

**Madhepura College, Madhepura**

*(Affiliated to BNM University, Madhepura)*

**B.Voc. in Hardware & Networking (UGC)**

**B.VOC  
In  
HARDWARE AND NETWORKING  
(UGC)**

**Program Outcomes:**

- Learn the proper techniques of maintenance of hardware and networking devices
- Study the science of hardware and networking
- Diagnose and repair all major problems regarding hardware, PC peripheral devices
- Build your own book of business
- Work as a system administrator



Vinod Kumar Tiwari  
Officer on Special Duty (Judicial)

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21/12/22

## INTRODUCTION

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B. Voc.) Degree with multiple exits such as Diploma/Advanced Diploma under the NSQF. The B. Voc. programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles along with broad based general education. This would enable the graduates completing B. Voc. to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

The proposed vocational programme in Software Development will be a judicious mix of skills, professional education related to Software Development and also appropriate content of general education. It is designed with the objective of equipping the students to cope with the emerging trends and challenges in the Software Development environment.

## PROGRAMME STRUCTURE

The B. Voc Computer Hardware and Networking shall include:

- Language courses (English)
- General Education Components
- Skill Components
- Project
- Industrial Training
- Soft Skills and Personality Development Programmes

B.VOC MCM



Vinod Kumar Tiwari  
Officer on Special Duty (Judicial)

Dr. Manoj Kumar  
22/11/22

# Course Structure

## Semester-I

Course Name	G.C./S.C.	Credits	Marks Distribution		Total
			Internal	External	
PC Hardware	G.C.	4	20	80	100
Computer Networking	G.C.	4	20	80	100
Communicative Skills	G.C.	4	10	40	50
Basic IT Skills	S.C.	6	10	40	50
PC Hardware Lab	S.C.	6	10	40	50
Computer Networking Lab	S.C.	6	10	40	50

## Semester-II

Course Title	G.C./S.C.	Credits	Marks Distribution		Total
			Internal	External	
Database Management Systems	G.C.	4	20	80	100
Operating System	G.C.	4	20	80	100
Microprocessor & Interfacing	G.C.	4	20	80	100
IT Service Management	S.C.	6	20	80	100
Database Management Systems Lab	S.C.	6	10	40	50
Operating System Lab	S.C.	6	10	40	50



Vinod Kumar Tiwari  
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### Semester-III

Course Title	G.C./S.C.	Credits	Marks Distribution		Total
			Internal	External	
Information & Network Security	G.C.	6	20	80	100
LINUX OS	G.C.	6	20	80	100
IT Foundation and Programming Concepts	S.C.	6	20	80	100
Information & Network Security Lab	S.C.	6	10	40	50
Linux OS Lab	S.C.	6	10	40	50

### Semester-IV

Course Name	G.C./S.C.	Credits	Marks Distribution		Total
			Internal	External	
Programming in C	G.C.	6	20	80	100
BUSINESS ANALYSIS : ENVIRONMENT, SALES & MARKETING	G.C.	6	20	80	100
COMPUTER HARDWARE, PC ASSEMBLING & TROUBLE SHOOTING	S.C.	6	20	80	100
Programming in C Lab	S.C.	6	10	40	50
COMPUTER HARDWARE, PC ASSEMBLING & TROUBLE SHOOTING Lab	S.C.	6	10	40	50



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## Semester-V

Course Title	G.C./S.C.	Credits	Marks Distribution		Total
			Internal	External	
Entrepreneurship development	G.C.	8	20	80	100
Mobile Computing	G.C.	8	20	80	100
Internet Routing Design	G.C.	8	20	80	100
Project	S.C.	6	20	80	100

## Semester-VI

Course Title	G.C./S.C.	Credits	Marks Distribution		Total
			Internal	External	
Industrial Training/Project	S.C.	24	0	200	200
Project Seminar	G.C.	06	0	100	100

- G.C. – General Component
- S.C. – Skill Component




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## Semester I

Course Name	Marks Distribution		Total
	Internal	External	
PC Hardware	20	80	100
Computer Networking	20	80	100
Communicative English	10	40	50
Basic IT Skills	10	40	50
PC Hardware lab	10	40	50
Computer Networking Lab	10	40	50

B.VOC

  
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**Course Name : PC Hardware**

Program : B.Voc	Internal max. marks: 20
Branch : Hardware & Networking	External max. marks:80
Semester: I	Total marks: 100
Paper-01	Time-3hours

<b>Detailed contents</b>
<b>Unit 1:</b> Assemble/setup and upgrade personal computer systems: computer system modules/ components and its operations, need of hardware and software for computer to work, different hardware components within a computer and connected to a computer as peripheral devices, type of computer bus structures, different processors used for personal computers and note book computers.
<b>Unit 2:</b> Perform installation, configuration, and upgrading of microcomputer: Hardware and software requirement, Assemble/setup microcomputer systems, accessory boards, types of motherboards, selection of right motherboard, Installation & replacement of motherboard, troubleshooting problems with memory.
<b>Unit 3:</b> Install/connect associated peripherals: Working of printers and scanners, Installation of printers and scanners, sharing a printer over a local area network, troubleshooting printer and scanner problems, troubleshooting hard drive problems.
<b>Unit 4:</b> Diagnose and troubleshooting of microcomputer systems hardware & software and other peripheral equipment: Approaches to solve a PC problem, troubleshooting a failed boot before the OS is loaded, different approaches to installing and supporting I/O device, managing faulty components.

**Suggested Readings :**

1. PC Hardware: The Complete Reference, McGraw-Hills
2. The Indispensable PC Hardware Book (4th Edition) Hans-Peter Messmer
3. PC Hardware: A Beginner's Guide by Ron Gilster

  
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**Course Name : Computer Networking**

Program : B.Voc	Internal max. marks: 20
Branch : Hardware & Networking	External max. marks:80
Semester:I	Total marks: 100
Paper-II	Time-3hours

<b>Detailed contents</b>
<b>Unit 1:</b> Data Communications Concepts: Digital and analog transmissions-Modem, parallel and serial, synchronous and asynchronous, Modes of communication: Simplex, half duplex, full duplex, Concept of multiplexing, De-multiplexing. Types of Networks: LAN, MAN, WAN Network Topologies: Bus, Star, Ring, Mesh, Tree, Hybrid Communication Channels: Wired transmissions: Telephone lines, leased lines, switch line, coaxial cables-base band, broadband, optical fiber transmission
<b>Unit 2:</b> Transmission Media: Guided Media(Twisted Pair Cable, Coaxial Cable, Fiber Optics Cable), Unguided Media (Radio Waves, Microwaves, Infrared) Communication Devices (Switches, Hub, Routers, gateway etc) Introduction to Switching: Circuit Switch Networks, Datagram Switch Networks Network Models:
<b>Unit 3:</b> Introduction to OSI Model – Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer TCP/IP (Layer Architecture) Data Link Layer, Internet Layer, Transport Layer, Application Layer
<b>Unit 4:</b> MAC sub layer, 802.4Token Bus, IEEE 802.5 Token Ring Concept of Internetworking.

**Suggested Readings:**

1. Computer Networks, Tanenbaum, Andrew, Fifth Edition, PHI
2. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition
3. Computer Today, S.K. Basandra, First Edition, Galgotia
4. Data Communication System, Black, Ulysse, Third Edition, PHI
5. Data and Computer Communications, Stalling, Ninth Edition, PHI



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**Course Name: Communication Skills**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: 1 <sup>st</sup>	Total marks: 50
Paper-III	Time-3hours

<b>Detailed contents</b>
<b>Unit 1: (Introduction)</b> <ul style="list-style-type: none"><li>• Theory of Communication,</li><li>• Types and modes of Communication</li></ul>
<b>Unit 2: (Language of Communication)</b> <ul style="list-style-type: none"><li>• Verbal and Non-verbal</li><li>• (Spoken and Written)</li><li>• Personal, Social and Business</li><li>• Barriers and Strategies</li><li>• Intra-personal, Inter-personal and Group communication</li></ul>
<b>Unit 3 (☺) Reading and Understanding)</b> <ul style="list-style-type: none"><li>• Close Reading</li><li>• Comprehension</li><li>• Summary Paraphrasing</li><li>• Analysis and Interpretation □</li><li>• Translation(from Hindi/Punjabi to English and vice-versa</li><li>• Literary/Knowledge Texts</li></ul>
<b>Unit 4: (Writing Skills)</b> <ul style="list-style-type: none"><li>• Documenting</li><li>• Report Writing</li><li>• Making notes</li><li>• Letter writing</li></ul>

**Suggested Readings:**

1. Fluency in English – Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Practical English Usage. Michael Swan. OUP. 1995.
4. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
5. Exercises in Spoken English

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**Course Name : Basic IT Skill**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: 1 <sup>st</sup>	Total marks: 50
Paper-IV	Time-3hours

Detailed contents
<b>Unit 1: Human Computer Interface.</b> Concepts of Hardware and Software; Data and Information. Functional Units of Computer System: CPU, registers, system bus, main memory unit, cache memory, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors. Devices: Input and output devices, keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter. Memory: Primary, secondary.
<b>Unit 2: Concept of Computing &amp; PC Software– I</b> Concept of Computing. Types of Languages: Machine, assembly and High level Language; Operating system as user interface, utility programs. Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, and equation editors.
<b>Unit 3: PC Software – II</b> Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs. Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows.
<b>Unit 4:</b> The Impact of Computing and the Internet on Society. Electronic Payment System: Secure Electronic Transaction, Types of Payment System: Digital Cash, Electronic Cheque, Smart Card, Credit/Debit Card EMoney, Immediate Payment System (IMPS).

**Suggested Readings:**

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education
2. Computer Fundamentals, A. Goel, 2010, Pearson Education.
3. Fundamentals of Computers, P. K.Sinha& P. Sinha, 2007, BPB Publishers.
4. IT Tools, R.K. Jain, Khanna Publishing House
5. "Introduction to Information Technology", Satish Jain, Ambrish Rai & Shashi Singh, Paperback Edition, BPB Publications, 2014.



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**Course Name: PC Hardware Lab**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: I	Total marks: 50
Paper-V	Practical

<b>Task 1</b>	Assembling and De Assembling of Computer System
<b>Task 2</b>	Loading and configuration procedure of Microsoft Client O/S Win XP /Win 7 and Windows 8
<b>Task 3</b>	Installation of utility tools (Software and Drivers)
<b>Task 4</b>	Firewall configuration, Antivirus/Internet security loading and configuration procedure.
<b>Task 5</b>	Installation and configuration of , I/O devices – Printers , Webcams , Scanners, Digital Camera , USB Wifi , USB BT, USB Storage, Projector
<b>Task 6</b>	Multiple OS loading and trouble shooting

**Course Name: Computer Networking Lab**


Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: I	Total marks: 50
Paper-VI	Practical

<b>Task 1</b>	Preparing Computer Network Cable using Connectors and Networking tools
<b>Task 2</b>	LAN & WAN Connectivity using Hub, Switch and Router
<b>Task 3</b>	Installation of Windows and Server
<b>Task 4</b>	Sharing peripheral devices
<b>Task 5</b>	Configuration of Network Connectivity
<b>Task 6</b>	Troubleshooting of Computer Hardware and Network

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## SEMESTER- II

Course Title	Marks Distribution		Total
	Internal	External	
Database Management Systems	20	80	100
Operating System	20	80	100
Microprocessor & Interfacing	20	80	100
IT service Management	20	80	100
Database Management Systems Lab	10	40	50
Operating System Lab	10	40	50

  
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**Course Name : Database Management System**

Program : B.Voc	Internal max. marks: 20
Branch : Hardware & Networking	External max. marks:80
Semester: II	Total marks: 100
Paper-I	Time-3hours

**Detailed contents**

**Unit 1:** Introduction of DBMS, Data Modeling for a Database, Three level Architecture of DBMS, Components of a DBMS.

Introduction to Data Models, Hierarchical, Network and Relational Model, Comparison of Network, Hierarchical and Relational Model, Entity Relationship Model.

**Unit 2:** Relational Database, Relational Algebra and Calculus, SQL Fundamentals, DDL, DML, DCL, PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Triggers.

**Unit 3:** Introduction to Normalization, First, Second, Third Normal Forms, Dependency Preservation, Boyce-Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Domain-key normal form (DKNF).

**Unit 4:** Database Recovery, Concurrency Management, Database Security, Integrity and Control. Structure of a Distributed Database, Design of Distributed Databases.

**Suggested Readings:**

- 1 "SQL, PL/SQL The Programming Language of Oracle", Ivan Bayross, BPB Publications, 4<sup>th</sup> Revised Edition (2009)
2. "An Introduction to Database Systems", C. J. Date, A. Kannan, S. Swamynathan, 8<sup>th</sup> Edition, Pearson Education, (2006).
3. "Database System Concepts", Abraham Silberschatz, Henry F. Korth, S. Sudharshan, Tata McGraw Hill, 6<sup>th</sup> Edition, (2013).
4. Database Management Systems, Raghu Ramakrishnan, McGraw-Hill, Third Edition, 2014.



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**Course Name : Operating System**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: II	Total marks: 100
Paper-II	Time-3hours

**Detailed contents**

**Unit 1**

Types of operating systems – Simple Batch Systems, Multiprogramming, Time Sharing systems, Personal computer systems, Parallel systems, Distributed Systems, Real – Time System, Multiprocessing, online & offline processing. Command Line Operating Systems, GUI Operating Systems, Selecting an OS

**Unit 2**

Disk Operating System, Booting Process, Warm and Cold Booting, DOS disk structure, DOS booting sequence, Systems files, Autoexec and Config files. Internal & External DOS commands. Directory commands: DIR, MD, RD, TREE, PATH, SUBST. file management Commands: COPY, DEL, ERASE, REN, ATTRIB, XCOPY, BACKUP and RESTORE, Format, FDISK, General commands: TYPE DATE, TIME, PROMT. Other commands - Chkdsk, Defrag, Diskcomp, Doskey, Edit, Label, Mem. Mode, Move, Scandisk, Tree, Undelete, Xcopy, Attrib, Deltree, Format, Sys, Fdisk, Disk Copy.

**Unit 3:** Windows OS Booting Process, Dual Booting, Alternative Windows Startup Modes, Displaying the Startup Menu, Making a Windows Startup Disk, Windows Recovery Console. Windows Tools and Utilities, Installing and Removing Applications, Adding and Removing Windows Components, Using a Command Prompt, Installing New Devices, Plug and Play Devices, Non-Plug and Play Devices, Removing Devices, Resolving Resource Conflicts, Precautions to Avoid Viruses, Detecting and Removing Viruses, Correcting Windows Problems, Working without a Mouse.

**Unit 4:**

Linux overview, File systems and structure of directories and file, File Oriented Commands – Cat, cp, In mv, rm. File Permissions, Directory Oriented commands – Is, mkdir, rmdir, cd, pwd. Inter user connection commands – write, mail, used, at, wall. Common commands – kill, date, wc, sleep, who, ps.

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**Suggested Readings:**

1. Modern Operating Systems 2<sup>nd</sup> Edition – Tanenbaum (PHI)
2. Teach Yourself Windows 95 – Gini Courier
3. Using Linux – Tackett, Burnett (PHI).
4. Operating System Concepts – Sillberschatz 5. IT Today – S. Jaiswal.

**Course Name: Microprocessor & Interfacing**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: II	Total marks: 100
Paper-III	Time: 3 hours

**Detailed contents**

**Unit -1**

Evolution of Microprocessor and types, Silent features of 8085 Microprocessor, architecture of 8085 (Block diagram), pin diagram, register organization, limitations of 8-bit Microprocessor, 8085 interrupt structure. Silent features of 8086 Microprocessor, architecture of 8086 (Block diagram, signal description), register organization, concepts of pipelining,

**Unit- 2**

Concept of Machine Language, Instruction format, addressing modes, Instruction set (Arithmetic, logical, data transfer, bit manipulation, string, program control transfer, process control) Assembly Language Programming Tools Editors, Assembler, Linker, Debugger, Assembler directives, model of 8086 assembly language programming, programming using assembler

**UNIT-3**

Defining Procedure (Directives used, FAR and NEAR, CALL and RET instructions) 5.2 Defining Macros. 5.3 Assembly Language Programs using Procedure and Macros. 5.4 DOS interrupt services.

**Unit -4:**

Interfacing Techniques (I/O mapped I/O, Memory mapped I/O, memory and I/O addressing, 8086 addressing, and address decoding, memory interfacing as Even and Odd bank) 6.2 Interfacing 8255, Block diagram, modes of operation. 6.3 8259: Block diagram, Characteristics and function only. 6.4 8257/8237: Block diagram, Characteristics and function only.

  
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**Suggested Readings:**

1. Microprocessor Architecture, Programming and Applications with 8085” by R S Gaonkar
2. The 8051 Microcontroller, Architecture, Programming and Applications” by Kenneth J Ayala
3. D.V. Hall, “Microprocessors and Interfacing”, 2<sup>nd</sup> Edition McGraw-Hill Book Company
4. M.A. Mazidi and J.G. Mazidi, “The 8051 Microcontroller and Embedded Systems”, Pearson Education, India

**Course Name : IT Service Management**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: II	Total marks: 100
Paper-IV	Time-3hours

<b>Detailed contents</b>
<b>Unit 1-INFORMATION SYSTEMS</b> 1.1 Information systems components 1.2 Organisations and management 1.3 The information system as a sociotechnical system 1.4 The strategic use of Information Technology
<b>Unit 2-MANAGEMENT INFORMATION SYSTEMS</b> 2.1 Informational needs of organisations 2.2 Capabilities of information systems from an organisational perspective 2.3 Information requirements for management 2.4 Levels of planning and control with MIS 2.5 MIS support for business functions 2.6 Management reporting processing systems
<b>UNIT3- SYSTEMS AND MANAGEMENT CONCEPTS</b> 3.1 Systems approach, organisational design, MIS in organisational control e.g. feedback etc. 3.2 Management theory and management functions 3.3 Concepts of planning 3.4 Role of information systems in the planning process (e.g. modelling and forecasting)

  
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3.5 Using MIS to enhance management control: performance reports, break-even analysis, calculation of financial ratios e.g. return on investment
<b>Unit 4-MANAGERIAL DECISION MAKING</b>
4.1 Decision-making
4.2 Components of Decision Support Systems
4.3 Types of DSS
4.4 Building a DSS
4.5 Executive Information Systems
4.6 Organisational aspects of DSS and EIS

**Suggested Readings:**

1. Service Management, Fourth Edition, J.A. Fitzsimmons and M.J. Fitzsimmons, McGraw Hill.
2. Services Marketing, Valerie Zeithaml, Mary Jo Bitner, and Dwayne Gremler, McGraw-Hill.
3. Introduction to Operations Research, Hillier and Lieberman
4. Service modeling, Principles and Applications. Vilho Räsänen, Wiley
5. Understanding Service Business, S.E. Sampson, Wiley

**Course Name: Database Management Systems Lab**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: II	Total marks: 50
Paper-V	Practical

<b>Task 1</b>	Used of CREATE, ALTER, RENAME, INSERT INTO, DELETE, UPDATE and DROP statement in the database tables
<b>Task 2</b>	Use of simple select statement, select query, aggregate functions
<b>Task 3</b>	Use of substring comparison.
<b>Task 4</b>	Use of nesting of queries
<b>Task 5</b>	Use of order by statement.
<b>Task 6</b>	Consider the following schema for a Library Database: BOOK (Book_id, Title, Publisher_Name, Pub_Year) BOOK_AUTHORS (Book_id, Author_Name) PUBLISHER (Name, Address, Phone) BOOK_COPIES (Book_id, Branch_id, No-of Copies) BOOK_LENDING (Book_id, Branch_id, Card No, Date_Out, Due_Date) LIBRARY_BRANCH (Branch_id, Branch Name, Address) Write SQL queries to 1. Retrieve details of all books in the library_id, title, name of publisher, authors, number of copies in each branch, etc.

**Course Name: Operating System Lab**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: II	Total marks: 50

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Paper-VI	Practical
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<b>Task 1</b>	Execution of internal and external DOS commands
<b>Task 2</b>	Managing the Boot manager and Installation of Windows OS.
<b>Task 3</b>	Working with Windows Tools and utilities and Installation of devices.
<b>Task 4</b>	Installing and Un-installation of Windows components.
<b>Task 5</b>	Installation and un-installation of different applications.
<b>Task 6</b>	Study of File systems of Linux and Execution of different linux commands.

### Semester III

Course Title	Marks Distribution		Total
	Internal	External	
Information & Network Security	20	80	100
LINUX OS	20	80	100
IT foundation and Programming Concepts	20	80	100
Information & Network Security Lab	10	40	50
Linux OS Lab	10	40	50



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**Course Name : Information & Network Security**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks:20
Semester: III	Total marks: 100
Paper-I	Time-3hours

**Detailed contents**

**Unit 1**

Introduction Management of malicious intent, threat scenarios, critical infrastructures, security targets and policies, security mechanisms, examples of applications and their different security requirements, multi-lateral security, privacy and data protection, computer misuse legislation, Operating system and network security, Cyber laws.

**Unit 2**

Network Layer Security Routing algorithm vulnerabilities: route and sequence number spoofing, instability and resonance effects. Information hiding: DMZ networks, route aggregation and segregation ICMP redirect hazard: denial of service. ARP hazard: phantom sources, ARP explosions and slow links.

Move, Scandisk, Tree, Undelete, Xcopy, Attrib, Deltree, Format, Sys, FDisk, DiskCopy.

**Unit 3:**

  
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Firewalls Network partitioning, firewall platforms, partitioning models and methods, Secure SNMP, Secure routing interoperability: virtual networks (DARTnet/CAIRN). Transparent and opaque network services. Source masking and hidden channels

**Unit 4:**

Security in Wireless Networks: How it is different, Methods and procedures, MIN/ESN, shared secret data authentication, Token based, public key based.

**Suggested Readings:**

1. Stallings, W., "Cryptography and Network Security: Theory and Practice", Second Edition, John Wiley
2. Schneier, B., "Applied Cryptography – Protocols, Algorithms, and Source Code in C", Second Edition, John Wiley and Sons, 1995
3. Stein L., "Web Security: A Step-by-Step Reference Guide", Addison Wesley Longman, Inc., 1998
4. Anderson R., "Security Engineering: A Guide to Building Dependable Distributed Systems", Wiley
5. Cheswick W., Bellovin S., "Firewalls and Internet Security: Repelling the Wily Hacker", 2<sup>nd</sup> ed., Addison-Wesley

**Course Name : LINUX OS**

Program : B. Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: III	Total marks: 100
Paper-II	Time-3hours

**Detailed contents**

**Unit 1**

Linux Introduction – Basic Features, Different flavors of Linux. Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories.

**Unit 2**

Installation of Linux system- Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process, init and run levels. Essential Linux commands Understanding shells, Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp & comm, View files, disk related commands, checking disk free spaces

**Unit 3:**

Processes in Linux-process fundamentals, connecting processes with pipes, tee, Redirecting input output, manual help, Background processing, managing multiple processes, changing process priority with nice,



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scheduling of processes at command, cron, batch commands, kill, ps, who, sleep, Printing commands, find, sort, touch, file, file related commands-ws, sat, cut, dc,

**Unit 4:**

Backup and restore files, reconfiguration hardware with kudzu, installing and removing packages in Linux. Configure X-windows starting & using X desktop. KDE & Gnome graphical interfaces, changing X windows settings. Setting up and using telnet server and clients. Installation and simple configuration of Proxy Server – Squid, Mail server – Sendmail, Web server – Apache, File server and Samba server in linux VNC server and client setting

**Suggested Readings:**

1. UNIX – Concepts & Applications (Third Ed.) – Sumitabha Das, Tata McGraw Hill Publications.
2. Unix for programmers and users (Third Ed.) – Graham Glass & King Ables, Pearson Education

**Course Name: IT foundation and Programming Concepts**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: III	Total marks: 100
Paper-III	Time-3hours

**Detailed contents**

**Unit 1-Computer System Characteristics And Capability –**

Basic structure, ALU, memory, CPU, I/O devices. Development of computers. Classification of computers (Micro, mini frame, super computer, pc, server, workstations), BIT, BYTE, WORD, ASCII, EBCDIC, BCD Code. Introduction to Number system: Binary, Octal, Decimal and Hexadecimal. Conversation from one number system to another number system. Introduction to Basic Gates.

**Unit 2-Input Devices and Output Devices –**

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Keyboard, Direct Entry: Card readers, scanning devices (BAR CODE, OMR, MICR), Voice input devices, Light pen, Mouse, Touch Screen, Digitizer, scanner. CRT, LCD/TFT, Dot matrix printer, Inkjet printer, Drum plotter, Flatbed plotter

**Unit 3: Memory Devices –**

RAM, ROM, PROM, EPROM, EEPROM. – Base memory, extended memory, expanded memory, Cache memory – Storage devices Tape, FDD, HDD, CDROM, Pen Drive.

**Unit 4: Introduction To Programming Environment-**

Definition and properties, Principles of flowcharting, Flowcharting symbols, Converting algorithms to flowchart, History of languages, high-level, Low level, Assembly languages etc. , Compilers, Interpreters, Assemblers, Linkers, Loaders

**Suggested Readings:**

R. Hunt And Shell Y. "Computers And Commonsense" BFB Publications

V.Rajaraman "Computer Fundamentals" PHI Learning

Ashok Arora "Fundamentals of Computer Systems"

Russell A Stultz "Fundamentals of Computer Systems"

**Course Name: Information & Network Security Lab**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: III	Total marks: 50
Paper-IV	Practical

<b>Task 1</b>	Study of Cyber laws I and II.
<b>Task 2</b>	Implementation & Configuration of firewalls.
<b>Task 3</b>	Creation and Implementation of Standard ACL.
<b>Task 4</b>	Creation and Implementation of Extended ACL.
<b>Task 5</b>	Creation and Implementation of Named ACL.
<b>Task 6</b>	Implementing wireless security using SSID.

**Course Name: Linux OS LAB**

  
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Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: III	Total marks: 50
Paper-V	Practical

<b>Task 1</b>	Study of File systems of linux.
<b>Task 2</b>	Study of Partitions of Linux.
<b>Task 3</b>	Booting in Linux.
<b>Task 4</b>	Standard Linux installation.
<b>Task 5</b>	Setting up Mail server and Web server.
<b>Task 6</b>	Installation of packages.

B.VOC MCM

### Semester IV

Course Name	External	Internal	Total
Programming in C	20	80	100
BUSINESS ANALYSIS: ENVIRONMENT, SALES & MARKETING	20	80	100



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COMPUTER HARDWARE, PC ASSEMBLING & TROUBLE SHOOTING	20	80	100
Programming in C Lab	10	40	50
COMPUTER HARDWARE, PC ASSEMBLING & TROUBLE SHOOTING Lab	10	40	50

B.Voc MCM

**Course Name : Programming in C**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks:20
Semester: IV	Total marks: 100
Paper-I	Time-3 hours



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**Detailed contents**

**Unit 1-**Introduction and Basic elements of C programming  
Introduction to problem solving through algorithm and flowchart, Overview, Character set, Keywords and Identifiers, Constants and Variables, Data types, Operators and Expressions, Operator precedence and associativity, Type casting

**Unit 2-**Data I/O, Control Structures-  
Basic structure of C program, Formatted and Unformatted Input and Output, Conditional branching – if, switch statement, Iterative loops – while, do while and for statement, break and continue statement, goto statement.

**Unit 3:** Arrays Functions-  
Introduction, Declaration and Initialization, Accessing Array elements, Memory representation of Array, One dimensional Arrays, Two dimensional Arrays, Character Arrays and Strings. Standard Library Functions, User Defined Functions (UDF) – Declaration, Definition, Function call, Parameter Passing – by value and by reference, Recursion, Storage Classes.

**Unit 4:** Structure, Union and Pointers-  
Defining Structure, Declaration, Initialization, Array of Structures, Structure and Functions, Nested Structures, Unions, Enumerated data type, typedef, Pointers and Dynamic Memory Allocation


**Suggested Readings:**

Yashavant Kanetkar "Let us" C BPB Publication  
E. Balagurusamy "Programming in ANSI C" Tata McGraw Hill  
Byron Gottfried "Programming with C" Tata McGraw Hill  
Yashavant Kanetkar "Exploring C" BPB Publication

**Course Name : BUSINESS ANALYSIS: ENVIRONMENT, SALES & MARKETING**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: IV	Total marks: 100
Paper-II	Time-3 hours

**Detailed contents**

  
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**Unit 1-Business Environment - Introduction, Concept of Business, Levels of the Business Environment, Understanding the Environment, Economic Environment of Business, The Global Economic Environment, Economic Policies, Business and Economic Policies, Socio Cultural Environment, Business and Society, Business and Culture , Indian Business Culture, Culture and Organizational Behavior. Introduction to Political Environment, Political Environment and the Economic system, Types of Political Systems, Indian Constitution and Business, Changing Profile of Indian Economy , Business Risks Posed by the Indian Political System, Economic Systems, Financial Environment: Introduction, An Overview of the Financial System, Components of Financial System, Financial Institutions and their Roles, Financial Institutions in India, Role of Foreign Direct Investment**

**Unit 2-Introduction to Legal Environment, Laws Impacting Industry in India, Intellectual Property Rights, Major Regulations Pertaining to Business, Regulatory Role of Government, Promotional Role of Government, Participatory Role of Government, Conciliatory and Judicial Role of Government , Impact of India's Industrial Policy on Economic Reforms, New Economic Policy, Globalization, India, WTO and Trading Blocs, Levels of Economic Integration/Trading Blocs, Effects of Economic Integration, Major Regional Trading Blocs, Commodity Agreement- World Trade Organization, WTO and India, Corporate Social Responsibility: Introduction, Meaning and Definition, Need for social responsibility of business, Social responsibility of business towards different groups, Barriers to social responsibility, Social responsibility of business in India, Public, Private, Joint and Cooperative Sector**

**Unit 3: Segmentation & its implication. Concept of Product, Product Planning and Development, Packaging: Role and Functions; Brand name and Trade mark, Product Life Cycle Concept; Distributions Channels and Physical Distribution. Price: Importance of Price in the Marketing Mix; Factors affecting Price of a Product/Service; Discounts and Rebates. Methods of Promotion; Advertising Media; Characteristics of an effective Advertisement**

**Unit 4: Scientific Selling; Approach and Presentation. Methods of Approaching a Customer; Presentation Process and Styles; Presentation planning. Objection Handling: Types of objections; Handling customer objections. Closing Sales and Follow up. Methods of closing sale; Executing sales order; Follow-up; Sales Promotion Schemes: Sampling; Coupon; Price Off; Premium Plan; Consumer Contests and Sweeps Takes; POP Displays; Demonstration; Trade Fairs and Exhibitions; Sales Promotion Techniques and Sales Force.**

**Suggested Readings:**

1. Business Environment; By Vishwajeet Prasad, Gyan Publishing House.
2. Business Environment; By Saleem, Pearson Education India.
3. BUSINESS ENVIRONMENT; By VEENA KESHAV PAILWAR, PHI Learning Pvt. Ltd.
4. Business Environment, by Suresh Bedi, Excel Books
5. BUSINESS ENVIRONMENT INDIAN AND GLOBAL

  
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**Course Name: COMPUTER HARDWARE, PC ASSEMBLING & TROUBLE SHOOTING**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks:20
Semester: IV	Total marks: 100
Paper-III	Time-3hours

**Detailed contents**

**Unit 1-system Case.** Plan System Layout. Install Hard Disk Drive/DVD-RW Drive. Configure Motherboard. Install Processor. Install Memory Modules/Motherboard/I/O Port Connectors/PS/2 Mouse Port Connector Connect Motherboard and Case Connect Hard Disk Drive/ DVD-RW Drive to Motherboard. Install Video Card. Perform Post-Assembly Inspection. Connect External Peripherals. Perform Initial Boot/Initial BIOS Setup/Install System Tests/Additional Peripherals. Partition and Format Hard Disk. Complete Assembly. Installation of Windows (Client version). Installation and configuration of driver software. Installation of Linux (Client version). Updating Service Pack of O. S. Installation of Anti Virus Software(Well known). Updating Anti Virus Software

**Unit 2-Problems:** Wired mouse and wireless mouse both. Desktop & Laptop that shut down without warning are often experiencing overheating issues. Troubleshooting for Desktop& Laptop Hard Drive Failure, Date and Time problem, No power etc. RAM failure.

**Unit 3:** Start, Unable to Connect to the Wireless Network (for Laptop), System restarts without warning. Fix the Windows blue screen errors. Not a valid win32 application. How to fix a fatal exception error. How to fix a general protection fault Runtime errors. Troubleshoots for Virus affected systems: Suspicious computer behavior such as high CPU usage on unrecognized processes. Unable to access network resources such as shared drives. Internet Explorer home page is changed without permission. Exploring error for drives.

**Unit 4:** software program. Troubleshoots for Network problems. Bad network card drivers or software settings. Firewall preventing computers from seeing each other. Connection related issues. Bad network hardware. Connection IP conflict problem etc. Internet Configuration Different types of internet connection and their configuration method. Broadband connection (ADSL and Cable etc). Webcam installation. Troubleshoot while configuring internet

**Suggested Readings:**

- Mastering PC Hardware & Network, Dr. Ajit Mittal, Dr. Ajay Rana
- How Computers Work, Ron White
- Modem TFT & LCD Monitor Introduction and Troubleshooting, BPB Publication
- Service Manual Mother Board & Laptop, GT Publication
- Fundamental of Computer, V. Rajaraman



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**Course Name: Programming in C Lab**


Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: IV	Total marks: 50
Paper-IV	Practical

Task 1	Programs based on input output statements
Task 2	Programs based on various operators and control statement (if, switch)
Task 3	Programs based on various loops (for, while, do-while)
Task 4	Programs based on 1-D Array and on 2-D Array
Task 5	Programs based on Function
Task 6	Programs based on Pointer, Array, Function, Structure and Union

**Course Name : COMPUTER HARDWARE, PC ASSEMBLING & TROUBLE SHOOTING Lab**

Program : B.Voc	Internal max. marks: 10
Branch : Hardware & Networking	External max. marks:40
Semester: IV	Total marks: 50
Paper-V	Practical


Task 1	Prepare System Case for Assembly and Checking SMPS and fit with system Case.
Task 2	Plan System Layout and Install Hard Disk Drive/DVD-RW Drive.
Task 3	Configure Motherboard and Install Processor
Task 4	Install Memory Modules/Motherboard/I/O Port, Connectors/PS/2 Mouse Port Connector Connect Motherboard and Case, Connect Hard Disk Drive/ DVD-
Task 5	Install Video Card, Perform Post-Assembly Inspection. Connect External Peripheral and Perform Initial Boot/Initial BIOS
Task 6	Partition and Format Hard Disk, Complete Assembly and Installation of Windows

  
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## Semester V

Course Title	Marks Distribution		Total
	Internal	External	
ENTREPRENEURSHIP DEVELOPMENT	20	80	100
Mobile Computing	20	80	100
Internet Routing Design	20	80	100
Project	20	80	100

B.VOC

  
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**Course Name : ENTREPRENEURSHIP DEVELOPMENT**

Program : B. Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: V	Total marks: 100
Paper-I	Time-3hours

<b>Detailed contents</b>
<b>Unit 1-</b> Concepts of entrepreneur: Entrepreneur- Definitions- Characteristics of entrepreneur- Classification of entrepreneur- Entrepreneurial traits- Entrepreneurial functions- role of entrepreneurs in the economic development- Factor effecting entrepreneurial growth- Entrepreneurship - Meaning- definition- Entrepreneur Vs Intrapreneur- Women Entrepreneurs- Recent development-Problems- Entrepreneurial Development Programmes- Objectives of EDP- Methods of training- Phases of EDP.
<b>Unit 2-</b> Institutional support and incentives to entrepreneurs- Functions of Department of Industries and Commerce (DIC) - Activities of Small Industrial Development Corporation (SIDCO)-Functions of National Small Industries Corporation(NSIC)-Functions of Small Industries Development Bank of India (SIDBI)-Khadi Village Industry Commission (KVIC)-Small Industries Service Institute (SISI)- Functions and services of Kerala Industrial Technical Consultancy Organisation (KITCO)-Activities of Science and Technology Entrepreneurship Development Project (STEDP)-Strategies of National entrepreneurship Development Board(NEDB)-Objectives of National Institute for entrepreneurship and small business development (NIESBUD)- Techno park-Functions of techno park Incentives- Importance- Classification of incentives- Subsidy- Types of Subsidy.
<b>Unit 3:</b> Micro Small and Medium Enterprises- Features- Objectives- Importance- Role of SME in the economic development- MSME Act 2006- Salient features- Credit Guarantee Fund Trust Scheme for MSMEs - Industrial estates-Classification-Benefits-Green channel- Bridge capital- Seed capital assistance-Margin money schemes -Single Window System- Sickness- Causes - Remedies- Registration of SSI
<b>Unit 4:</b> Setting up of Industrial unit-(Only Basic study) Environment for Entrepreneurship -Criteria for selecting particular project- Generating project ideas-Market and demand analysis-Feasibility study- Scope of technical feasibility- Financial feasibility- Social cost benefit analysis-Government regulations for project clearances -Import of capital goods- approval of foreign collaboration- Pollution control clearances- Setting up of micro small and medium enterprises-Location decision- Significance.

**Suggested Readings:**

  
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1. Shukla M. B., Entrepreneurship and Small Business Management, KitabMahal Allahabad.
2. Sangram Keshari Mohanty, Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., New Delhi.
3. H. Nandan, Fundamentals of Entrepreneurship, PHI Learning Pvt. Ltd., New Delhi.
4. Dr. Vasant Desai, Small-Scale Industries and Entrepreneurship, Himalaya Publishing, Delhi.
5. C. N. Sontakki, Project Management, Kalyani Publishers, Ludhiana.
6. Peter F. Drucker, Innovation and Entrepreneurship, Routledge Taylor & Francis Group
7. Dr. Vasant Desai, Small Business Entrepreneurship, Himalaya Publications.

**Course Name : Mobile Computing**

Program : B.Voc	Internal max. marks: 80
Branch : Hardware & Networking	External max. marks: 20
Semester: V	Total marks: 100
Paper-II	Time-3hours

Detailed contents
<b>Unit 1-Mobile Communications: An Overview:</b> Mobile Communication, Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Data Dissemination, Mobility Management, Security Mobile Devices and Systems: Mobile Phones, Digital Music Players, Handheld Pocket Computers, Handheld Devices:
<b>Unit 2-Operating Systems, Smart Systems, Limitations of Mobile Devices, Automotive Systems GSM and Similar Architectures:</b> GSM-Services and System Architecture, Radio Interfaces, Protocols, Localization, Calling Handover, Security, New Data Services, General Packet Radio Service, High-speed Circuit Switched Data, DECT.
<b>Unit 3: Wireless Medium Access Control and CDMA based Communication:</b> Medium Access Control, Introduction to CDMA-based Systems, Spread Spectrum in CDMA Systems, Coding Methods in CDMA, IS-95 cdma One System, IMT- 2000, I - m o d e , O F D M , Mobile IP Network Layer:
<b>Unit 4: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunnelling and Encapsulation Route Optimization, Dynamic Host Configuration Protocol, Mobile Transport Layer, Conventional TCP/IP Transport, Layer Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP-layer Transmission for Mobile Networks, TCP Over 2.5G/3G Mobile Networks</b>

**Suggested Readings:**

1. Mobile Computing, Raj Kamal, Oxford University Press
2. Mobile Communications Jochen Schiller, Addison-Wesley.
3. Handbook of Wireless Networks and Mobile Computing, Stojmenovic and Cacute, Wiley,
4. Mobile Computing Principles: Designing and Developing Mobile



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5. Applications with UML and XML, Reza Behravanfar, Cambridge University Press

**Course Name : Internet Routing Design**

Program : B.Voc	Internal max. marks: 60
Branch : Hardware & Networking	External max. marks: 40
Semester: V	Total marks: 100
Paper-III	Time-3hours

**Detailed contents**

**Unit 1**

Networking and Network Routing: An Introduction, Addressing and Internet Service: An Overview, Network Routing, IP Address subnetting, Service Architecture, Protocol Stack Architecture, Router Architecture, static, dynamic routing.

**Unit 2**

Routing Algorithms and types, states. Implementation of RIP v1,2 and its configuration. Implementation of EIGRP and its configuration. Routing Protocols: Framework and Principles Routing Protocol, Routing Algorithm, and Routing Table, Routing Information Representation and Protocol Messages, Distance Vector Routing Protocol, Link State Routing Protocol, Path Vector Routing, Protocol, Link Cost

**Unit 3:**

OSPF and Integrated IS-IS : OSPF: Protocol Features, OSPF Packet Format, Integrated IS-IS,

**Unit 4:**

Managable switch, switching concept, states & modes of switches, looping in switch, Spanning tree protocol, V-LAN, implementation of VLAN

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**Suggested Readings:**

1. Network Routing: Algorithms, Protocols, and Architectures Deepankar Medhi and Karthikeyan Ramasamy (Morgan Kaufmann Series in Networking)
2. Network Algorithmic: An Interdisciplinary Approach to Designing Fast Networked Devices George Varghese (Morgan Kaufmann Series in Networking)

**Semester VI**

Course Title	Marks Distribution		Total
	Internal	External	
Industrial Training/Project	0	300	300



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