

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसचे (बी.व्होक पदवी, अॅडव्हॉस डिप्लोमा, डिप्लोमा व सर्टिफिकेट) अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करणे बाबत.

परिपत्रक

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, विद्यापीठ अनुदान आयोगाने शैक्षणिक वर्ष २०२०-२१ पासून मान्यता दिलेल्या व्होकेशनल कोर्सेसच्या (बी. व्होक पदवी, अॅडव्हॉस डिप्लोमा, डिप्लोमा व सर्टिफिकेट्स) अभ्यासक्रमांना मा विज्ञान व तंत्रज्ञान विद्याशाखेने दिनांक ३१ मे २०२१ रोजीच्या बैठकीतील केलेल्या शिफारशीप्रमाणे व मा. विद्यापरिषदेच्या दिनांक १२ जून २०२१ रोजीच्या बैठकीतील विषय क्रमांक २६/५१-२०२१ च्या ठरावानुसार खालील अभ्यासक्रमांस मान्यता देण्यात आली आहे.

1. B. Voc. IT/Hardware and Networking.
2. B. Voc Software Development.
3. B. Voc. Medical Laboratory Technology.
4. B. Voc. Horticulture and Post-Harvest Technology.
5. B. Voc. Herbal Medicine.
6. B. Voc. Commercial Aquaculture.
7. B. Voc. Food Processing Technology.
8. B. Voc. Skill Based Zoology.
9. B. Voc. Vocational Biotechnology.
10. B. Voc. Plant Tissue Culture Secretary.
11. Advance Diploma Radiological Physics.
12. Diploma – Computer Hardware.
13. Diploma – Computer Network Assistant.
14. Diploma – PGDMLT.
15. Diploma – Embedded System Design.
16. Diploma- Biofertilizer.
17. Diploma- Fisheries and Farm Management.
18. Diploma - Bee Keeping.

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी. ही विनंती.

जा.क्र.:शैक्षणिक-१/परिपत्रक/व्होकेशनल अभ्यासक्रम/N-
२०२०-२१/६८

दिनांक : ०५.०७.२०२१

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

स्वाक्षरित

सहा कुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

Swami Ramanand Teerth Marathwada University, Nanded

(NAAC Re-accredited with 'A' Grade)



Syllabus of

B. Voc. Hardware and Networking (First Year)

(3 years Degree Course)

Introduced from Academic Year 2020-21

TITLE OF THE PROGRAMME

B. Voc. Hardware and Networking

1. Preamble:

Skills and knowledge are the driving forces of economic growth and social development for any country. Presently, the country faces a demand – supply mismatch, as the economy needs more ‘skilled’ workforce than that is available. In the higher education sphere, knowledge and skills are required for diverse forms of employment in the sectors of education, health care, manufacturing and other services.

Government of India, taking note of the requirement for skill development among students, launched National Vocational Education Qualification Framework (NVEQF) which was later on assimilated into National Skills Qualifications Framework (NSQF). Various Sector Skill Councils (SSCs) are developing Qualification Packs (QPs), National Occupational Standards (NOSs) and assessment mechanisms in their respective domains, in alignment with the needs of the industry.

In view of this our University initiated to start skill based courses which are in demand of industries to be carry responsibilities of society. The programme is highly relevant for all those who want to pursue a professional career in software development.

2. Aim:

1. To develop a healthy attitude among students towards work and life.
2. To enhance individual employability.
3. To reduce the mismatch between the demand and supply of skill man-power.
4. To provide an alternative for those intending to pursue higher education without particular interest or purpose.
5. To prepare students for identified vocations spanning several area of activity.
6. An emphasis in vocational education will also be on development of attitudes, knowledge, and skills for entrepreneurship and self-employment.
7. To provide opportunities to fulfil the needs of women, rural and tribal students and the deprived sections of society.
8. To give opportunities for professional growth, career improvement and lateral entry into courses of general, technical and professional education through appropriate bridge courses.

3. Objective:

- (1) To increase the productive potential of the country.
- (2) To raise the economic standard of people.
- (3) To reduce the level of unemployment by providing self- employment schemes.
- (4) To utilize man-power to fullest extent.
- (5) To make the students skilled technician.
- (6) To help for equitable sharing of benefits of economic development to ensure social and economic justice.
- (7) To help students understand the scientific and technological aspects of contemporary civilization.
- (8) To make use of material and human resources.
- (9) To exploit the scientific and technical knowledge for betterment of the society.
- (10) To generate in pupils a love and appreciation for work.

4. Eligibility and Fees

10+2 Pass

5. Program outcome:

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

First Exit Point (Diploma) and Outcome of First Year

1. Apply the fundamental knowledge of the specific skill based trade from the solution of the target skill sector
2. Identify the industry domain related problems at various complexities and analyse the same to formulate sustained conclusion using the principles of domain sectors and technical knowledge.
3. Design or develop the solutions for broad based problems in the target skill based trade to address changing challenges put forward by market demand.
4. Design and conduct technology enabled experiments, analyse the resulting data and interpret the same to provide valid conclusions.

Second Exit Point (Advance Diploma) and Outcome of Second Year

1. Use the techniques, skills and modern tools necessary skill based trade to practice with clear understanding of limitations.
2. Apply broad understanding of ethical and professional skill based trade practice in the context of global, economic, environment and social realities while encompassing relevant contemporary issues.
3. Apply broad understanding of impact of skill based trade in a global, economic, environmental and societal context.
4. Apply ability to develop practical solutions for skill trade problems within positive professional and ethical boundaries.

• Third Exit Point (B. Voc. Degree) and Outcome of Third Year

1. Function effectively as a leader and as well as team member in various multidisciplinary environments.
2. Communicate effectively in oral and written format addressing specific professional or social demands
3. Demonstrate knowledge and understanding of the principles of skill trade and apply these to one's own work as a member and leader in a team, to complete project in any environment.
4. Recognize the need for and have the ability to acquire advance knowledge for addressing the changing technological demands of the target skill trade.

Students will be awarded:

Certificate	Student shall be required to appear in examinations of all courses. However, to award the Certificate a student shall study the minimum of 30 credits course and opt minimum passing credits as per university rule.
Diploma:	Student shall be required to appear in examinations of all courses. However, to award the Diploma a student shall study the minimum of 60 credits course and opt minimum passing credits as per university rule.
Advanced Diploma	Student shall be required to appear in examinations of all courses. However, to award the Advanced Diploma a student shall be required to study minimum of 120 credits course and opt minimum passing credits as per university rule.
B.Voc Degree	Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to study minimum of 180 credits course and opt minimum passing credits as per university rule.

6. Assessment:

The Skill component of the course will be generally assessed by the respective Sector Skill Councils. In case, there is no Sector Skill Council for a specific trade, the assessment may be done by an allied Sector Council or the Industry partner. Further if Sector Skill Council in concerned / relevant trade has no approved QP which can be mapped progressively or due to any other reason, if the SSC expresses its inability to conduct the assessment or cannot conduct the skill assessment in stipulated time frames as per academic calendar, the institutions may conduct skill assessment through a Skill Assessment Board by 'Certified Assessors' as per the provisions enumerated in MHRD Skill Assessment Matrix for Vocational Advancement of Youth (SAMVAY). The Skill Assessment Board may have Vice-Chancellor/Principal/Director/Nodal officer/Coordinator of the programme / Centre, representatives of the partner industry(s), one nominee of the Controller of Examination or his/her Nominee of affiliating University / Autonomous College and at least one external expert. The affiliating university may nominate additional experts on the Skill Assessment Board, if required.

The certifying bodies may comply with / obtain accreditation from the National Accreditation Board for Certification Bodies (NABCB) set up under Quality Council of India

(QCI). Wherever the university/college may deem fit, it may issue a joint certificate for the course(s) with the respective Sector Skill Council(s).

The general education component will be assessed by the concerned university as per the prevailing standards and procedures. General Education credit refers to a unit by which the course work is measured. It determines the number of hours of instructions required per week.

One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week. Accordingly, one Credit would mean equivalent of 14-15 periods of 60 minutes each or 28 – 30 hrs of workshops/ labs. For internship / field work, the credit weighage for equivalent hours shall be 50% of that for lectures /tutorials. For self-learning, based on e-content or otherwise, the credit weighage for equivalent hours of study shall be 50% of that for lectures / tutorials.

The institutions offering B.Voc degree programme should adopt and integrate the guidelines and recommendations of the respective Sector Skill Councils (SSCs) for the assessment and evaluation of the vocational component, wherever available.

Letter Grades and Grade Points: it is recommended to adopt 10- point grading system with the Letter grades as given below:

Grades and Grade Points

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F(Fail)	0
Ab (Absent)	0

Passing percentage for each paper each course is 40%. Separate passing for continuous assessment and end semester examination and/or as per time to time guidelines of the university.

A student obtaining Grade F and Ab shall be considered failed and he/she will be required to reappear in the examination.

Computation of Semester Grade Point Average System (SGPA) and Cumulative Grade Point Average (CGPA):

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the course components taken by a student and the sum of the number of credits of all the courses undergone by a student in a semester, i.e

$$SGPA (S_i) = \frac{\sum(C_i \times G_i)}{\sum C_i}$$

where 'C_i' is the number of credits of the ith course component and 'G_i' is the grade point scored by the student in the ith course component.

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$CGPA = \frac{\sum(C_i \times S_i)}{\sum C_i}$$

Where 'S_i' is the SGPA of the ith semester and C_i is the total number of credits in that semester.

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

The skill component would be taken as one of the course components in calculation of SGPA and CGPA with given credit weightage at respective level.

Swami Ramanand Teerth Marathwada University, Nanded

B. Voc. Hardware and Networking

Syllabus with effective from 2020-2021

Semester I

Sr. No.	Course Code	Course Title	Continuous Assessment Credits (CA)	End Semester Exam Credits (ESE)	Total Credits
General Education					
1	BHN101	Communication Skill -I	2	2	4
2	BHN 102	Fundamentals of Computers	2	2	4
3	BHN 103	Programming Language Paradigm	2	2	4
Skill Courses					
4	BHN 104	Basic Electronics	2	2	4
5	BHN 105	Computer & Network Organization – I	2	2	4
6	BHN 106	Hardware Basics	2	2	4
Practical Skill Courses					
7	BHN 107	LAB1: Basic Electronics Lab.	1	1	2
8	BHN 108	LAB2: Computer & Network Organization Lab.	1	1	2
9	BHN 109	LAB3: Hardware Basics	1	1	2
	Total				30

Semester II

Sr. No.	Course Code	Course Title	Continuous Assessment Credits (CA)	End Semester Exam Credits (ESE)	Total Credits
General Education					
1	BHN 201	Communication Skill -II	2	2	4
2	BHN 202	Environmental Studies	2	2	4
3	BHN 203	Operating System Concepts	2	2	4
Skill Courses					
4	BHN 204	Digital Electronics	2	2	4
5	BHN 205	Computer & Network Organization – II	2	2	4
6	BHN 206	Personal computing software	2	2	4
Practical Skill Courses					
7	BHN 207	LAB4: Digital Electronics Lab	1	1	2
8	BHN 208	LAB5: Computer & Network Organization – II Lab	1	1	2
9	BHN 209	LAB6: Personal computing software	1	1	2
Total					30

SEMESTER-I

Course Code	Course Title	Credits
BHN101	Communication Skill -I	04
Objective	1. To familiarize students with English sounds and phonemic symbols. 2. To enhance their ability in listening and speaking.	
Outcome	1. Listen to lectures, public announcements and news on TV and radio 2. Engage in telephonic conversation 3. Communicate effectively and accurately in English. 4. Use spoken language for various purposes.	
Unit I	Language and communication: Definition of Language, nature of language, Characteristics of Human Language, Varieties of English Language: British, American, Indian, Australian etc., English for specific and special purposes.	
Unit II	Communication: Importance of communication; Animal and human communication; Methods of communication (Verbal & Non-Verbal); Barriers of communication	
Unit III	Oral Communication Basic skills of communication, Listening to and Understanding a) Extended natural speech in business situations, Both face to face and on the telephone. b) Understanding standard American, British and Indian accents., Speaking with correct Pronunciation a) English Consonants b) English Vowels c) Speaking with right accent	
Unit IV	Presentation Skills : 1) Planning and preparing to speak 2) Strategies for making powerful openings in presentations. 3) Body Language 4) Voice Modulations	
Unit V	Other communications a) Meetings b) Group discussions c) Seminars d) Conference e) Interviews	
Suggested Readings	1) DEVELOPING COMMUNICATION SKILLS Krishna Mohan and Meera Bajaj 2) THE STERILING BOOK OF COMMON ERRORS IN ENGLISH Gratian Vass 3) SPOKEN ENGLISH FOR YOU.R.Radha Krishna Pillai and K Rajeevan 4) INDIAN AND BRITISH ENGLISH- A HAND BOOK OF USAGE AND PRONUNCIATION. ParooNihlani, Ray Tongue and Priya Hosali 5) A COURSE IN PHONETICS AND SPOKEN ENGLISH Sethi and Dhamija. 6) ENGLISH PRONUNCING DICTIONARY. Daniel Jones. 7) MACMILLAN’S FOUNDATION ENGLISH.R. K. Dwivedi and A. Kumar	

Course Code	Course Title	Credits
BHN102	Fundamentals of Computers	04
Objectives	<ol style="list-style-type: none"> 1. To understand basics of computer with its working, characteristics, capabilities and limitations. 2. To understand the data representation methods in computers. 3. To understand the working of inputs output devices and memory organization of computer with its hierarchy. 4. To understand working of software, OS and its relationship with hardware. 5. To understand problem solving approach using algorithms and flowcharts. 	
Outcome	<ol style="list-style-type: none"> 1. Students will be able to understand the computer organization and architecture with data representation techniques in computers. 2. Students will be able to understand the working, functions and handling of operating system. 3. Students will be able to understand and design algorithms and flowchart for solving problems. 	
Unit I	Introduction to Computers : Development history of Computers, Computer system concepts, Characteristics, Capabilities and limitations, Classification of Computers - Micro, Mini Mainframe, Super Computer, PC, Server, Workstations, Generations of Computers, Basic components of a computer system – CU, ALU, CPU, Block diagram of computer, Von Neumann Architecture, Instruction Execution Cycle. Data representation in computers - Bit, Byte, KB, MB, TB, 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 II	Input Output Devices: Input Devices Keyboard, Mouse, Direct Entry Devices - Card readers, scanning devices (BAR CODE, OMR, MICR), Voice input devices, Light pen, Touch Screen, Scanner, Output Devices: Printers and their types - Impact and Non-impact printers, CRT, LCD, CD-WRITTER, DVD, Web Camera, Modem	
Unit III	Computer Memory Organization: Concept of computer memory, Memory types and its hierarchy – RAM, ROM, EPROM, PROM, Cache memory Flash Memory, Virtual memory, Secondary memory storage devices - HDD, SDD, Magnetic tapes, Pen drives.	
Unit IV	Softwares and Operating System Concept of operating system, Functions of OS, Types of OS-Batch Processing, Single User, Multi User, Multiprogramming, Multi-Tasking, Introduction of Windows and DOS, booting process, file & directory structure, Basic DOS Commands, Concept of Software, Types of Software–System software, Application software, Utility Software, Demoware, Shareware, Freeware, Firmware, Programming languages–Machine, Assembly, High Level, 4GL, Compilers, Interpreters, Assemblers, Linkers, Loaders.	

Unit V	<p>Computer Program Planning using Algorithms and Flowcharts</p> <p>Purpose of program planning, Algorithm, Definition and properties, algorithm steps with some examples, Flowchart, Principles of flowcharting, Flowcharting symbols, Converting algorithms to flowcharts, levels of flowchart, advantages and limitations of flowchart.</p>
Suggested Readings	<ol style="list-style-type: none"> 1. Fundamentals of Computers By V. Rajaraman and Neeharika 6th Edition PHI Learning Pvt. 2. Computer Fundamentals By Pradeep K. Sinha &Priti Sinha, 6th Edition, BPB Publication. 3. Computer Fundamentals, By Anita Goel, Pearson Education India, First edition. 4. Fundamentals of Computers By Reema Thareja, Oxford University Press, 2nd Edition 5. Fundamentals of Computer Algorithms, By Horowitz Ellis, SatranjSahani, 2nd Edition. 6. Operating System Concepts By Abraham Silberschatz, Peter Galvin

Course Code	Course Title	Credits
BHN103	Programming Language Paradigm	04
Objective	<ol style="list-style-type: none"> 1. To understand the concept of programming languages and its features. 2. To understand basic paradigms of programming languages with variables, data types, decision making and control flow statements for designing the computer program. 3. To understand concepts of object orientation, data abstraction and implementation 	
Outcome	<ol style="list-style-type: none"> 1. Students will be able to understand general features of Computer Languages 2. Students will be able to use Functional Programming language to solve the problems 3. Students will be able to understand and implement the concepts of object orientation, data abstraction 	
Unit I	Introduction : Programming Languages and Paradigms, Programming language spectrum, Programming Environments, Functional Programming Language, Basic LISP Primitives, Procedure definition and binding, Predicates and Conditional, Procedure Abstraction and Recursion	
Unit II	Data types and Control Flow: Introduction, Primitive Data Types, Character String Types, User defined Ordinal types- Enumeration & Sub range types, Array types, Associative Arrays, Record types, Union Types, Pointer and Reference Types, Control Flow Expression Evaluation, Structured and Unstructured Flow, Sequencing, Selection, Iteration, Recursion	
Unit III	Subprograms and Implementing subprograms: Fundamentals of subprograms, Design issues for subprograms, Local referencing environments, Parameter passing methods, Parameters that are subprograms, Overloaded subprograms, Generic subprograms, , Co-routines, Semantics of Calls and Returns	
Unit IV	Programming language based on Logic (Turbo Prolog): Introduction, Facts, Objects and Predicates, Variables, Using Rules, Input and Output, Controlling execution – fail, repeat and cut predicate, Arithmetic operations, Compound objects, Dynamic database, Lists, Strings, Files	
Unit V	Names, Scopes, and Bindings : The Notion of Binding Time, Object Lifetime and Storage Management, Scope Rules, The meaning of Names in a Scope, The Binding of Referencing Environments, The Binding of Referencing Environments, Macro Expansion	
Suggested Readings	<ol style="list-style-type: none"> 1. Concepts of Programming Languages By Robert W. Sebesta, 8th Edition, Pearson Education. 2. Programming Language Concepts By Carlo Ghezzi, Mehdi Jazayeri, 3rd Edition, Wiley Publication 3. Programming Languages: Concepts and Constructs By Sethi Ravi, Pearson 2nd Edition 4. LISP By Patrick Henry Winston & Berthold Klaus Paul Horn, Addison Wesley Publishing Company 3rd Edition 5. Introduction to Turbo Prolog By Carl Townsend, Sybex Inc, U.S., 2nd Revised edition 	

Course Code	Course Title	Credits
BHN104	BASIC ELECTRONICS	04
Objective	1. To enable students to learn about Analog electronics technologies 2. To implement analog technologies in circuit tracing 3. To uses analog electronics technologies in circuit tracing, troubleshooting and maintenance.	
Outcome	Basic electronics enable the students to learn about Analog electronics technologies, their implementation, uses, circuit tracing, troubleshooting and maintenance	
Unit I	Current Electricity: Definition of Resistance, Voltage, Current, power, Energy and their units, Relation between electrical and mechanical units, Temperature variation of resistance, Difference between AC and DC voltage and current. D.C. Circuits: Ohm's Law, Series – parallel resistance circuits, calculation of equivalent resistance.	
Unit II	Capacitors: Capacitor and its capacity, Concept of charging and discharging of capacitors, Types of Capacitors and their use in circuits. Overview of Atom, Sub-Atomic Particles and CRO: Brief History of Electronics. Atom and its elements, Electron, Force, Field intensity, Potential, Energy, current Electric field, Magnetic field, Motion of charged particles in electric and magnetic field. Overview of Multimeter and CRO.	
Unit III	Resistors, Inductors. Voltage and Current sources, Symbols and Graphical representation, Cells and Batteries, Energy and Power. 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 and 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 IV	Bipolar Junction Transistor: Operation of NPN and PNP Transistors, Biasing of BJT. CB, CE and CC configuration. Introduction to FET, JFET, MOSFET, CMOS and VMOS	
Suggested Readings	1. Fundamentals of Electrical and Electronics, B.L. Thereja 2. Principles of Electronics, V.K Mehta 3. Basic Electronics, S. Biswas, Khanna Publishing House (AICTE Recommended Textbook)	

Course Code	Course Title	Credits
BHN105	Computer & Network Organization – I	04
Objective	The objective of this course is to familiarize students with Fundamentals of network organizations	
Outcome	It enables the student to get practical exposure towards networking organizations	
Unit I	Basic Network Concepts, Network Operating Systems, Types of Networks, Network Interface Card, Hub, Cables, Expansion Devices, Wireless Networking, Connecting a Peer-to-Peer Network, Setting Up Windows Networking, Installing the NIC Driver, Installing the Clients and Protocols.	
Unit II	Networking devices like repeaters, NIC, Hub, Switches, Routers, Bridges, transmission media STP, UTP, networking cabling, color coding and crimping.	
Unit III	Development of Internet, network architecture, How internet works, browsers, servers, ISP concept, Network Addressing scheme MAC, IP address.	
Unit IV	Computer Communication and Networking concepts, Forms of data transmission; Analog and Digital Communication channels, Bandwidth; Narrow, voice & broad band, Data transmission Media - Wire, Fiber optics, Cable, Satellite, Microwave, Telephone network, Different Networking Topology. Study of OSI Networking Model, Data Travels through the OSI Layers	
Suggested Readings	<ol style="list-style-type: none"> 1. Understanding Computers - Dineshkumar 2. Computer Fundamentals – P. K. Sinha 3. Computer Networks – Andrew S. Tanenbaum - (Prentice Hall of India). 4. Basics of Networking - Prentice Hall of India & NIIT. 	

Course Code	Course Title	Credits
BHN106	Hardware Basics	04
Objective	At the end of the program the students will be able to understand the fundamentals of Hardware	
Outcome	Student will be able to understand the operations of basic PC hardware.	
Unit I	Introduction to computer hardware, components of mother boards & its types-ports, slots, connectors, add on cards,	
Unit II	Power supply units, cabinet types. Storage devices. Primary & secondary storage medium	
Unit III	Magnetic disc, RAM, ROM, PROM, EPROM, Floppy, CD Rom, CDRW, DVD, Virtual memory, Cache memory, Linear & Physical memory, video memory.	
Unit IV	Input devices-keyboard, mouse, types of mouse, joy stick, how input is taken in & given out, gaming device	
Unit V	Output devices- monitors-different types of monitors, printers & its types, projectors,	
Suggested Readings	<ol style="list-style-type: none"> 1. Mastering PC Hardware & Network, Dr. Ajit Mittal, Dr. Ajay Rana, Khanna Publishing House 2. How Computers Work, Ron White 3. Modern TFT & LCD Monitor Introduction and Troubleshooting, BPB Publication 4. Service Manual Mother Board & Laptop, GT Publication 5. Fundamental of Computer, V. Rajaraman 6. Computer Fundamentals, R.S. Salaria, Khanna Publishing House (AICTE Recommended Textbook – 2018) 	

Course Code	Course Title	Credits
BHN107	LAB1: Basic Electronics Lab.	02
List of Experiments	<ol style="list-style-type: none"> 1. Identification of different symbols and their components. 2. Demonstration on the function of Digital Multimeter and voltage, current, resistance measurement by Multimeter. 3. Demonstration of CRO and its use. 4. Component checking methodology by Multimeter. 5. Checking of phase, neutral and earthing of AC supply line. 6. Equivalent resistance identification when they are in series, parallel and series / parallel combination 7. Verification of Ohm's Law. 8. Characteristics of PN junction Diode 9. Experiment on Half wave rectifier by using Diode 10. Experiment on Full wave rectifier by using Diode 11. Basic concept of soldering, de soldering, demonstration on different soldering methods, practice of solder removal, replacement of components. 12. Characteristics of BJT 13. Characteristics of JFET 	
	<p>Practical : 40 Internal Assessment : 10 Total Marks : 50</p>	

Course Code	Course Title	Credits
BHN108	LAB2: Computer & Network Organization – I Lab.	02
List of Experiments	<ol style="list-style-type: none"> 1. Installation of Network card and drivers. 2. Network cable color coding. 3. Crimping of network Cable. 4. Creation of different network w.r.t. topologies. 5. Assigning and study of address scheme in devices. 6. Study Application, presentation, session layers. 7. Study of Transport and network layer. 8. Study of Data Link and physical layers. 9. Study of MAC address. 10. Implementation of IP address in LAN. 	
	<p>Practical : 40 Internal Assessment : 10 Total Marks : 50</p>	

Course Code	Course Title	Credits
BHN109	LAB3: Hardware Basics	02
List of Experiments	<ul style="list-style-type: none"> ▪ Prepare System Case for Assembly. <input type="checkbox"/> Checking SMPS and fit with system Case. <input type="checkbox"/> Plan System Layout. <input type="checkbox"/> Install Hard Disk Drive/DVD-RW Drive. <input type="checkbox"/> Configure Motherboard. <input type="checkbox"/> Install Processor. <input type="checkbox"/> Install Memory Modules/Motherboard/I/O Port Connectors/PS/2 Mouse Port Connector <input type="checkbox"/> Connect Motherboard and Case <input type="checkbox"/> Connect Hard Disk Drive/ DVD-RW Drive to Motherboard. <input type="checkbox"/> Install Video Card. <input type="checkbox"/> Perform Post-Assembly Inspection. <input type="checkbox"/> Connect External Peripherals. <input type="checkbox"/> Perform Initial Boot/Initial BIOS Setup/Initial System Tests/Additional Peripherals. <input type="checkbox"/> Partition and Format Hard Disk. <input type="checkbox"/> Complete Assembly. <input type="checkbox"/> Installation of Windows (Client version) <input type="checkbox"/> Installation and configuration of driver software <input type="checkbox"/> Installation of Linux (Client version) <input type="checkbox"/> Updating Service Pack of O.S. <input type="checkbox"/> Installation of Anti Virus Software(Well known) <input type="checkbox"/> Updating Anti Virus Software. <input type="checkbox"/> Document System. 	
	<p>Practical : 40 Internal Assessment : 10 Total Marks : 50</p>	

SEMESTER-II

Course Code	Course Title	Credits
BHN201	Communication Skill –II	04
Objective	<ol style="list-style-type: none"> 1. To enhance learner’s communication skills by giving adequate exposure (use of language lab) in listening and speaking skills and the related sub-skills. 2. To create learner’s confidence in oral and interpersonal communication by reinforcing the basics of pronunciation. 3. To help learners to recognize and make use of sentence structures in English 	
Outcome	<ol style="list-style-type: none"> 1. Students will be aware of listening and speaking skills and the related sub-skills. 2. They can focus a lot on listening style to be the better speaker of English language 	
Unit I	Reading: Reading and understanding business letters, Reports and memos. Reading and understanding scientific texts. Reading a dictionary, thesaurus, and encyclopedia. Reading passages and poems.	
Unit II	Writing : Letters- Formal and Informal, Note taking and note making, Reports, Curriculum Vitae, Making advertisements for newspapers, Rearranging the jumbled sentences.	
Unit III	Use of Grammar and usage reference sources: Morphology: Word formation processes, Word classes, Phrase, Clause and Sentence, Punctuation and Capitalization. Common errors in the use of English.	
Unit IV	Aspects of Communication a) Communication through body language: i) Eye contact. ii) Gesture. iii) Posture. b) Communication through Technology: Email and PPT	
Unit V	Written Communication a) Comprehension c) Composition c) Précis Writing	
Suggested Readings	<ol style="list-style-type: none"> 1. Balasubramaniam, T. 1981. A Textbook of Phonetics for Indian Students. New Delhi: Macmillan. 2. Sethi, J. & P. V. Dhamija, 1997. A Course in Phonetics and Spoken English. New Delhi, Prentice-Hall. 3. Crystal, David. 1985. Rediscover Grammar with David Crystal Longman. 4. Bakshi, R. N. A Course in English Grammar Orient Longman. 	

Course Code	Course Title	Credits
BHN202	Environmental Studies	04
Objective	1. To create better understanding about the deteriorating condition of our environment among students	
Outcome	1. <i>Have better awareness and concern about current environmental issues</i> 2. <i>Develop a healthy respect and sensitivity to environment</i> 3. <i>Develop pride in social and environmental activism.</i>	
Unit I	The Multi-disciplinary Nature of Environmental Studies: Definition, scope and importance, Need for Public Awareness, Ecology and Ecosystems: Definition of Ecology, Structure and function of an ecosystem, Producers.	
Unit II	Consumers and Decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristics features and function of – forest ecosystem, grassland ecosystem, desert ecosystem, aquatic ecosystem(ponds, streams, lakes, rivers, oceans, estuaries)	
Unit III	Biodiversity and its conservation: Introduction, genetic, species and ecosystem diversity definition, value of biodiversity, biodiversity at global, national and local levels, India as a mega diversity nation, hot spots of biodiversity, threats to biodiversity – habitat loss, poaching of wild life, man wild life conflicts, endangered and endemic species of India	
Unit IV	Social issues and the environment: From unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, water shed management, resettlement and rehabilitation of people- it's problems and concerns, case studies, environmental ethics- environmental value relationships, environmental ethics and species preservation, climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocaust, case studies, waste land reclamation, consumerism and waste products, legislation to protect the environment, environmental protection act, air(prevention and control of pollution) act, water(prevention and control of pollution) act, wild life protection act, forest conservation act, environmental management systems (EMS),	
Suggested Readings	1. Kiran B Chokkas and others : "Understanding Environment", Sage 2004 2. P. VenugopalaRao, Environmental Science & Engineering, PHI 3. Benny Joseph: Environmental Studies, Tata McGraw Hill 4. Lester R Brown, Plan B: rescuing a Planet under stress and a civilization in trouble, Orient Longman Kurien Joseph & R Nagendran, Essentials of Environmental Studies, Pearson	

Course Code	Course Title	Credits
BHN203	Operating System Concepts	04
Objective	1. To understand the Resources used in Operating System 2. To aware the working of DOS, Windows and Linux Operating system 3. To analyze the system using the various commands of O.S.	
Outcome	1. Students are able to execute the commands and interpret the outcome 2. Students are able to install, repair the operating systems 3. Students are able use various system calls	
Unit I	Overview of Operating System: Operating System Concepts, Operating System Structure, Operating system as resource manager, Types of Operating systems and File systems: FAT16, FAT32, NTFS, Ext2, Ext3, SWAP, RAID.	
Unit II	Working of DOS, Windows and Linux Operating System : Introduction to DOS , Installation of DOS6.2, Introduction to windows, Installation of various windows versions, Installation of Linux, Introduction to Virtual Box, creation of Virtual Machines for DOS, Linux and windows using Virtual Box, Components of Windows GUI Environment, Components of Linux GUI Environment	
Unit III	DOS Commands : DOS internal Commands: MD, RD,CD, Date, Time, CUT, COPY, DIR, Type, REN, CLS, Path, VER,VOL, DEL, Prompt, Copy Con. External Commands: Sort, Find, Xcopy, Attrib, Format, Edit, label, diskcopy, chkdsk, tree, doskey, backup, restore.	
Unit IV	Linux commands : LS, tar, Man,CP, CAL, Date, Time, CAT, dig, grep, fgrep, egrep, alais,cd, chmode, chown, curl, df, diff, echo,, exit, find, finger, free, gzip, head, history, kill,mkdir, mv, passwd, ping, ps, pwd, shutdown, sudo, top, uname, whoami.	
Unit V	System calls: What is system call, need of system calls, how system call works, types of system calls, examples of system calls.	
Suggested Readings	1. Abraham Silberschatz, Peter B. Galvin, G. Gagne, “Operating System Concepts”, Sixth Edition, Addison Wesley Publishing Co., 2003 2. Stuart E Madnik and John J Donovan, “Operating Systems”, MGH Publications 3. DuCharme, B. (1994). The Operating Systems Handbook: UNIX, OpenVMS, OS/400, VM and MVS. United Kingdom: McGraw-Hill. 4. Mark G. Sobell, A Practical Guide to Linux Commands,Editors, and Shell Programming” PHI Publication SECOND EDITION 5. Helmut Torns Dorf “MS-DOS for beginners” Abacus Data Becker Book	

Course Code	Course Title	Credits
BHN204	Digital Electronics	04
Objective	To enable the students to learn about Digital electronics technologies, their implementation, uses, circuit tracing, troubleshooting and maintenance	
Outcomes	Digital electronics enable the students to learn about Digital electronics technologies, their implementation, uses, circuit tracing, troubleshooting and maintenance	
Unit I	Number Systems and Boolean Algebra: Basics of Analog and Digital Boolean algebra, De-morgan's law, Truth tables. Logical Circuits Logic gates: AND, OR, NOT, NOR, NAND, XOR, XNOR	
Unit II	Combinational Circuits: Arithmetic Circuits: Half adders, Full adders , Half Subtractor, Full Subtractor, Data Processing Circuits: Encoders, Decoders, Multiplexers, De-Multiplexers	
Unit III	Latches and Flip-Flops: Concept of Latches, Types of Latches SR latch. SR Flip Flop, JK Flip Flop, D Flip flop, T Flip Flop, Master Slave J-K Flip Flop. Introduction to counters, Types of counters, Asynchronous and Synchronous. Introduction to shift registers, types of shift registers	
Unit IV	Introduction to Display Devices: LED, LCD, 7 segment display, Integrated Circuits and Memories, Introduction to IC's, Importance and applications, Linear and Digital IC's .Introduction to SSI, MSI, LSI and VLSI (Terminology & Definitions). Memory Organization and Operations, RAM, ROM, PROM, EPROM, EEPROM.	
Suggested Readings	<ol style="list-style-type: none"> 1. Digital Circuits and Logic Design, S.Salivahanan 2. Digital Electronics, S.Salivahanan 3. Digital computer electronics, Malvino and Brown 4. Digital Electronics, R.Anand, Khanna Publishing House (AICTE Recommended Textbook) 	

Course Code	Course Title	Credits
BHN205	Computer & Network Organization – II	04
Objective	The objective of this course is to familiarize students with Fundamentals of network organizations	
Outcomes	It enables the student to get practical exposure towards networking organizations	
Unit I	Designing and implementing LAN in a peer-peer network with data sharing and security.	
Unit II	Install Windows 2003 Server, Configure a Server Client, Set Up a Windows 7 Client. Administering Server- Administer User Accounts, Add, Modify Delete or Disable a User Account	
Unit III	Windows 2003 Security Groups, Create Groups, Maintain Group Membership, Create and Administer Shares, Share Security, Map Drives.	
Unit IV	Installing Linux in a Server Configuration - Install Red Hat Linux, Linux Systems Administration - Use Linuxconf, Manage Users, Add Users, Remove or Edit Users, Change Root's Password, Configure Common Network Settings, Change Your Host Name, The / /hosts File.	
Suggested Readings	<ol style="list-style-type: none"> 1. Computer Networks – Andrew S. Tanenbaum - (Prentice Hall of India). 2 Working with Windows 2000 Server - Prentice Hall of India & NIIT. 3. Basics of Networking - Prentice Hall of India & NIIT. 4. Networking – A beginner’s Guide – Bruce A. Hallberg (TMH) 5. Introduction to Operating System - (Prentice Hall of India) & NIIT). 6. Troubleshooting your PC by M. David Stone & Alfred Poor 7. The complete PC upgrade & maintenance guide by Mark Minasi 	

Course Code	Course Title	Credits
BHN206	Personal computing software	04
Objective	The objective of this course is to familiarize students with Fundamentals of Information Technology and its applications.	
Outcomes	It enables the student to get practical exposure towards MS- Office tools	
Unit I	<p>DOS : Versions of DOS: Booting sequence; Warm and Cold Reboot, Concept of File and directory , Redirecting command input and output pipes, Wildcard characters, Types of DOS commands: Internal and External; Internal Commands: DIR, MD, CD , CLS, COPY, DATE, DEL, PATH, PROMPT, REN, RD, TIME, TYPE, VER, VOL; External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FIND, SYS , FORMAT, CHKDSK, DISKCOPY, LABEL, MOVE, TREE, DELTREE, DEFRAG, SCANDISK, UNDELETE. Batch Files: Introduction to simple batch files; Introduction to CONFIG.SYS and AUTOEXEC.BAT files. Graphical User Interface: Fundamentals of windows, types of windows, anatomy of windows, Icons, Recycle bin Operations on window: Opening a Window, Minimizing and Maximizing a window, Moving window, Resizing Window, Closing the window windows explorer Folders: Creating and deleting folders, copying, renaming folders, folder properties. Control panel: Customizing screens, Screen colors, Patterns, Spacing icons, selecting time/date, setting the Sound, Concept of menu Using Help, Creating Short cuts, Basics of Window Setup, Notepad, Window Accessories, System restore. Customizing printing, changing the print queue, configuring the printer, adding printers. Working with fonts: changing, removing, adding, customizing mouse and keyboard use. System properties and the device manager Management tools, DOS sessions, Explorer, Memory configuration, Safe mode Install and uninstall applications, Setup/troubleshooting issues. Maintaining and optimizing disks: Disk Cleanup, Disk defragmenter, Compressing and uncompressing folders and files. Encrypting and decrypting folders and files.</p>	
Unit II	<p>Word Processing Package: Basics of Word Processing; Opening and Closing of documents; Text creation and Manipulation; Finding and replacing text, Printing of document, Formatting of text; Margin setting, Adding Borders and shading, Adding Headers and Footers, Setting up Multiple columns, Working with tables, Spell check, Grammar facility, Auto text, language setting and thesaurus; Mail merging. Installation of Word Processing Software.</p>	
Unit III	<p>Spreadsheet Package : Worksheet Basics, Data Entry in Cells: Entry of numbers, text and formulae, Moving data in a worksheet, Moving around in a worksheet, Selecting Data Range, Using the Interface (Toolbars, Menus), Editing Basics, Working with workbooks, Cell referencing; Formatting and Calculations: using Auto fill, Working with Formulae, Efficient Data Display with Data formatting (number formatting, date formatting etc.), Working with Ranges, Worksheet Printing; Working with Graphs and Charts : Creating Embedded Chart using chat</p>	

	wizard, sizing and moving parts, updating charts, Changing chart types, Chart wizard, Adding Titles, Legends and Gridlines, Printing Charts; Database Management. Finding records with Data form, Adding/Deleting Records, Filtering Records in a worksheet; Functions and Macros: Worksheet Creating Macros, Recording Macros, Running Macros, Assigning Macros to Buttons, Defining Macros from Scratch. Multiple Worksheets. Installation of Spreadsheet software.
Unit IV	Presentation Packages: Basics, General Features, Creating a presentation, formatting and enhancing text, Incorporation of Animation, adding charts, multimedia, page setup and printing slides. Installation of Presentation software. Internet and WWW: Evolution of Internet, services provided on Internet, Access Methods, application of Internet.
Suggested Readings	<ol style="list-style-type: none"> 1. Mathur Rajiv, 1996: Learning Word 6 for Windows Step-by-Step, Galgotia. 2. Mathur Rajiv, 1996: Learning Excel 5 for Windows Step-by-Step, Galgotia. 3. Jamsa, Kris A., 1993: Rescued by Windows 3.1, Galgotia. 4. Basandra, S.K., 1995 Computers Today, Galgotia. 5. Kasser, Barbara, 1998: Using the Internet, PHI, 4th ed., New Delhi. 6. Wall, David A. & Others, 1996: Using the World Wide Web, PHI, 2nd ed., New Delhi. 7. Darril Gibson, Microsoft Windows Networking Essentials 1st Edition. 8. Ramesh Bangia, 2017, PC Software Made Easy, Khanna Publishing House 9. Mastering Excel, Khanna Publishing House

Course Code	Course Title	Credits
BHN207	LAB4: Digital Electronics	02
List of Experiments	<ol style="list-style-type: none"> 1. Verification of truth tables of Logic Gates 2. Verification of Universal Gate (NAND & NOR). 3. Construction and study of Half adder. 4. Construction and study of Full adder 5. Construction and study of Half Subtractor. 6. Construction and study of Full Subtractor 7. Study of Decoder 8. Study of Encoder 9. Study of MUX. 10. Study of DEMUX. 11. Study of Flip Flop 12. Study of Counter 13. Study of Register 	

Course Code	Course Title	Credits
BHN208	LAB5: Computer & Network Organization – II Lab	02
List of Experiments	<ol style="list-style-type: none"> 1. Creation of a LAN with IP address. 2. Data sharing in a LAN. 3. Data security in a LAN. 4. Installation of windows 2003 server. 5. Installation of AD in server. 6. Creating users. 7. Creating user groups. 8. Modify / delete users. 9. Installation of linux server. 10. Creating, managing users. 	

Course Code	Course Title	Credits
BHN209	LAB6: Personal computing software Lab	02
List of Experiments	<ol style="list-style-type: none"> 1. Create Directory in DOS (MD Command) 2. Create File in DOS (COPY CON Command) 3. Apply internal DOS commands DIR, CD, CLS, COPY, DATE, DEL, PATH, REN, RD, TYPE, VER) 4. Apply External DOS Commands(XCOPY,ATTRIB,MOVE,TREE) 5. Create Folders and Files in Windows Desktop 6. Apply Commands such as COPY,CUT,PASTE,DELETE,RENAME on Files and Folders 7. Create a Word document and type your own bio data, save and format the document 8. Apply bold, italic, underline, font and other formats in a document 9. Create a table with multiple rows/columns and enter tabular data 10. Apply mail merge feature in MS Word 11. Create excel database and save the worksheet 12. Apply auto sum in a numeric range in a database 13. Create different charts such as Line, Column, Bar, Pie from suitable example database 14. Apply filter to extract records (Auto Filter/Advanced Filter) 15. Create a presentation with multiple slides and save the presentation 16. Apply different slide transitions 17. Apply different animations on the slide objects 	