

TUMKUR UNIVERSITY




Board of Studies in Computer Science

**Bachelor of Vocation Course under
National Skill Qualification Framework (NSQF)
in**

B.Voc (Hardware Technology and Networking)

Curriculum Structure and Syllabus for I and II Semesters

2024 - 25 onwards


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BOS Computer Science Committee Members

1.	Dr. Kusuma Kumari B.M MCA Coordinator & Assistant Professor Department of Studies and Research in Computer Applications Tumkur University, Tumakuru	Chairperson
2.	Dr. Ramani. R Assistant Professor Department of Computer Science University College of Science Tumkur University, Tumakuru	Member
3.	Dr. Chandrali Baishya Associate Professor Department of Studies and Research in Mathematics Tumkur University, Tumakuru	Member
4.	Dr. Prakash B.R Assistant Professor Department of Computer Science Government First Grade College, Tipatur.	Member
5.	Sri. Mohan Kumar N Assistant Professor Department of Computer Science Y.E.R Government First Grade College, Pavagada.	Member
6.	Capt. Ramalinga Reddy S Assistant Professor Sri Siddaganga Arts and Commerce Evening College Tumkur.	Member
7	Dr. Manjunath S Assistant Professor, Department of Computer Science Y.E.R Government First Grade College, Pavagada.	Member
8	Dr. Nagamani H.S Associate Professor, Department of Computer Science Maharani Cluster University, Bengaluru.	Member
9	Dr. Asha Gowda Karegowda Associate Professor , Department of MCA Siddaganga Institute of Technology, Tumkur.	Member
10	Dr. Sumathi R Gowda Assistant Professor MCA Department, Karnataka State Open University, Muktha Gangotri, Mysore.	Member
11.	Dr. Haridas S. Associate Professor Department of Computer Science Government First Grade College, Tumkur.	Member

B. VOC (HARDWARE TECHNOLOGY & NETWORKING)

First Semester – SEM I

Sl. No.	Type & Title of the Paper.	Subject Code	Instructions (Hrs/ week)	No.of Credits	Duration of the Exam	Max Marks		
						IA	Sem. End Exam	Total Marks
1	General English-I	GEC-1.1 T	4	4	3 Hrs	20	80	100
	Industrial Visit	-	-	2	-	-	-	-
2	Computer Fundamentals & ICT	GEC-1.2 T	4	4	3 Hrs	20	80	100
	Computer Fundamentals & ICT Lab	GEC-1.2 P	4	2	3 Hrs	10	40	50
3	Basic Electronics & Measuring Instruments	SDC-1.3 T	4	4	3 Hrs	20	80	100
	Basic Electronics & Measuring Instruments Lab	SDC-1.3 P	4	2	3 Hrs	10	40	50
4	PC Hardware and Software	SDC-1.4 T	4	4	3 Hrs	20	80	100
	PC Hardware and Software Lab	SDC-1.4 P	4	2	3 Hrs	10	40	50
5	Computer Organization	SDC- 1.5 T	4	4	3 Hrs	20	80	100
	Computer Organization Lab	SDC- 1.5 P	4	2	3 Hrs	10	40	50
				30				700
Compulsory Course(Mandatory for the course completion not to be considered for the declaration of class and rank)								
6.	Indian Constitution		2		2 Hrs		50	50

B. VOC (HARDWARE TECHNOLOGY & NETWORKING)

Second Semester – SEM II

Sl. No.	Type & Title of the Paper	Subject Code	Instruction s(Hrs/ week)	No.of Credits	Duration of the Exam	Max. Marks		
						IA	Sem. End Exam	Total Marks
1	General English – II	GEC-2.1 T	4	4	3 Hrs	20	80	100
	Industrial Visit	-	-	2	-	-	-	-
2	8051 Microcontroller and Its Interfacing	GEC-2.2 T	4	4	3 Hrs	20	80	100
	8051 Microcontroller and Its Interfacing Lab	GEC-2.2 P	4	2	3 Hrs	10	40	50
3	Computer Networking	SDC-2.3 T	4	4	3 Hrs	20	80	100
	Computer Networking Lab	SDC-2.3 P	4	2	3 Hrs	10	40	50
4	Programming in C	SDC-2.4 T	4	4	3 Hrs	20	80	100
	Programming in C Lab	SDC-2.4 P	4	2	3 Hrs	10	40	50
5	Digital Electronics	SDC-2.5 T	4	4	3 Hrs	20	80	100
	Digital Electronics Lab	SDC -2.5 P	4	2	3 Hrs	10	40	50
				30				700
Compulsory Course(Mandatory for the course completion not to be considered for the declaration of class and rank)								
6.	Environmental Studies		2		2 Hrs		50	50

Internal Assessment Marks for Theory and Practical

Internal Assessment Marks Allotment for Theory	
Internal Test 1	05
Internal Test 2	05
Assignment	05
Seminar/Quiz	05
TOTAL	20

Internal Assessment Marks Allotment for Practical	
Internal Test	05
Record and Attendance	05
TOTAL	10

Evaluation Scheme for Lab Examination

Assessment Criteria	
Writing 2 Programs	10
Execution of 2 Programs	20
Viva	10
Total	40 Marks

First Semester			
Subject Name: General English – I			
Subject Code	GEC-1.1 T	CIE Marks	20
No of Hours/Week	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Poetry:	Hours 10
	1. "If—" by Rudyard Kipling 2. "The Road Not Taken" by Robert Frost 3. "Still I Rise" by Maya Angelou 4. "Ozymandias" by Percy Bysshe Shelley 5. "Do Not Go Gentle into That Good Night" by Dylan Thomas	
Unit 2	Prose:	Hours 30
	1. "The Last Leaf" by O. Henry 2. "The Fly" by Katherine Mansfield 3. "The Necklace" by Guy de Maupassant 4. "The Yellow Wallpaper" by Charlotte Perkins Gilman 5. "The Lottery" by Shirley Jackson	
Unit 3	Grammar:	Hours 20
	1. Parts of Speech: Nouns, Adjectives, Adverbs, Prepositions, Conjunctions 2. Subject-Verb Agreement 3. Active and Passive Voice 4. Direct and Indirect Speech 5. Articles	

PRIMARY TEXTS:

1. <https://www.poetryfoundation.org/poems/46473/if--->
2. <https://www.poetryfoundation.org/poems/44272/the-road-not-taken>
3. <https://www.poetryfoundation.org/poems/46446/still-i-rise>
4. <https://www.poetryfoundation.org/poems/46565/ozymandias>
5. <https://poets.org/poem/do-not-go-gentle-good-night>
6. https://americanenglish.state.gov/files/ae/resource_files/the-last-leaf.pdf

7. <https://www.katherinemansfieldsociety.org/archive/www.katherinemansfieldsociety.org/assets/KM-Stories/THE-FLY.pdf>
8. <https://www.eastoftheweb.com/short-stories/UBooks/Neck.shtml>
9. <https://www.owleyes.org/text/yellow-wallpaper>
10. <https://www.newyorker.com/magazine/1948/06/26/the-lottery>

REFERENCE MATERIALS:

1. <https://www.britannica.com/topic/part-of-speech>
2. <https://www.grammarly.com/blog/grammar-basics-what-is-subject-verb-agreement/>
3. <https://www.grammarly.com/blog/active-vs-passive-voice/>
4. <https://www.wallstreetenglish.com/exercises/direct-and-indirect-speech-exercises>
5. <https://academicguides.waldenu.edu/writingcenter/grammar/articles>

First Semester			
Subject Name: Computer Fundamentals & ICT			
Subject Code	GEC-1.2 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Computer Fundamentals	Hours 15
	Introduction, Objectives, Basic Applications of Computer, Types of Computers - Micro, Mini, Mainframe and Super Computer, Architecture of a Computer System–Processor (CPU) - Types and their specifications (Intel: Celeron, P4 family, Xeon, dual core, quad core, core 2 duo, i3, i5, i7 and AMD), ALU, Components of Computer System: Keyboard, mouse and VDU, Other Input devices, Other Output devices, Computer Memory. Concept of Hardware and Software: Hardware, Software: Application Software, Systems software. Concept of computing, data and information. Bringing computer to life: Connecting keyboard, mouse, monitor and printer to CPU, Checking power supply. Objective, advantages and benefit.	
Unit 2	Operating System	Hours 10
	Introduction, Objectives, Basics of Operating System: Types of Operating Systems, Functions of an Operating System, Need of OS, Batch Processing, Multi-processing, Single user & Multi user OS, Distributed and Time-Sharing Operating Systems, Introduction to Unix, Linux and Windows. Basic DOS Utility commands.	
Unit 3	Introduction to Computer Networks and Internet:	Hours 10
	Introduction, Objectives. Basic of Computer Networks: Local Area Network (LAN), Wide Area Network (WAN). Internet: Concept of Internet, Applications of Internet, connecting to the Internet, Troubleshooting, World Wide Web (WWW), Web Browsing Software, Popular Web Browsing Software. Search Engines: Popular Search Engines / Search for content, Accessing Web Browser, Using Favorites Folder, Downloading Web Pages, Printing Web Pages. Understanding URL, Surfing the web: Using e - governance website. Search Engines & Netiquette.	

Unit 4	Introduction to MS-Office:	Hours 15
	MS- Windows: Basic components of windows, icons, types of icons, taskbar, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders, Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance, Using windows accessories MS Word; Opening and saving new document, Text Basics, Editing Text, Text Formatting, Lay outting the file, Mail Merge, MS Excel: Introduction to Excel, Formatting excel work book, Perform Calculations with Functions, sorting, filtering, charts. MS-Power Point, Setting Up PowerPoint, Environment: Creating slides and applying themes, animation, slide show.	
Unit 5	Introduction to Electronic Mail	Hours 10
	Introduction, Objectives, Basics of E - mail: What is an Electronic Mail, Email Addressing, And Using E - mails: Opening Email account, Mailbox: Inbox and Outbox, Creating and Sending a new E - mail, replying to an E - mail message, Forwarding an E - mail message, sending soft copy as attachment, Enclosures to email, sending a Portion of document as email Sorting and Searching emails.	

TEXT BOOKS:

1. Course On Computer Concepts Reema Thareja, Oxford University Press
2. Computer Fundamentals–Pradeep. K.Sinha: BPB Publications.
3. Fundamentals of Computers -Reema Thareja, Oxford University Press India

REFERENCE BOOKS:

1. Fundamentals of Computer – V. Rajaraman, Printice Hell of India.
2. Introduction to Computers–Peter Norton McGraw-Hill.
3. Microsoft Office 2010: John Walkenbach, Herb Tyson, Michael R Groh, Faithe Wempen.

First Semester			
Subject Name: Computer Fundamentals & ICT Lab			
Subject Code	GEC-1.2 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. Identifying different components of a computers.
2. Connecting & disconnecting computer peripherals and components.
3. Identifying and managing different components of Desktop and Taskbar
4. Apply internal DOS commands (DIR, CD, CLS, COPY, DATE, DEL, PATH, REN, RD, TYPE, VER)
5. Apply External DOS Commands (XCOPY, ATTRIB, MOVE, TREE)
6. Software downloads and installation.
7. Surfing the Internet: Giving the URL address, Search, Moving Around in a web-site,
Printing or saving portion of web pages, down loading/uploading

PART B:

1. Create E-mail ID in a mail server and send E-mail. Understanding Email etiquette.
2. Formatting text in Word.
3. Create Bio data in word
4. Create a presentation with multiple slides and save the presentation
5. Apply different animations and slide transitions on the slide.
6. Create excel spreadsheet to generate salary bill of company.
7. Apply filter to extract records (Auto Filter/Advanced Filter)
8. Create different charts such as Line, Column, Bar, Pie from suitable example database

First Semester			
Subject Name: Basic Electronics & Measuring Instruments			
Subject Code	SDC-1.3 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Current Electricity	Hours 10
	Brief history of Electronics, Atom and its elements, Electron, Potential Energy, current Electric field, Magnetic field, Motion of charged particles in electric and magnetic field. Definition of Resistance, Voltage, Current, Power, Energy and their units, Power generation system, Switch- plug wiring, Analyzing Conductivity of elements, Types of Conductors, Semi conductors - Silicon, Germanium. Temperature variation of resistance, Difference between AC and DC voltage and current. AC Fundamentals, Ohm's law.	
Unit 2	Semiconductor Theory	Hours 12
	Basics of Semiconductor: Semiconductor materials, Metals and Semiconductors. N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor. PN junction diode, depletion layer, Forward & Reverse bias, V-I Characteristic, Effects of temperature, Zener diode, Photo diode, LED, Types and applications of diode. Diode as a rectifier, Half wave and full wave rectification, Zener diode Regulator. Introduction to Filters.	
Unit 3	Electronics Components	Hours 13
	Resistors, Capacitors, Inductors, Series and Parallel connection of Resistors and Capacitors, Color coding of resistors. Transformers, Types, working and Principles, Transistors (BJT) NPN, PNP, Biasing of BJT- CB, CE and CC configuration, their characteristics. Field effect transistor, MOSFET, Photo transistor. IC's, Types of IC's, Scale of IC's.	
Unit 4	Power Supply and Basic Measuring Instruments	Hours 10
	Basic regulated power supply using Zener diode, Block diagram of IC based Power supply, Basic Switch Mode Power Supply (SMPS), Basic uninterrupted Power Supply (UPS) .	

	Multimeters – Electronics and Digital, Cathode Ray Oscilloscope (CRO), basic working, uses and Measurement of CRO, LCR – Q meter.	
Unit 5	Safety and Servicing	Hours 15
	First aid, Artificial respiration, Safety in handling heavy and delicate equipment, Electrical safety, grounding principle, Different types of Fuses and their applications, Different types of connectors used in electrical and electronic appliances. Different types of switches used in electrical and electronic applications. Important Safety Basics Identification, specification and application of basic hand tools. How to handle components to ensure their longevity, Anti-static environment. Soft soldering and precautions to be taken for making a good solder joint. Types of solder and need of soldering paste.	

TEXT BOOK:

1. Principles of Electronics, V.K Mehta

REFERENCE BOOK:

1. Fundamentals of Electrical and Electronics, B.L. Thereja

First Semester			
Subject Name: Basic Electronics & Measuring Instruments Lab			
Subject Code	SDC-1.3 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	4

LIST OF PRACTICAL PROGRAMS

PART A:

1. Demonstration on the function of Digital Multimeter and voltage, current, resistance measurement by Multimeter.
2. Identification of different electrical symbols and their components.
3. Switch Board Wiring and Testing. Identifying cables and connectors.
4. Checking of phase, neutral and earthing of AC supply line.
5. Basic concept of soldering, de soldering, demonstration on different soldering methods, practice of solder removal, replacement of components.
6. Passive and active component checking methodology by Multimeter.
7. Measurement of voltage, Frequency of a signal using CRO.
8. Equivalent resistance identification when they are in series, parallel and series / parallel combination

PART B:

1. Verification of Ohm's Law.
2. Voltage Measurement of Different Circuits
3. Testing and Measurement of SMPS
4. Experiment on Half wave rectifier by using Diodes.
5. Experiment on Full wave rectifier by using Full wave & Bridge diodes.
6. Characteristics of PN junction Diode
7. Characteristics of BJT

First Semester			
Subject Name: PC Hardware and Software			
Subject Code	SDC-1.4 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Introduction to the Personal Computers	Hours 10
	<p>Identifying the Names, Purposes, and Characteristics of Cabinet and Cases, SMPS, Connectors, Motherboards, CPUs, Cooling, ROM and RAM, Memory Modules, Cache Memory, Error Checking, Adapter, Cards.</p> <p>Storage Drives- Floppy Drive, Hard Drive, Optical Drive, External Flash Drive, Types of Drive, Serial Ports and Cables, USB Ports and Cables, FireWire Ports and Cables, Parallel Ports and Cables, SCSI Ports and Cables, Network Ports and Cables, PS/2 Ports, Audio Ports, Video Ports and Connectors, Monitors and Projectors, All-in-One Printer, Speakers and Headphones, System Resources and their Purposes.</p>	
Unit 2	Safe Lab Procedures and Tool Use	Hours 10
	<p>Identify Safety Procedures and Potential Hazards: for Users and Technicians, General Safety Guidelines, Electrical Safety Guidelines, Fire Safety Guidelines, Identify Safety Procedures to Protect Equipment from Damage and Data from Loss, Electrostatic Discharge, Electromagnetic Interference, Climate, Power Fluctuation Types, Power Protection Devices</p> <p>Safety Procedures and Protection: Environment from Contamination, Material Safety Data Sheet, Proper Disposal of Batteries, Proper Disposal of Monitors or CRTs, Proper Disposal of Toner Kits, Cartridges, and Developers, Proper Disposal of Chemical Solvents and Aerosol Cans.</p> <p>Hardware Tools and Their Purpose: ESD Tools, Hand Tools, Antistatic Wrist Strap, Antistatic Mat, Workbench, Screws, Flat-Head Screwdriver, Phillips-Head Screwdriver, Hex Driver, Part Retriever, Needle-Nose Pliers, or Tweezers. Use of Cleaning Materials for Computer Cases and Monitors, LCD Screens, Component Contacts, Keyboard, Mouse</p>	

	Step by Step Computer Assembly	Hours 15
	<p>Identifying Modern Mother boards, Type, layouts, connectors, Sockets, Slots, Latest Intel, AMD Processor, Molex Power Connectors, Berg Power Connectors, Data Cables, SMPS.</p> <p>Installing a CPU and a Heat Sink/Fan Assembly, ROM, RAM, Internal Drives, Drives in External Bays, Adapter Cards, Connecting All Internal Cables, Connecting the Power Cables, Motherboard Power Connections, ATA Power Connectors, Reattaching the Side Panels and Connecting External Cables.</p> <p>Booting the Computer for the First Time: Identify Error Code, Beep Codes, Post Code, BIOS Setup and Upgrade and, Testing. Theory to Determine an Exact Cause of fault</p>	
Unit 3		
	Installing Operating Systems	Hours 15
	<p>Characteristics of Modern Operating Systems, Hardware management, File and Folder Management, User Interface, Application Management.</p> <p>Modes of Operation: Real Mode, Protected Mode, Virtual Real Mode, Compatibility Mode</p> <p>Compare Latest Operating Systems to include purpose, limitations, and compatibilities of different latest Desktop Operating Systems: Microsoft Windows, Apple Mac OS, UNIX/Linux, Network Operating Systems, Servers OS.</p> <p>Identify Applications and Environments That Are Compatible with the above Operating System, Determine Minimum Hardware Requirements and Compatibility with the OS Platform. Installation of Windows/Linux OS</p>	
Unit 4		
	Troubleshooting Operating Systems and Maintenance	Hours 10
	<p>Creating Preventive Maintenance Plan: Preventive Maintenance Planning, Device Driver Updates, Firmware Updates, Operating System Updates, Security, Startup Programs, Schedule a Task, System Utilities, Automatic Updates, Restore Point, Backup Status and Configuration, ERD and ASR, Back Up the Hard Drive, Normal Backup, Copy Backup, Differential Backup, Incremental Backup, Daily Backup. Backup Media.</p> <p>Review the Troubleshooting Process, Identify the common Problem, establish a Theory of Probable Causes, Determine an Exact Cause, implement a Solution,</p>	
Unit 5		

	Verify Solution and Full System Functionality, Document Findings, Hardware Replacement Steps.
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TEXT BOOK:

1. IT Essentials: PC Hardware and Software Companion Guide, Cisco Networking Academy

REFERENCE BOOKS:

1. PC Hardware: A Beginner's Guide Ron Gilster
2. Upgrading and Repairing PCs by Scott Mueller.
3. PC Hardware: The Complete Reference by Craig Zacker

First Semester			
Subject Name: PC Hardware and Software Lab			
Subject Code	SDC-1.4 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. Study the different connectors and ports of a PC
2. Understand the various cables in a computer system
3. Familiarize the different types of memory modules.
4. Study various secondary storage devices.
5. Identifying mother board, Hardware component and assembling a PC.
6. CMOS Setup and Troubleshooting.
7. Identifying the Boot Sequence, Files and Registry Files, Windows 10 Boot Process, Windows Boot Menu, Windows Registry, Startup Modes,
8. Describing Directory Structures, File Extensions and Attributes.

PART B:

1. Installing the latest Windows / Linux Operating System Using Default Settings, Create User Accounts, Complete the Installation, Custom Installation Options and Network Installation.
2. Partitioning and Formatting, Prepare the Hard Drive, Disk Cloning, Recovery Disc, Factory Recovery Partition.
3. Working with Software and Diagnostic Tools: Disk Management Tools, Protection Software Tools,
4. Navigating GUI: Manipulating Display Properties and Settings, Desktop Items, Start Menu. My computer, Launching Applications, My Network Places, Control Panel Applets.
5. Exploring Administrative Tools, Computer Management, Device Manager, Task Manager, Services, Performance Monitor, Event Viewer, MMC, Remote Desktop. Performance Settings, Install and Uninstall an application, Add or Remove Programs, Upgrading an Operating System.

6. Identify and Describe the Components of a Laptop Docking Station. Compare and Contrast Desktop and Laptop Motherboards, Processors and Capabilities.
7. Installation of OS on Laptop and Configuring Options
8. Safe Installation and Removal of Laptop Components and Communication Hardware Installation
9. Identify Common Problems and Troubleshooting Laptops

First Semester			
Subject Name: Computer Organization			
Subject Code	SDC- 1.5 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Basic Computer Organization and Design	Hours 15
	Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture. Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input/output and interrupt, Accumulator, Stack Organization, Data transfer and manipulation, Program Control, Reduced Instruction Set Computer (RISC) and CISC.	
Unit 2	Introduction and Architecture of Microprocessor 8086	Hours 12
	Microprocessor Overview, Intel 8086 Microprocessor: Register Organization, Architectural block, diagram: Bus interface unit, Execution unit, pipelining, pin configuration, flags, data and address bus, Address, modes of operation: - minimum mode and maximum, mode. Accessing odd and even memory bank, instruction cycle, fetch-execute cycles, timing diagrams, - memory read, write, I/O write.	
Unit 3	Programming the Basic Computer	Hours 13
	Introduction, Machine Language, Assembly Language, assembler, Programming Arithmetic and logic operations, Instruction Formats, Instruction Sets, Addressing Modes, Addressing Modes Examples with Assembly Language [8086 CPU], subroutines, I-O Programming.	
Unit 4	Input-Output Organization	Hours 10
	Input-Output Organization: Peripheral Devices, I/O interface, I/O vs. Memory Bus, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, Modes of Transfer, Asynchronous and synchronous Data Transfer	
Unit 5	Memory Organization	Hours 10

	Memory Organization: Memory Hierarchy, Semiconductor Memories, RAM, ROM, Cache Memory, Performance considerations, Virtual memory, Paging, Secondary Storage, Auxiliary memories, RAID.
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TEXT BOOKS:

1. Carl Hamacher.V., Zvonko G. Vranesic, Safwat G.Zaky “Computer organization” TMH, 2011
2. The 8088 and 8086 Microprocessors Programming, interfacing, software, hardware and Applications - Waltier A. Triebel and Avtar Singh. PHI

REFERENCE BOOKS:

1. M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India
2. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Third Edition, Elsevier, 2005.
3. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.

First Semester			
Subject Name: Computer Organization Lab			
Subject Code	SDC- 1.5 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. Write an assembly level program to illustrate swapping of two numbers.
2. Write an assembly level program to illustrate the branch instruction.
3. Write an assembly level program to find largest of three numbers.
4. Write an assembly level program to find the number of digits in a number.
5. Write an assembly level program to find the sum of first n odd natural numbers.
6. Write an assembly level program to display multiplication table of any number.

PART B:

1. Write an assembly level program to find the product of first 7 natural numbers.
2. Write an assembly level program to find the sum of first n even whole numbers.
3. Write an assembly level program to find the factorial of a numbers.
4. Write an assembly level program to find the area and perimeter of rectangle.
5. Write an assembly level program to find the sum of first n natural number.
6. Write an assembly level program to find the number is even or odd and display '0' if the number is even or '1' if the number is odd.
7. Write an assembly level program to find the power of a number.

Second Semester			
Subject Name: General English – II			
Subject Code	GEC-2.1 T	CIE Marks	20
No of Hours/Week	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Poetry:	Hours 10
	<ol style="list-style-type: none"> "The Bus" by Arun Kolatkar "The Worm" by Nissim Ezekiel "My Grandmother's House" by Kamala Das "Hunger" by Jayanta Mahapatra "Obituary" by A. K. Ramanujan 	
Unit 2	Prose:	Hours 30
	<ol style="list-style-type: none"> "Most Beautiful" by Ruskin Bond "The Curd-seller" by Masti Venkatesha Iyengar "The Secret of Culture" by Premchand "Lawley Road" by R. K. Narayan "The Postmaster" by Rabindranath Tagore (translated into English) 	
Unit 3	Communication Skills:	Hours 20
	<ol style="list-style-type: none"> Verbal and Non-Verbal Communication- Types, Process, Barriers and Tips for Effective Communication Presentation Skills- Preparation and Tips for Effective Presentation Interview Skills- Preparation and Tips for Effective Interview Email Communication-Do's and Don'ts of Email Communication Academic Writing- Essays and Report Writing 	

PRIMARY TEXTS:

1. <https://allpoetry.com/The-Bus>
2. <https://www.gradesaver.com/the-poems-of-nissim-ezekiel/study-guide/poem-text>
3. <https://www.poetrynook.com/poem/my-grandmothers-house>
4. <https://www.poemhunter.com/poem/hunger-71/>
5. https://littleflowercollege.edu.in/upload/e_contents/files/be8e6b70bc66cb41464d671e43e17e5d.pdf<https://www.arvindguptatoys.com/arvindgupta/ruskin-stories.pdf>(The Secret of Culture, Lawley Road and Most Beautiful)
6. https://ia801706.us.archive.org/28/items/indian-short-stories-1/indian%20short%20stories1_text.pdf(The Curd Seller)
7. <https://shortstoryproject.com/stories/the-postmaster/>(The Postmaster)

REFERENCE MATERIALS:

1. <https://study.com/learn/lesson/verbal-nonverbal-messages-communication-types-skills-examples.html>
2. <https://USIC.sheffield.ac.uk/blog/how-to-improve-your-presentation-skills>
3. <https://in.indeed.com/career-advice/interviewing/interviewing-skills>
4. <https://www.mindtools.com/apz815y/writing-effective-emails>
5. https://www.internationalstudent.com/essay_writing/essay_tips/
6. <https://byjus.com/english/how-to-write-a-report/>

Second Semester			
Subject Name: 8051 Microcontroller and Its Interfacing			
Subject Code	GEC-2.2 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Architecture & Instruction Set of 8051	Hours 14
	<p>ARCHITECTURE OF 8051 Comparison of Microprocessor and Microcontroller - Block diagram of Microcontroller – Functions of each block - Pin details of 8051 – ALU –ROM– RAM – Memory Organization of 8051 - Special function registers –Program Counter – PSW register – Stack - I/O Ports – Timer – Interrupt – Serial Port – Oscillator and Clock - Clock Cycle – State - Machine Cycle –Instruction cycle – Reset – Power on Reset – Overview of 8051 family</p> <p>INSTRUCTION SET OF 8051 Instruction set of 8051 – Classification of 8051 Instructions - Data transfer instructions – Arithmetic Instructions – Logical instructions –Branching instructions – Bit Manipulation Instructions</p>	
Unit 2	Programming 8051	Hours 10
	<p>ASSEMBLER AND ADDRESSING MODES Assembling and running an 8051 program –Structure of Assembly Language –Assembler directives - Different addressing modes of 8051</p> <p>PROGRAMMES Multibyte Addition – 8 Bit Multiplication and Division – Biggest Number / Smallest Number – Ascending order / Descending order BCD to ASCII Conversion – ASCII to Binary Conversion – Odd Parity Generator – Even Parity Generator -Time delay routines</p>	
Unit 3	I/O and Timer:	Hours 12
	<p>I/O Bit addresses for I/O and RAM – I/O programming – I/O bit manipulation programming. TIMER Programming 8051 Timers – Timer 0 and Timer 1 registers – Different modes of Timer – Mode 0 Programming – Mode 1 Programming - Mode 2Programming - Counter programming – Different modes of Counter – Mode 0 Programming – Mode 1 Programming - Mode 2 Programming (simple programs)</p>	
Unit 4	Interrupt and Serial Communication	Hours 12

	<p>SERIAL COMMUNICATION Basics of Serial programming – RS 232 Standards - 8051 connection to RS 232 – 8051 Serial Communication Programming – Programming 8051 to transmit data serially - Programming 8051 to Receive data serially.</p> <p>INTERRUPT 8051 Interrupt s – Programming Timer Interrupts – Programming external hardware interrupts – Programming the serial communication interrupt –Interrupt priority in 8051 (simple programs).</p>	
Unit 5	Interfacing Techniques	Hours 12
	<p>IC 8255 IC 8255 – Block Diagram – Modes of 8255.</p> <p>INTERFACING TECHNIQUES Interfacing external memory to 8051– 8051 interfacing with the 8255 – ASM Programming – Relays – Sensor interfacing – ADC 0804 interfacing – DAC interfacing - Keyboard interfacing – Seven segment LED Display Interfacing - Stepper Motor interfacing – DC motor interfacing using PWM</p>	

TEXT BOOK:

1. Microcontrollers, Principles and Applications – Ajit pal – PHI Ltd., - 2011.

REFERENCE BOOKS:

1. 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi, Mazidi and D. MacKinlay, 2006 Pearson Education Low Price Edition.
2. Microprocessor and Microcontroller by R.Theagarajan, Sci Tech Publication, Chennai

Second Semester			
Subject Name: 8051 Microcontroller and Its Interfacing Lab			
Subject Code	GEC-2.2 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. ALP to add, subtract, multiply and divide two 8-bit numbers
2. ALP to add/subtract two 16-bit numbers
3. ALP to add two BCD numbers
4. ALP to count the number of 1's in a given data byte.
5. ALP to find the average of 10 numbers
6. ALP to find the square/cube of a given number

PART B:

1. ALP to arrange a set of data in ascending/descending order
2. Program to find the GCF of two numbers
3. Program to generate Fibonacci series.
4. Program to find LCM of two numbers
5. Program to search an element in an array of N numbers
6. Program to Interfacing simple switch and LED to I/O ports to switch on/off LED with respect to switch status.
7. Program to display number in seven segment LED Display Interfacing

Second Semester			
Subject Name: Computer Networking			
Subject Code	SDC-2.3 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Introduction to Networks.	Hours 15
	Networks–Components: Data Representation, need of network, services. Network models-peer to peer, client server, distributed. Application of network and criteria, Types of connections: Topologies-mesh, star, bus, ring, Categories of Networks -LAN, WLAN, MAN, WAN. Transmission Media: Types, Guided Media: twisted pair cable, coaxial cable, fiber optics, Unguided Media: radio wave, microwave, light wave, infrared and satellite.	
Unit 2	Protocols and standards	Hours 10
	Protocols and standards, standards Organizations, internet standards. Introduction and Description of the OSI model and the TCP/IP protocol suit: the layers in the OSI model – TCP/IP protocol suit.	
Unit 3	Application & Transport layer	Hours 13
	Introduction, Domain Name System, DHCP, TELNET, SMTP, FTP, TFTP, HTTP, SNMP, Telnet- Architecture-Remote Login. Introduction to Socket, Security and cryptography. Duties of transport layer – Multiplexing – Demultiplexing – User Datagram Protocol (UDP) Transmission Control Protocol (TCP) –Port Numbers– Congestion Control,	
Unit 4	Network Layer & Data Link Layer	Hours 10
	Packet switching and datagram approach – IP addressing methods-Address Classes. Subnetting, Routing, ARP.IPV4 and IPV6 format. MAC Addressing, Framing, Error control, Flow control, Ethernet, FDDI, Address Resolution Protocols. IEEE Ethernet standards	
Unit 5	Physical Media	Hours 12

<p>Common LAN Media: STP, UTP, Coaxial cable, Optical fiber, TIA/EIA standards, Making & testing Cable, straight thru Cable, Crossover Cable, Connectors, Jacks, Patch Panels.</p> <p>Wireless Networks Generation -Wireless Transmission Protocols- Wired Vs Wireless Networks, Networking Devices: NIC, Switches, Routers, WiMAX, Wi-Fi devices, Bluetooth.</p>

TEXT BOOKS:

1. Data Communications and Networking (Forth Edition), Behrouz A. Forouzan, Tata McGraw Hill
2. Computer Network by Andrew S. Tanenbaum Pearson

REFERENCE BOOKS:

1. Data Communications and Networks, Achyut S. Godbole, Tata McGraw Hill
2. Complete Reference Networking, Craig Zacker, Tata McGraw Hill
3. Computer Networking, Tularam M Bansod Dreamtech, Wiley
4. Networking + Certification (Second Edition) Microsoft Press PHI(Prentice-Hall of India Private Limited)

Second Semester			
Subject Name: Computer Networking Lab			
Subject Code	SDC-2.3 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. To connect, understand and configure different network devices used in Switches, Routers, Repeaters, Gateways, and Modems.
2. To study the constructional details and properties of transmission media- co-axial cables, twisted pair cables, optical fibre cable.
3. To create network straight and cross cable using RJ 45 connectors.
4. Connections of two hubs by creating cross over connections.
5. Install a network interface card (NIC) and locate mac address of computer

PART B:

1. Build computer LAN, share Data and Printer
2. Establish Peer to Peer network connection using two systems using Switch in a LAN
3. Usage of basic network commands and Network configuration commands - Ipconfig, Ping, Tracer and Net stat utilities to debug the network issues.
4. Design and configure different classes of IP, Subnet Mask and Default Gateway in a System in LAN (TCP/IP Configuration) and share data in Windows & Linux OS.
5. Setting up a work group in windows PC.
6. Configuring IP address and subnet with different Routers and Networks.
7. To identify different problems and troubleshooting of network example- no network, card problem, cable problem, server errors.

Second Semester			
Subject Name: Programming in C			
Subject Code	SDC-2.4 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	C Programming Basics	Hours 15
	Types of Programming Languages, Translators. Need for Logical Analysis and Thinking, Algorithm – Pseudocode – Flowchart, Problem Formulation Problem Solving. Introduction to “C” Programming – Fundamentals – Features of C, Structure of a C Program, Compilation and Linking Processes. C Programming Basic Concepts – Tokens- Identifiers, Keywords, Constants, variable. Data Types – Declaration and initialization of variables, typedef, typecasting. Expressions and Type of operators. Precedence and order of Evaluation Managing Input and Output Operations – Unformatted, Formatted I/O operations- printf and scanf, escape sequence characters.	
Unit 2	Control Statements	Hours 12
	Sequence, Decision Making and Branching – simple if, if-else, nested if – if ladder and elseif ladder, switch- case, Looping Statements-while, for, do-while, Jumping statements- break, continue, exit, goto-labels.	
Unit 3	Arrays and Strings	Hours 13
	Arrays: Initialization, Declaration, One Dimensional and Two-Dimensional Arrays. Searching: linear and binary searching, Sorting: selection and bubble sorting techniques. Matrix operations- addition and multiplication of two matrices. String: Declaration and initialization, String handling functions, character handling functions, Command Line Arguments.	
Unit 4	Functions and Pointers	Hours 10
	Function: User defined and Library functions, Basics of functions, Definition of Function, Declaration of Function, Types of user defined functions, Pass by Value, Pass by Reference, Return values, Recursion. Pointers: Definition, Initialization, Pointers Arithmetic, Pointers and Arrays, Example Problems.	
Unit 5	Structures and Unions	Hours 10
	Introduction, Need for Structure Data Type, Structure Definition, Structure Declaration, Structure within a Structure, Union, Programs Using Structures and Unions, Storage Classes, Pre-processor Directives.	

TEXT BOOKS:

1. E. Balaguruswamy: Programming in ANSI C (TMH)
2. Computer Fundamentals and Programming in C, by Anjay Mittal & Anita-Goel, Pearson

REFERENCE BOOKS:

1. P. K. Sinha & Priti Sinha: Computer Fundamentals (BPB)
2. Kamthane: Programming with ANSI and TURBO C (Pearson Education)
3. V. Rajaraman: Programming in C (PHI – EEE)
4. S. Byron Gottfried: Programming with C (TMH)
5. Yashwant Kanitkar: Let us C
6. P.B. Kottur: Programming in C (Sapna Book House)

Second Semester			
Subject Name: Programming in C Lab			
Subject Code	SDC-2.4 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. Convert the temperature given in Fahrenheit to Celsius
2. Write a C program to Find one's and two's complement of a number
3. Write a C program to Print Floyd's triangle
4. Write a C program to find a given value called Key in a list of N numbers using binary search
5. Write a C program that sorts the list in ascending order by using bubble sort.
6. Write a C program to Add and Multiply two matrices of order $m \times n$

PART B:

1. Write a C program to find the sum of the rows and columns of a matrix.
2. Write a C program to check whether a given square matrix is symmetric or not.
3. Write a C program to Input a string and count the occurrences of vowels in the particular string in the string
4. Write a C program that makes the use of a recursive function to find the factorial of a number.
5. Write a C function that Illustrate the use of built in mathematical function.
6. Write a C program that illustrates the use of structure and union
7. Write a C program that illustrates to Pre-processor Directives

Second Semester			
Subject Name: Digital Electronics			
Subject Code	SDC-2.5 T	CIE Marks	20
No of Hours/Week:	4	SEE Marks	80
Total Hours:	60	Credits	4

Unit 1	Number systems	Hours 15
	Number systems-Introduction– decimal-binary, Octal, Decimal, hexadecimal – interconversion of number system- binary coded decimal - arithmetic operations on binary numbers -addition subtraction- multiplication- division Negative number representation - one’s and two’s complement methods - binary subtraction using two’s complement method. Binary Codes: Classification of Binary codes, BCD code, XS-3 code, Gray code, Error detection and correction codes, Alphanumeric Codes.	
Unit 2	Logic Gates and Boolean Algebra	Hours 12
	Logic Gates: AND, OR, NOT, Universal, XOR, XNOR Gates and truth table. Boolean algebra -important laws and rules (statement only) - Demorgan’s theorems (Statement only) - simplification of expressions Boolean function representations-Standard forms of SOP and POS expressions - K Map up to four variables -Simplification of Boolean expressions using K Map (SOP only)	
Unit 3	Combinational logic circuits	Hours 13
	Adder: Half-Adder, Full Adder, implementation of full adder using two Half adders. Subtractor: Half-Subtractor, Full subtractor implementation of full subtractor using two Half subtractors. Encoder: definition, Decimal to BCD encoder, Decoder: definition, BCD to Decimal Decoder Multiplexers: Definition, 4:1 MUX truth table logic diagram. Demultiplexers: Definition, 1:4 DMUX truth table logic diagram.	
Unit 4	Sequential logic Circuits	Hours 10
	Latch, concept of clock, Flip-flops conversion of RS flip flop to D flip flop and JK flipflop, JK to T flip flop, Application of Flipflops.	

Unit 5	Display Devices	Hours 10
	Principle, Working Mechanism and Applications: Seven Segment Display and its types, Liquid Crystal Display, LED Display, Touch Screen (Resistive and Capacitive), Plasma Display, OLED Display, DLP.	

TEXT BOOKS:

1. Computer System Architecture by M Morris Mano.
2. Computer Organization and architecture by William Stallings

REFERENCE BOOKS:

1. Carl Hamacher et al., Computer Organization and Embedded Systems, 6 ed., McGraw-Hill 2012
2. Digital fundamental by Thomas L. Floyd
3. Digital Electronics by A K Maini
4. Electronic Instrumentation - H.S.Kalsi, 2nd Edition, TMH, 2005

Second Semester			
Subject Name: Digital Electronics Lab			
Subject Code	SDC-2.5 P	CIE Marks	10
No of Hours/Week:	4	SEE Marks	40
Total Hours:	60	Credits	2

LIST OF PRACTICAL PROGRAMS

PART A:

1. Verification of truth tables for AND, OR, NOT gates.
2. Verification of truth tables for EXOR and EXNOR gates
3. Verification of truth tables for NAND and NOR gates.
4. Realization of AND, OR, NOT gates using only NAND gates.
5. Realization of AND, OR, NOT gates using only NOR gates.
6. Verification truth table for Half adder using NAND gates.
7. Verification truth table for Full adder using NAND gates.

PART B:

1. Verification of truth table for Full subtractor using XOR gates and Basic gates
2. Verification truth table for Half subtractor using NAND gates.
3. Verification of truth table for Decimal to BCD Encoder
4. Verification of truth table for BCD to Seven segment display decoder.
5. Verification of Distributive property.
6. Verification of truth table for BINARY TO GRAY conversion using XOR gates
7. Verification of truth table for GRAY TO BINARY conversion using XOR gates
8. Verification of truth table for SR and D Flip-Flop.
9. Verification of truth table for JK and T Flip-Flop.

**Question Paper Pattern for Semester End Examination (SEE)
(Common for I and II Semester)**

SUBJECT NAME

Time: 3 Hours

Max. Marks: 80

Instruction to Candidate: Answer all the Sections

SECTION A

I. Answer any ten of the following questions

(10X2 = 20)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.

SECTION B

II. Answer any five of the following questions

(5X5 = 25)

- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.

SECTION C

III. Answer any five of the following questions

(5X7 = 35)

20.

21.

22.

23.

24.

25.

26.

Question Paper Pattern for General English – I

First Semester: General English-I

Total Marks: 80

Hours: 03

Part-I (Poetry and Prose)

I. Answer any 5 of the following in a sentence each: (5×2=10)

- 1
- 2
- 3
- 4
- 5
- 6
- 7

II. Answer any 4 of the following in about 100 words each: (4×5=20)

- 1
- 2
- 3
- 4
- 5
- 6

III. Answer any 2 of the following in about 200 words each: (2×10=20)

- 1
- 2
- 3
- 4

Part-II(Grammar)

IV. Parts of Speech:

1. Nouns, (2×1=2)
2. Adjectives, (2×1=2)
3. Adverbs, (2×1=2)
4. Prepositions, (2×1=2)
5. Conjunctions (2×1=2)

V. Subject-Verb Agreement (5×1=5)

VI.	Active and Passive Voice	(5×1=5)
VII.	Direct and Indirect Speech	(5×1=5)
VIII.	Articles	(5×1=5)

**Question Paper Pattern:
Second Semester: General English – II**

Total Marks: 80

Hours: 03

Part-I (Poetry and Prose)

- I. Answer any 5 of the following in a sentence each: (5×2=10)**
- 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
- II. Answer any 4 of the following in about 100 words each: (4×5=20)**
- 1
 - 2
 - 3
 - 4
 - 5
 - 6
- III. Answer any 2 of the following in about 200 words each: (2×10=20)**
- 1
 - 2
 - 3
 - 4

Part-II(Communication Skills)

- IV. Verbal and Non-Verbal Communication-, (1×5=5)**
- V. Presentation Skills (1×5=5)**
- VI. Interview Skills- (1×5=5)**
- VII. Email Communication- (1×5=5)**
- IX. Academic Writing-**
1. Essays (1×5=5)
 2. Report Writing (1×5=5)
