॥ 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

25
1994 - 2019
SILVER JUBILEE YEAR

ACADEMIC (1-BOARD OF STUDIES) SECTION

संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे **CBCS Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक ०८ जून २०१९ रोजी संपन्न झालेल्या ४४व्या मा. विद्या परिषद बैठकीतील ऐनवेळचा विषय क्र.११/४४–२०१९** च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९–२० पासून लागू करण्यात येत आहेत.

1. Agricultural Microbiology	18. Dyes and Drugs
2. Agrochemicals & Fertilizers	19. Electronics
3. Analytical Chemistry	20. Environmental Science
4. B.C.A.	21. Fishery Science
5. B.Voc. (Food Processing, Preservation and Storage)	22. Food Science
6. B.Voc. (Web Printing Technology)	23. Geology
7. Biochemistry	24. Horticulture
8. Bioinformatics	25. Industrial Chemistry
9. Biophysics	26. Information Technology (Optional)
10. Biotechnology (Vocational)	27. Mathematics
11. Biotechonology	28. Microbiology
12. Botany	29. Network Technology
13. Chemistry	30. Physics
14. Computer Application (Optional)	31. Software Engineering
15. Computer Science (Optional)	32. Statistics
16. Computer Science	33. Zoology
17. Dairy Science	

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–०१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/
२०१९–२०/२९२
दिनांक : ०३.०७.२०१९.

स्वाक्षरित/–
उपकुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

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) सहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

Swami Ramanand Teerth Marathwada University, Nanded
(NAAC Re-accredited with 'A' Grade)

Syllabus of

B.Sc. Network Technology (3 years) (Revised CBCS pattern)

Introduced from Academic Year 2019-20

B.Sc. Network Technology

B.Sc. Network Technology (3years) program / degree is a specialized program in computer network. It builds the student on studies in applied use of networks and to become competent in the current race and development of new networking era. The duration of the study is of six semesters, which is normally completed in three years.

CBCS pattern

The B.Sc. Network Technology program as per CBCS (Choice based credit system) pattern, in which choices are given to the students under open electives and subject electives. The students can choose open electives from the wide range of options to them.

Eligibility and Fees

The eligibility of a candidate to take admission to **B.Sc. Network Technology** program is as per the eligibility criteria fixed by the University. More details on admission procedure and fee structure can be seen from the prospectus of the college / institution as well as on website of the University.

Credit Pattern

Every course has corresponding grades marked in the syllabus structure. There are 24 credits per semester. A total of 144 credits are essential to complete this program successfully. The Grading pattern to evaluate the performance of a student is as per the University rules.

Every semester has a combination of Theory (core or elective) courses and Lab courses. Each theory course has 04 credits which are split as 03 external credits and 01 internal credit. The university shall conduct the end semester examination for 03 external credits. For theory internal credit, student has to appear for 01 class test (15 marks) and 01 assignment (10 marks). Every lab course has 02 credits which are split as 01 external credit and 01 internal credit. For lab internal credit, the student has to submit Laboratory Book (05 marks) and remaining 20 marks are for the Lab activities carried out by the student throughout the semester. For lab external credit, 20 marks are reserved for the examinational experiment and 05 marks are for the oral / viva examinations.

The open elective has 04 credits which are purely internal. If students are opting for MOOCs as open elective , then, there must be a Faculty designed as MOOCs course coordinator who shall supervise learning through MOOCS. This is intentionally needed as the MOOCs course coordinator shall verify the MOOC details including its duration, staring date, ending date, syllabus contents, mode of conduction, infrastructure feasibility, and financial feasibility during start of each semester. This is precautionary as the offering of the MOOCs through online platforms are time specific and there must be proper synchronization of semester duration with the MOOCs duration. Students must opt for either institutional / college level open elective or a course from University recognized MOOCs platforms as open electives.

The number of hours needed for completion of theory and practical courses as well as the passing rules, grading patterns, question paper pattern, number of students in practical batches, etc shall be as per the recommendations, norms, guidelines and policies of the UGC, State Government and the SRTM University currently operational. The course structure is supplemented with split up in units and minimum numbers of hours needed for completion of the course, wherever possible.

Under the CBCS pattern, students would graduate **B.Sc. Network Technology** with a minimum number of required credits which includes compulsory credits from core courses, open electives and program specific elective course. All students have to undergo lab / practical activities leading to specific credits and project development activity as a part of professional UG program.

1. **B.Sc. Network Technology Degree** / program would be of 144 Credits. Total credits per semester= 24
2. Each semester shall consist of three core courses, one elective course, one open elective course and two practical courses. Four theory courses (core+elective) = 16 Credits
3. Two practical / Lab courses= 4 Credits in total (02 credits each) , One Open elective= 4 credit
4. One Credit = 25 marks , Two Credits = 50 Marks, Four Credits = 100 Marks

PEO, PO and CO Mappings

1. **Program Name** : B.Sc.(NT)

2. **Program Educational Objectives**: After completion of this program, the graduates / students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in **Computer Networking** based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

3. **Program Outcome(s):** Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.
PO2: Generate solutions for various connectivity issues using LAN-MAN-WAN, etc
PO3: Design component, or processes to meet the needs within realistic constraints.
PO4: Identify, formulate, and solve problems using computational temperaments.
PO5: Comprehend professional and ethical responsibility in computing profession.
PO6: Express effective communication skills.
PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.
PO9: Knowledge of contemporary issues and emerging developments in computing profession.
PO10: Utilize the techniques, skills and modern tools, for actual development process
PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work
PO12: Research insights and conduct research in computing environment.

4. **Course Outcome(s):** Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

5. **Mapping of PEO& PO and CO**

Program Educational Objectives	Thrust Area	**Program Outcome**	Course Outcome
PEO I	Technical Expertise	PO1,PO2,PO3,PO6	All core courses
PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

Year	Semester	Course category	Course Code	Course Title	Credits * *(split up will be given separately)
First	**First**	Core Course	BNT-101	Basics of Computer System and Hardware	04
		Core Course	BNT-102	Programming in C	04
		Core Course	BNT-103	Basics of Computer Network	04
		Chose any one from the below Elective courses			
		Elective Subject	BNT-104 A	Introduction to TCP/IP	04
			BNT-104 B	Cisco Certified Entry Networking Technician (CCENT)	
		Chose any one Open Elective courses			
		Open Elective	BNT-105 A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR	04
			BNT-105 B	Applied English OR Business Communication	
		Lab / Practical	BNT-106	C Programming	02
			BNT-107	Based on Elective course	02
Total					**24**
First	**Second**	Core Course	BNT-201	Operating System Concepts	04
		Core Course	BNT-202	Web Technology	04
		Core Course	BNT-203	Fundamentals of Linux	04
		Chose any one from the below Elective courses			
		Elective Subject	BNT-204A	Office Automation	04
			BNT-204B	Network Operating System's Administration (NOSA)	
		Chose any one Open Elective courses			
		Open Elective	BNT-205A	University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses OR	04
			BNT-205B	Functional English OR Corporate English	
		Lab / Practical	BNT-206	Linux OS and Web Technology	02
			BNT-207	Based on Elective course	02
Total					**24**
For skill enhancement, if any, in all semesters, online course with internal credits is mandatory					

Code: BNT-101	First semester	**Basics of Computer System and Hardware**	Credits: 04

Course Objectives:
1. Study of motherboard components.
2. Basics knowledge of computer evolution.
3. Managing Hardware Devices.
4. Study of Computer Languages

Course Outcome:
1. Design, install, configure, troubleshoot and manage components of computer systems.
2. Apply basic knowledge of Hardware Devices.
3. Install, manage, and maintain Computer System.
4. Best Practices for Computer assembling.

Unit-1:	**Introduction**

Characters of computers, The Evolution of computer, generations of Computer, Classification of computers, Basic computer organization.

Unit-2:	**Hardware Component on Motherboard**

Mother Board and its types, Types of HDD, Types of RAM, Types of Chipsets, Microprocessor and its type, IDE and SATA cables, Other parts on motherboard.

Unit-3:	**Input Output Devices**

Input devices, Point-and-draw devices, Data scanning devices, Digitizer, Electronic card reader Output device, Monitors, Printers, Plotters, Screen image projector.

Unit-4:	**Processor & Memory**

Central processing unit, The control unit, Arithmetic logic unit, Instruction sets, Registers, Processor speed, Types of processors, The main memory, Storage evaluation criteria, Main memory organization

Unit-5:	**Secondary Storage Devices**

Sequential and Direct-Access Devices, Magnetic tape, Basic principles of operation Types of magnetic tapes, Advantages & disadvantages of magnetic tapes, Uses of magnetic tapes, Magnetic disks.

Unit-6:	**Computer Languages**

Machine Language, Advantages & Limitations of Machine Language, Assembly Language Assembler, Advantages & limitations of Assembly Language, Level Language Compiler, Linker, Interpreter, Advantages & limitations of high level language.

Reference Books	
1.	Fundamental of Computer –By Pradeep K.Sinha and Priti Sinha
2.	Fundamental of Computer System-Low Price Edition.
3.	Computer Fundamental –By Rajaraman PHI publication

Code: BNT-102	First semester	**Programming in C**	Credits: 04

Course Objectives:
1. It is general purpose and procedure oriented programming language. In which we are able to develop OS and MAC operating system, application software and programming languages. Programming Language are also used to build students logic for programming.

Course Outcome:
1. To study of structure of programming languages, structure of c program.
2. To study different keyword for making program.
3. To develop programs using operators and control statement.
4. To describe an array.
5. Student are able to develop application software.

Unit-1:	**Introduction to Programming in C**

History, Application Areas, Algorithms, Flowcharts, Structure of a C program, Compilers and Interpreters

Unit-2:	**C Tokens**

Keywords, Variables, Primary Data types, Operators, Formatted I/O Statement, Gets(), Puts(), Getc(), Putc(), Unformatted I/O Statement, Printf(), scanf()

Unit-3:	**Decision Making Statement & Looping Statement**

If Statement, If- else Statement, Nested if –else Statement, Switch Statement, For Loop, While Loop, Do-while Loop, Nested for Loop, Break, goto and Continue

Unit-4:	**Array and Structure**

Arrays, Array declaration, initialization, One dimensional Array, Two dimensional Array, Passing arrays to functions

Unit-5:	**Function in C**

Functions in C, What is a function?, User defined functions, Declaration, Definition, Function calling, Storage Classes, Recursion, What is String?, Standard String library functions

Unit-6:	**Structures and Unions**

What is Structures?, Creating structures, Accessing structure members (dot Operator), Array of structures, Unions, Creating File, Types of File, Operation on File, Random Access to File

Reference Books	
1.	Complete C Reference – Herbert Schildt (Thomson learning publications)
2.	The C Programming language – Kernighan and Ritchie
3.	Structured Programming approach using C – Forouzan and Gilberg,
4.	Pointer in 'C' Kanetkar Yashavant P. (BPB Publication)

Code: BNT-103	First semester	**Basics of Computer Network**	Credits: 04

Course Objectives:
1. Study of Network Topology.
2. To introduce basic concepts and functions of modern network devices.
3. To understand various transmission media.
4. Study of multiplexing techniques.

Course Outcome:
1. t Design, install, configure, troubleshoot and manage components of computer systems.
2. Apply basic knowledge of Network Devices.
3. Install, manage, and maintain LAN & WAN
4. Best Practices to design network setup.

Unit-1:	Introduction

Uses of computer Networks, Network Hardware- LAN, MAN, WAN, Wireless Networks, Network Software-Protocol Hierarchy

Unit-2:	LAN Hardware

Network Interface Card, Twisted Pair Cable, Coaxial Cable, Fiber optic cable, Network Topologies- Bus, Ring, Star, Tree and other Topologies, Networking Devices – Repeaters, Bridges, Routers, Gateways, Hub and Switch.

Unit-3:	Multiplexing, Switching

Multiplexing – Time division and Frequency division, Switching, Circuit Switching, Packet Switching, Message Switching

Unit-4:	Network Standards and Network protocols

OSI reference model, TCP/IP reference model, IP protocol, SMTP, PPP, FTP, HTTP, SNMP. IP-addresses, Concept of DNS.

Unit-5:	Internet

Definition, Internet verses Intranet, Internet Service Provider, E-mail–Architecture and Services, WWW-Client side and Server side, URL, Messenger, Search Engine.

Unit-6:	LAN Software

Client-Server Model, File Server, Database Server, Print Server, DHCP Server, DNS Server, Peer-TO-Peer Networks

Reference Books	
1.	Gerd E. Keiser", Local Area Networks", Tata McGraw Hill Edition, New Delhi.
2.	Andrew S. Tannenbaum, "Computer Networks", (Third Edition), Prentice-Hall of India Pvt. Ltd, New Delhi.

Code: BNT-104 A Elective	First semester	**Introduction to TCP/IP**	Credits: 04

Course Objectives:
1. Study of Internet Services.
2. Understanding of how connection oriented and connectionless network operate.
3. Understanding networking Protocols.
4. Study of Network technologies.

Course Outcome:
1. Design, install, configure, troubleshoot and manage components of Network.
2. Apply basic knowledge of TCP/IP protocols.
3. Install, manage, and maintain for Ethernet technology
4. Best Practices for IP Configuration Settings

Unit-1:	**Introduction**

The motivation for Internetworking, The TCP/IP Internet, Internet services, History and scope of the Internet, The Internet Architecture Board, Application level Interconnection, properties of the Internet, Network level Interconnection, Internet Architecture.

Unit-2:	**Reviews of Underlying Network Technologies**

Introduction, Connection oriented & connectionless Services, WAN, LAN, Ethernet Technology- 10 Base 5,10 Base 2, 10 Base T, Fiber Distributed Data Interconnection (FDDI).

Unit-3:	**Internet Protocol**

Introduction, Universal Identifiers, Three Primary classes of IP- addresses, The concept of Unreliable Delivery, Connectionless Delivery system, The purpose of the Internet Protocol, The Internet Datagram

Unit-4:	**Reliable Stream Transport Service (TCP)**

Introduction, the Need for Stream delivery, Properties of the reliable delivery service, providing reliability, The Idea behind Sliding Window, The Transmission Control Protocol, TCP Frame Format.

Unit-5:	**Internet Protocol - Connectionless Data gram Delivery**

Introduction. A Virtual Network, Internet Architecture and Philosophy, The concept of Unreliable Delivery, Connectionless Delivery system, The purpose of the Internet Protocol, The Internet Datagram

Unit-6:	**Internetworking Concepts and Architectural Model**

Introduction, Application level Interconnection, properties of the Internet, Network level Interconnection, Internet Architecture, ARP, RARP.

Reference Books	
1.	Internetworking with TCPIIP, PriDc, T, les, Protocols & Architecture - Douglas E. Comer

Code: BNT-104 B Elective	Second semester	**Cisco Certified Entry Networking Technician (CCENT)**	Credits: 04

Course Objectives:
1. Understand different types of networks, various topologies and application of networks.
2. Understand types of addresses, data communication
3. Understand the concept of networking models, protocols, functionality of each layer.

Course Outcome :
1. Learn basic networking hardware and tools.
2. Practice to design peer to peer network
3. Practice to design Client Server Network

Unit-1:	**Introduction**

Network Essentials , Network Definitions , Network Topologies, Network Categories, The OSI Reference Model, Functions and Advantages, The Layers, Network Components, Protocol Data Units

Unit-2:	**Ethernet Fundamentals**

Ethernet History, Ethernet Characteristics, Frame Types and Addressing, Media Access, Data Flow, Ethernet Standards, Peer to Peer Network, Client Server Model.

Unit-3:	**Switching**

Switch Fundamentals, Physical Features, Switch Initialization Functions, Duplex and Speed, Switch Modes, Switch Design Considerations, Switch Installation and Connections, Looping and STP, VLANs

Unit-4:	**Routing Essentials and IP Addressing**

Routing Fundamentals , Routing Logic and Data Flow , Routed and Routing Protocols , An Introduction to IP Addressing , IP Address Construction, IP Address Classes , IP Address Technologies

Unit-5:	**Branch design and WAN**

Basic terminology, Connection with IPsec, Connection with DSL, Connection with VPN, Multicast Mac & IP address, Multicast solution, version of IGMP, Implementing multicast, Multicast routing protocol

Unit-6:	**Network Media and Devices**

Network Media, Media Terminology, Copper Cabling ,Fiber Cabling , Network Devices, NICs, Transceivers, Repeaters, and Hubs , Bridges and Switches , Routers , Security Devices

Reference Books	
1.	Cisco CCENT CCNA icnd1 100-101 Wendell Odam

Code: BNT-105 A	First semester	**Open Elective**	Credits: 04
University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses			

OR

Code: BNT- 105 B	First semester	**Applied English**	Credits: 04
Course Objectives :			
1. To make a comprehensive use of English in day-to-day life. 2. To help Students develop the ability to learn and contribute critically. 3. To develop the writing skills of the students. 4. To help the students to understand the basic usages of English.			
Course Outcome :			
By the end of this course students should be able to: 1. Understand and demonstrate Basic English usages for their different purposes. 2. Clear entrance examination and aptitude tests. 3. Write various letters, reports required for professional life.			
Unit-1:	**Morphology**		
Morphology: Free & Bound Morphemes, Word Formation Processes, Morphological Analysis of words			
Unit-2:	**Grammar in day-to-day use:**		
Word Classes: Open and Closed Word Classes, Phrase: Types and functions of the phrases			
Unit-3:	**Auxiliary Verbs**		
Verbs: Primary Auxiliary and Secondary Auxiliary, Usages and Functions of modal auxiliaries, Questions using Model Auxiliaries			
Unit-4:	**Transformation of Sentences**		
Voice: Active & Passive, Speech: Direct & Indirect			
Unit-5:	**Error Detection**		
Determiners: Article, Quantifiers and Demonstratives, Subject – Verb Agreement			
Unit-6:	**Tenses and their usages**		
Simple Present, Simple Past, Simple Future			
Reference Books			
1.	Modern English Grammar-L. S. Deshpande (creative Publication)		
2.	A Practical English Grammar- A. J. Thomson. (Oxford University)		
3.	Macmillan Foundation English. - R. K. Dwivedi & a. Kumar (Mammalian India Ltd)		
4.	Writing English for You- G. Radhakrishna Pillai (Emerland Publication)		
5.	High School English Grammar & Composition - Wren & Martin (S. Chand)		
6.	Radiance Communication Skills- Editorial Board (SRTM University) Orient Black Swan.		
7.	English Grammer and Composition – Rejendra Pal and Prem Lata Suri (Sultan Chand and Sons)		

<center>**OR**</center>

Code: BNT-105 B	First semester	**Business Communication**	Credits: 04

Course Objectives :
1. To make a comprehensive use of English in day-to-day life.
2. To help Students develop the ability to learn and contribute critically.
3. To develop the writing skills of the students.
4. To help the students to understand the basic usages of English.

Course Outcome :
        By the end of this course students should be able to:
1. Understand and demonstrate Basic English usages for their different purposes.
2. Clear entrance examination and aptitude tests.
3. Write various letters, reports required for professional life.

Unit-1:	**Basic English Grammar**

Noun, Verb, Adjective, Adverb

Unit-2:	**Sentence Elements**

Elements of sentences and their structures, Clauses: - Noun, Adjective, Adverb, Sentence: - Simple, Compound, Complex

Unit-3:	**Morphology**

Affixes, Processes of Word Formation: Major and Minor Processes, Morphological Analysis of words

Unit-4:	**Writing Skills**

Essay Writing, Email Writing, Resume

Unit-5:	**Oral Communication**

Group Discussion, Seminars and Conferences, Interview

Unit-6:	**Situational English**

Dialogue Writing, Role Playing, Story Telling

Reference Books	
1.	Modern English Grammar-L. S. Deshpande (creative Publication)
2.	A Practical English Grammar- A. J. Thomson. (Oxford University)
3.	Macmillan Foundation English. - R. K. Dwivedi & a. Kumar (Mammalian India Ltd)
4.	Writing English for You- G. Radhakrishna Pillai (Emerland Publication)
5.	High School English Grammar & Composition - Wren & Martin (S. Chand)
6.	Radiance Communication Skills- Editorial Board (SRTM University) Orient Black Swan.
7.	English Grammer and Composition – Rejendra Pal and Prem Lata Suri (Sultan Chand and Sons)

Code: BNT-106	First semester	**C Programming**	Credits: 02
	Practical List:		

1. Program to demonstrate Basic structure of C Programming
2. Program to demonstrate Data Types
3. Program to demonstrate Operators
4. Program to demonstrate I/O Statement
5. Program to demonstrate Decision Making statement
6. Program to demonstrate Looping Statement
7. Program to demonstrate Break, Continue
8. Program to demonstrate goto statement
9. Program to demonstrate Array
10. Program to demonstrate two dimensional array

Code: BNT-107	First semester	**TCP/IP**	Credits: 02
	Practical List:		

1. Study of Hardware Component on Motherboard
2. Study of Assemble a Computer System.
3. Study of Installing Windows 7 OS
4. Study of Transmission Medias – Twisted Pair Cable, Co-ax Cable, Fiber-optic Cable.
5. Cable Coding (Straight Over, Crossover)
6. Study of Network Devices.
7. Study of IP address
8. Study of Internet & e-mail
9. Creating e-mail account
10. Study of folder sharing

OR

Code: BNT-107	First semester	**CCENT**	Credits: 02
	Practical List:		

1. Study of Hardware Component on Motherboard
2. Study of Assemble a Computer System.
3. Study of Installing Windows 7 OS
4. Study of Transmission Medias – Twisted Pair Cable, Co-ax Cable, Fiber-optic Cable.
5. Cable Coding (Straight Over, Crossover)
6. Study of Network Devices.
7. Study of IP address
8. Study of drive map
9. Study of Remote connections
10. Study of Team viewer software

Code: BNT-201	Second semester	**Operating System Concepts**	Credits: 04

Course Objectives:
1. To introduce basic concepts and functions of modern operating systems.
2. To understand the concept of process and thread management.
3. To understand the scheduling of processes and threads.
4. To understand various Memory Management techniques.

Course Outcome:
1. Fundamental understanding of the role of Operating Systems.
2. To understand the various memory management techniques
3. To apply the cons of process/thread scheduling
4. To understand the concept of a process and thread.

Unit-1:	**Introduction**

What Operating System Do – 1) User View 2) System View 3) Defining OS, Computer System Organization, Computer System Architecture – 1) Single Processor System 2) Multiprocessor System, Extended Machine Concept, Operating System Structure, An Operating System Resource Manager

Unit-2:	**System Structure**

Operating System Services, User Operating System Interface – 1) Command Interpreter 2) GUI, System Boot, System Calls, Types of System Calls – 1) Process Control 2) File Management 3) Device Management 4) Information Maintenance 5) Communication 6) Protection

Unit-3:	**Processor Management**

Process Concept – 1) The Process 2) Process States 3) Process Control Block, Process Scheduling – 1) Scheduling Queues 2) Schedulers 3) Context Switching, Scheduling Algorithms – 1) FCFS 2) SJF 3) Priority Scheduling 4) Round-Robin Scheduling.

Unit-4:	**Memory Management**

Introduction, Contiguous Memory Allocation 1) Memory Allocation 2) Fragmentation, Paging 1) Basic Method 2) Hardware Support, Segmentation 1) Basic Method 2) Hardware Support.

Unit-5:	**Multithreaded Programming**

Overview, Multithreading Models, Thread Libraries – pthreads.

Unit-6:	**File System**

t File concept, Access Methods- 1) Sequential 2) Direct, Directory and Disk Structure- 1) Directory Overview 2) Single Level Directory 3) Two Level Directory 4) Tree Structure Directory, Allocation Methods- 1) Contiguous Allocation 2) Linked Allocation 3) Indexed allocation, Free Space Management- 1) Bit Vector 2) Linked List 3) Grouping 4) Counting.

Reference Books	
1.	Operating System - Achyut Godbole, Atul Kahate

Code: BNT-202	Second semester	**Web Technology**	Credits: 04

Course Objectives:
1. To improve the skill to create the static web page.
2. To develop the ability to create the dynamic web pages.
3. To enhance the ability of Insert a graphic within a web page.
4. To improve the skills to Create, validate and publish a web page.

Course Outcome :
1. The ability to understand, analyse and design various websites.
2. Student are able to develop websites, webpages.

Unit-1:	**Introduction of HTML Documents**

Historical Roots of HTML, Web page, Website, Structure of HTML documents and Basic Tags: HTML, HEAD, TITLE, BODY, Formatting Tags: Paragraph Tags, List tags, HR Tag., Headings Tags, PRE tag, DIV tag, SPAN tag., FONT Tag, ADDRESS tag, MARQUEE tag., Text-Level Elements & other different formatting tags.

Unit-2:	**Technologies for Web Application**

WWW, Web browser, U.R.L. concept, Web server, Web protocols: HTTP, FTP, Telnet, Hyperlink (Anchor) Tag & it's all attributes, Creating Email Hyperlinks (using mail to anchor)

Unit-3:	**Use of Image And Table**

The Role of Images on the Web, tag & it's all attributes, Using Images create a links, Tables in HTML:- TABLE, TR, TH, TD tag with example, table with all Attributes

Unit-4:	**Basic Interactivity and DHTML**

Frames in HTML: FRAMESET & FRAME tags & its attributes, Simple Frame Example. Forms in HTML: Introduction to forms, FORM element & it's attributes (Action, Method (GET, POST), Name), Form controls: Text Controls, Password Field, Multiline Text Input, Pull-Down Menus, Check Box, Radio Buttons, Scrolled List, Reset Button and Submit button.

Unit-5:	**DHTML & CSS**

Introduction of DHTML, Ramifications of DHTML, Rollover Buttons, Introduction to Cascading Style Sheets, Embedded Styles, Inline Styles, Imported/External Styles.

Unit-6:	**Introduction to Java Script**

Introduction of JAVA Script, Adding script to documents with example, Variables, Use of different variable, Input and Output statements of JAVA Script

Reference Books	
1.	HTML The complete Reference (2nd Edition Thomas A Powel Tata McGraw Hill publication)
2.	The complete Reference (HTML & XHTML)- 5th Edition Thomas A Powel Tata McGraw Hill publication

Code: BNT-203	First semester	**Fundamentals of Linux**	Credits: 04

Course Objectives :
1. The main objective of Linux Operating system is to introduce students with basic concepts of Open source code operating system.
2. To family's students with file and directory structure of Linux with commands and utilities, their processes and resources with graphical and command line interface
3. To brief the student about software management and network interface in Linux OS

Course Outcome :
1. Appreciate the role of open source operating system as System software.
2. Learner will handle Linux OS for software development, web server and database administration for their carrier.

Unit-1:	**Introduction to Linux**

History of Linux, features of Linux, flavors of Linux, H/w and s/w requirements of Linux, installation of Linux, Linux kernel, Linux Boot loader

Unit-2:	**Working with Linux**

Logging into and working with Linux , Linux Shells, Changing user information, Changing File permission, Working with editors, virtual Console , Backup strategies , Backup S/w and media , Backup H/w media

Unit-3:	**Linux Commands and Utilities**

cat touch vi ls mkdir cd mv grep cal date rm rmdir dd du fdisk mount umount at batch ps kill jobs alias chmod chown chsh useradd usermod userdel groupadd groupdel ifconfing ping netstat route write wall mail mesg preloginmesg motd lp lpr lpc lpq lpstat zip unzip tar cpio gzip gunzip

Unit-4:	**System Administration**

managing users and groups, system services and runlevels, managing s/w with RPM, controlling services with administrative tools, starting and stopping services manually

Unit-5:	**The X Window System**

Basic X Concepts, Using XFree86, Starting X, Selecting and Using X Window Managers.

Unit-6:	**Managing Services**

Fedora Core Linux Boot Process, System Services and Run levels, Controlling Services at Boot with Administrative Tools, Starting and Stopping Services Manually.

Reference Books	
1.	Red Hat Linux and Fedora Unleashed – By Bill Ball and Hoyt Duff.

Code: BNT-204 A **Elective**	Second semester	**Office Automation**		Credits: 04

Course Objectives :

The main objective of Office Automation is to enhance and upgrade the existing system by increasing its efficiency and effectiveness. It will simplify the task and reduce the paper work means the software improves the working methods by replacing the existing manual system with the computer-based system.

Course Outcome :

After completion of this course student will be able to understand the computer software, hardware, made available to simplify and automate a variety of office operations such as data processing, data manipulating and data presentation with various application those are presents in Microsoft office tools packages.

Unit-1:	**Introduction to MS-Word**

Word 2010 Basics: - Opening screen of MS-word, uses of MS-word, Home menu- font tab, paragraph tab, styles tab, editing options in MS-Word, Header and Footer tool, custom dictionary, printing in MS-Word.

Unit-2:	**Working with Tables and Columns**

Creating table, entering text in a table using table tools, changing column's width with autofit, gridlines, merging cells, table formatting –sorting tables, copying tables and deleting tables, mail-merge.

Unit-3:	**Working With MS-Excel**

Introduction to MS-Excel, Working with spreadsheet, formatting spreadsheet, working with Formulas and Functions, Goal seek, data validation, Conditional Formatting.

Unit-4:	**Creating and Formatting Charts**

Introduction to charts, creating charts, Formatting charts, Exploring charts.

Unit-5:	**Working with Microsoft power point**

Opening Screen of MS PowerPoint, creating a new presentation based on template, design template and blank presentation, slide Transition, custom Animation effects, slide show, adding audio and video on slides.

Unit-6:	**Introduction to MS-Access**

Opening screen of MS-Access, performing Queries, Generating the report, creating the database in Access, creating forms and adding new records in MS-Access.

Reference Books	
1.	Microsoft Office 2010, PBP Publication by Prof. Satish Jain, M. Geetha, Kratika
2.	Microsoft office 2000 by Rebecca J. Fiala
3.	Working in Microsoft Office by TATA McGraw-Hill Edition.

Code: BNT-204 B Elective	Second semester	**Network Operating System's Administration (NOSA)**	Credits: 04

Course Objectives:
1. Understand different types of networks, various topologies and application of networks.
2. Understand Network file system.
3. Understand the concept of Proxy Server, Disk quotes, functionality of each Protocol.

Course Outcome:
1. Learn basic network management tools.
2. Practice to design server installation.
3. Practice to design NAT.

Unit-1:	**Introduction**

Network Standards & documentation, Packets & Encapsulation, CIDR, Private address &NAT Routing, Routing tables, ICMP Redirector, PPP Protocol, Packet forwarding.

Unit-2:	**Network File System**

Existing protocols, Expansion, Congestion, Maintenance & documentation, The Network File System, General information about NFS, Web NFS, File Locking, Disk quotes, Dump NFS Station

Unit-3:	**Routing Protocols**

Routing daemons & routing protocols, Distance vector protocol, Link State protocol, Network design Issues

Unit-4:	**Network management & debugging**

Troubleshooting, Network Management Protocol, RMON: Remote Monitor MIB

Unit-5:	**Internet Server**

Network Management Application, Internet Servers, and Caching Proxy Servers, Firewall.

Unit-6:	**Web Hosting**

Network architecture v/s Building Architecture, Web hosting, Web hosting basics, HTTP server installation, Virtual Interfaces.

Reference Books	
1.	UNIX System Administration Hand book III rdBy. EviNeimeth, Garth Snyder, Scott Seebags.

Code: BNT-205 A	First semester	**Open Elective**	Credits: 04
University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses			

OR

Code: BNT-205 B	Second semester	**Functional English**	Credits: 04

Course Objectives:
1. A comprehensive use of English in day-to-day life.
2. To help Students develop the ability to learn and contribute critically.
3. To develop the writing skills of the students.
4. To help the students to understand the basic usages of English.

Course Outcome:
> **By the end of this course students should be able to:**
1. Understand and demonstrate Basic English usages for their different purposes.
2. Clear entrance examination and aptitude tests.
3. Write various letters, reports required for professional life.

Unit-1:	**Business Correspondence**

E-mail Writing: Invitation, job, Essay Writing: Types, Structures etc., Resume, Bio-data, and CV.

Unit-2:	**Reading Comprehension**

Basic Approaches for understanding English, Para Jumbles

Unit-3:	**Practical Grammar**

Basic usages of Tenses, Auxiliaries (Modal and Primary), Phrasal Verbs

Unit-4:	**Vocabulary**

One-word substitution, Idioms and Phrases, Synonyms and Antonyms, Spelling Mistakes

Unit-5:	**Sentence Formation**

Sentence Completion/ Fillers, Paragraph Completion, Sentence Improvements, Cloze Test

Unit-6:	**Day-to-Day-English**

Describing persons, objects or things, Narrating Pictures, Talking about places and recipes, Expression opinions

Reference Books	
1.	Modern English Grammar-L. S. Deshpande (creative Publication)
2.	A Practical English Grammar- A. J. Thomson. (Oxford University)
3.	Macmillan Foundation English. - R. K. Dwivedi & a. Kumar (Mammalian India Ltd)
4.	Writing English for You- G. Radhakrishna Pillai (Emerland Publication)
5.	High School English Grammar & Composition - Wren & Martin (S. Chand)
6.	Radiance Communication Skills- Editorial Board (SRTM University) Orient Black Swan.
7.	English Grammer and Composition – Rejendra Pal and Prem Lata Suri (Sultan Chand and Sons)

OR

Code: BNT-205 B	Second semester	**Corporate English**	Credits: 04

Course Objectives:
1. A comprehensive use of English in day-to-day life.
2. To help Students develop the ability to learn and contribute critically.
3. To develop the writing skills of the students.
4. To help the students to understand the basic usages of English.

Course Outcome:
> **By the end of this course students should be able to:**
1. Understand and demonstrate Basic English usages for their different purposes.
2. Clear entrance examination and aptitude tests.
3. Write various letters, reports required for professional life.

Unit-1:	**Practical usage of English**

Group Discussion, Seminar and Conference, Interview

Unit-2:	**Business Communication**

E-mail and Cover letter writing, Resume and CV, Report writing

Unit-3:	**Fundamentals of English**

Articles, Prepositions, Conjunctions, Quantifiers

Unit-4:	**Basic Structures**

Phrases, Clauses, Sentence: Basic Structures

Unit-5:	**Phonetics**

Vowel Sounds in English, Consonants in English, Phonetic Transcription of the words

Unit-6:	**Practical English**

Questioning: Formal and Informal ways, Introducing oneself and others, Oral Presentations

Reference Books

1.	Modern English Grammar -L. S. Deshpande (creative Publication)
2.	A Practical English Grammar - A. J. Thomson. (Oxford University)
3.	Developing Communication Skills.- Krishna Mohan & Meera Banerji (Macmillan India Ltd)
4.	Macmillan Foundation English. - R. K. Dwivedi & a. Kumar (Mammalian India Ltd)
5.	Writing English for You- G. Radhakrishna Pillai (Emerland Publication)
6.	High School English Grammar & Composition - Wren & Martin (S. Chand)
7.	Radiance Communication Skills- Editorial Board (SRTM University) Orient Black Swan

Code: BNT-206	Second semester	**Linux OS and Web Technology**	Credits: 02
	Practical List:		

1. Installation of Linux
2. Study of files and directory related commands
3. Study of process and resources related commands
4. Study of compression and decompression commands
5. Study of communication commands
6. Introducing Web Browser and Concept of URL
7. Write a programme to structure of HTML
8. Write a programme on formatting tags
9. Write a programme on Font, Address, Marquee Tag
10. Write a programme to anchor tag with all attributes

Code: BNT-207	Second semester	**Office Automation**	Credits: 02
	Practical List:		

1. Study of Microsoft Office
2. Study of Open Office
3. Study of Libre office
4. Study of MS-Word
5. Study of Mail Merge
6. Study of MS-Excel
7. Study of Excel formulas
8. Study of Microsoft power point
9. Study of MS-Access
10. Study of Creating query and creating report in MS-Access

OR

Code: BNT-207	Second semester	**Network Operating System's Administration (NOSA)**	Credits: 02
	Practical List:		

1. Study of Web Browsers
2. Study of Web Servers
3. Study of Private and Public IP Address
4. Study of DNS
5. Study of Proxy Server
6. Study of Network Management Software
7. Study of HTTP Server
8. Study of Web Hosting
9. Study of Disk quotas
10. Study of Network Troubleshooting commands