling; Prentice Hall of India Ltd., New Delhi
9. Digital Electronics by Rajaraman; Prentice Hall of India Ltd., New Delhi
10. Digital Electronics and Microprocessor by Rajiv Sapra, Ishan Publication, Ambala

#### SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Topic No.	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1.	Evolution of Microprocessor	04	5
2.	Architecture of a Microprocessor (With reference to 8085 microprocessor)	12	20
3	Programming (with respect to 8085 Microprocessor)	16	25
4	Memories and I/O interfacing	10	15
5.	Instruction Timing and Cycles	08	10
6.	Interrupts	04	5
7.	Data transfer techniques	04	5
8.	Peripheral devices	06	15
<b>Total</b>		<b>64</b>	<b>100</b>

## 4.6 COMPUTER NETWORKS

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### RATIONALE

The future of computer technology is in computer networks. Global connectivity can be achieved through computer networks. A diploma holder in computer engineering should therefore understand the function of networks. Knowledge about hardware and software requirements of networks is essential.

### DETAILED CONTENTS

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|----|---|-----------|
| 1. | Networks Basics   | ( 06 hrs) |
|    | <ul style="list-style-type: none"> <li>- Concept of network</li> <li>- Models of network computing</li> <li>- Networking models</li> <li>- Peer-to –peer Network</li> <li>- Server Client Network</li> <li>- LAN, MAN and WAN</li> <li>- Network Services</li> <li>- Topologies</li> <li>- Concept of switching</li> <li>- Switching Techniques</li> </ul>                            |           |
| 2. | OSI Model   | (08 hrs)  |
|    | <ul style="list-style-type: none"> <li>- Standards</li> <li>- OSI Reference Model</li> <li>- OSI Physical layer concepts</li> <li>- OSI Data-link layer concepts</li> <li>- OSI Networks layer concepts</li> <li>- OSI Transport layer concepts</li> <li>- OSI Session layer concepts</li> <li>- OSI presentation layer concepts</li> <li>- OSI Application layer concepts</li> </ul> |           |
| 3. | Introduction to TCP/IP  | (10 hrs)  |
|    | <ul style="list-style-type: none"> <li>- Concept of physical and logical addressing</li> <li>- Different classes of IP addressing, special IP address</li> <li>- Sub netting and super netting</li> <li>- Loop back concept</li> <li>- IPV4 and IPV6 packet Format</li> <li>- Configuring IPV4 and IPV6</li> </ul>  |           |

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| 4.  | Protocol Suites   | (03 hrs) |
|     | <ul style="list-style-type: none"> <li>- Models and Protocols</li> <li>- Network IPX/SPX</li> <li>- Intranet Protocols</li> </ul>   |          |
| 5.  | Network Architecture  | (08 hrs) |
|     | <ul style="list-style-type: none"> <li>- ARC net specifications</li> <li>- Ethernet Specification and Standardization:<br/>10 Mbps (Traditional Ethernet), 10 Mbps (Fast Ethernet) and 1000 Mbps (Gigabit Ethernet), Introduction to Media Connectivity (Leased lines, ISDN, PSTN, RF, DSL, VSAT, Optical and IPLC)</li> </ul>  |          |
| 6.  | Network Connectivity  | (06 hrs) |
|     | <ul style="list-style-type: none"> <li>- Network connectivity Devices</li> <li>- NICs</li> <li>- Hubs</li> <li>- Repeaters</li> <li>- Multiplexers</li> <li>- Modems</li> <li>- Routers and Routing Protocols</li> <li>- Gateways, Amplifiers</li> <li>- Firewall</li> <li>- ATM</li> <li>- VOIP and Net-to-Phone Telephony,</li> <li>- Laws and Protocols</li> </ul> |          |
| 7.  | Network Printing  | (03 hrs) |
|     | <ul style="list-style-type: none"> <li>- Print Services</li> </ul>  |          |
| 8.  | Network Administration / Security   | (09 hrs) |
|     | <ul style="list-style-type: none"> <li>- Client/Server Technology</li> <li>- Server Management</li> <li>- RAID management and mirroring</li> <li>- Hauffman codes</li> <li>- Cryptography</li> </ul>  |          |
| 9.  | Network Trouble Shooting Techniques   | (06 hrs) |
|     | <ul style="list-style-type: none"> <li>- Trouble Shooting process</li> <li>- Trouble Shooting Tools: PING,IPCONFIG, IFCONFIG, NETSTAT, TRACEROOT, Wiresharp/ Dsniffer/ Pcop</li> </ul>  |          |
| 10. | Wireless Networking   | (05 hrs) |
|     | <p>Basics of Wireless: Types of Wireless Networks, Wireless MAN, Networking, Wireless LAN, Wi-Fi, WiMax(Broad-band Wireless) and Blue-Tooth technology, Mobile Adhoc Network (MANET)</p>  |          |

## 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 and Demonstration of sub netting of IP address
9. Use of Netstat and its options.
10. Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
11. Installation of Network Operating System(NOS)
12. Visit to nearby industry for latest networking techniques

### Required Software

- Windows Server/Linux Server

### Required Tools and Supplies

- 1) Crimping tool, crone Tool, Cable tester,
- 2) RJ 45 connectors, RJ-11, BNC, SCST
- 3) Coaxial Cable, UTP, STP, OFC cable
- 4) Screw Driver Kit
- 5) Switch/Hub/Router
- 6) Manageable Switch

## INSTRUCTIONAL STRATEGY

This subject deals with both theory and practicals. The students should be made to practically establish LAN with various hardware and software and their integration.

## RECOMMENDED BOOKS

1. Computer Networks by Tanenbaum, Prentice Hall of India, New Delhi
2. Data Communications and Networking by Forouzan, (Edition 2<sup>nd</sup> and 4<sup>th</sup>), Tata McGraw Hill Education Pvt Ltd, New Delhi
3. Data and Computer Communication by William Stallings, Pearson Education, New Delhi
4. Networking Essentials – BPB Publications New Delhi
5. Computer Network and Communications By V.K. Jain and Narija Bajaj, Cyber Tech Publications, New Delhi.

6. Linux – The complete Reference by Richard Peterson, Tata McGraw Hill Education Pvt Ltd, New Delhi.
7. Linux – Install and Configuration Black Book by Dee Anneblanc and Issac Yates, IDG Books India Private Limited, Delhi.
8. Unleashed Linux by TechMedia Publishers, New Delhi
9. Computer Network by J.S. Katre, Tech-Max Publication, Pune

**SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER**

<b>Topic No.</b>	<b>Topic</b>	<b>Time Allotted (Hrs)</b>	<b>Marks Allotted (%)</b>
1	Networks Basics	6	10
2	OSI Model	8	10
3	Introduction to TCP/IP	10	15
4	Protocol Suites	3	05
5	Network Architecture	8	15
6	Network Connectivity	6	10
7	Network Printing	3	05
8	Network Administration / Security	9	15
9	Network Troubleshooting Techniques	6	10
10	Wireless Networking	5	05
<b>Total</b>		<b>64</b>	<b>100</b>

## ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during fourth semester. Lectures will be delivered on the following broad topics by experts. There will be no examination for this subject

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centres, Commercial Banks, State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business

## **INDUSTRIAL TRAINING OF STUDENTS**

(During Summer Vacation after IV Semester)

It is needless to emphasize further the importance of Industrial Training of students during their 3 years of studies at Polytechnics. It is industrial training, which provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice. Polytechnics have been arranging industrial training of students of various durations to meet the above objectives.

This document includes guided and supervised industrial training of a minimum of 6 weeks duration to be organised during the semester break starting after second year i.e. after IV Semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A minimum of one visit per week by the teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 50 and external assessment of 50 marks have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weightage to performance in testing, general behaviour, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry.

Teachers and students are requested to see the footnote below the study and evaluation scheme of IV Semester for further details.