पाठ्य प्लान
या परिप्रेक्ष्यात सर्व संविधानसंग्रह कल्पित कार्यसंग्रहात येथे कोणते किरेले, दिनांक 08 जुन 2019 रोजी संपन्न द्वालेल्या 44व्या म. विद्या परिषद बैठकसंग्रह ऐनवेल्डा विषय क्र.२२/४४-२०१९ ज्ञा उट्यावनुसार प्रस्तुत विद्यापीठात यलेल्या महाविद्यालयातील विज्ञान व तंत्रज्ञान विद्याशाखातील पदवी सर्वाधिकारी प्रमाण कथ्याचे खालील विषयांना C.B.C.S. (Choice Based Credit System) Pattern नुसारे अभ्याससंग्रह शैक्षणिक वर्ष 2019-20 पाचून लागू करण्यात येऊ आहेत.

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

The B.Sc. Network Technology program 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, staning 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

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

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**

<table>
<thead>
<tr>
<th>Program Educational Objectives</th>
<th>Thrust Area</th>
<th>Program Outcome</th>
<th>Course Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEO I</td>
<td>Technical Expertise</td>
<td>PO1, PO2, PO3, PO6</td>
<td>All core courses</td>
</tr>
<tr>
<td>PEO II</td>
<td>Successful Career</td>
<td>PO4, PO5, PO11,</td>
<td>All discipline specific electives courses</td>
</tr>
<tr>
<td>PEO III</td>
<td>Hands on Technology and Professional experience</td>
<td>PO8, PO10</td>
<td>All Lab courses</td>
</tr>
<tr>
<td>PEO IV</td>
<td>Interdisciplinary and Life Long Learning</td>
<td>PO7, PO9, PO12</td>
<td>All open electives and discipline specific electives</td>
</tr>
<tr>
<td>Year</td>
<td>Semester</td>
<td>Course category</td>
<td>Course Code</td>
</tr>
<tr>
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</tr>
<tr>
<td>First</td>
<td>First</td>
<td>Core Course</td>
<td>BNT-101</td>
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<tr>
<td></td>
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<td>Core Course</td>
<td>BNT-102</td>
</tr>
<tr>
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<td></td>
<td>Core Course</td>
<td>BNT-103</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective courses</td>
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<tr>
<td></td>
<td></td>
<td>Elective Subject</td>
<td>BNT-104 A</td>
</tr>
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<td></td>
<td></td>
<td>Elective Subject</td>
<td>BNT-104 B</td>
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<tr>
<td></td>
<td></td>
<td>Open Elective</td>
<td>BNT-105 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open Elective</td>
<td>BNT-105 B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab / Practical</td>
<td>BNT-106</td>
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<tr>
<td></td>
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<td>BNT-107</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td>First</td>
<td>Second</td>
<td>Core Course</td>
<td>BNT-201</td>
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<td>Core Course</td>
<td>BNT-202</td>
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<tr>
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<td>Core Course</td>
<td>BNT-203</td>
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<tr>
<td></td>
<td></td>
<td>Elective courses</td>
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<td></td>
<td>Elective Subject</td>
<td>BNT-204 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective Subject</td>
<td>BNT-204 B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open Elective</td>
<td>BNT-205 A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open Elective</td>
<td>BNT-205 B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lab / Practical</td>
<td>BNT-206</td>
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<td>BNT-207</td>
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<tr>
<td><strong>Total</strong></td>
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</tbody>
</table>

For skill enhancement, if any, in all semesters, online course with internal credits is mandatory.
<table>
<thead>
<tr>
<th>Code: BNT-101</th>
<th>First semester</th>
<th>Basics of Computer System and Hardware</th>
<th>Credits: 04</th>
</tr>
</thead>
</table>

**Course Objectives:**
1. Study of motherboard components.
2. Basics knowledge of computer evolution.
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.

**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**

**Reference Books**
1. Fundamental of Computer –By Pradeep K.Sinha and Priti Sinha
3. Computer Fundamental –By Rajaraman PHI publication
<table>
<thead>
<tr>
<th>Code: BNT-102</th>
<th>First semester</th>
<th><strong>Programming in C</strong></th>
<th>Credits: 04</th>
</tr>
</thead>
</table>

**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)
<table>
<thead>
<tr>
<th>Code: BNT-103</th>
<th>First semester</th>
<th><strong>Basics of Computer Network</strong></th>
<th>Credits: 04</th>
</tr>
</thead>
</table>

**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. 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**
<table>
<thead>
<tr>
<th>Code: BNT-104 A</th>
<th>First semester</th>
<th><strong>Introduction to TCP/IP</strong></th>
<th>Credits: 04</th>
</tr>
</thead>
</table>

**Course Objectives:**
1. Study of Internet Services.
2. Understanding of how connection oriented and connectionless network operate.
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)

**Unit-5:** Internet Protocol - Connectionless Datagram 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, PriDe, T les, Protocols & Architecture - Douglas E. Comer
<table>
<thead>
<tr>
<th>Code: BNT-104 B</th>
<th>Second semester</th>
<th><strong>Cisco Certified Entry Networking Technician (CCENT)</strong></th>
<th>Credits: 04</th>
</tr>
</thead>
</table>

**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**

**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
<table>
<thead>
<tr>
<th>Code: BNT-105 A</th>
<th>First semester</th>
<th>Open Elective</th>
<th>Credits: 04</th>
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</table>

**University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses**

**OR**

<table>
<thead>
<tr>
<th>Code: BNT-105 B</th>
<th>First semester</th>
<th>Applied English</th>
<th>Credits: 04</th>
</tr>
</thead>
<tbody>
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</table>

**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-I: Morphology**

Morphology: Free & Bound Morphemes, Word Formation Processes, Morphological Analysis of words

**Unit-II: Grammar in day-to-day use:**

Word Classes: Open and Closed Word Classes, Phrase: Types and functions of the phrases

**Unit-III: Auxiliary Verbs**

Verbs: Primary Auxiliary and Secondary Auxiliary, Usages and Functions of modal auxiliaries, Questions using Model Auxiliaries

**Unit-IV: Transformation of Sentences**

Voice: Active & Passive, Speech: Direct & Indirect

**Unit-V: Error Detection**

Determiners: Article, Quantifiers and Demonstratives, Subject – Verb Agreement

**Unit-VI: Tenses and their usages**

Simple Present, Simple Past, Simple Future

**Reference Books**

1. Modern English Grammar-L. S. Deshpande (creative Publication)
4. Writing English for You- G. Radhakrishna Pillai (Emerland Publication)
5. High School English Grammar & Composition - Wren & Martin (S. Chand)
7. English Grammer and Composition – Rejendra Pal and Prem Lata Suri (Sultan Chand and Sons)
### Course Objectives:
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**By the end of this course students should be able to:**
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<table>
<thead>
<tr>
<th>Unit-1:</th>
<th>Basic English Grammar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noun, Verb, Adjective, Adverb</td>
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</table>

<table>
<thead>
<tr>
<th>Unit-2:</th>
<th>Sentence Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elements of sentences and their structures, Clauses: - Noun, Adjective, Adverb, Sentence: - Simple, Compound, Complex</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit-3:</th>
<th>Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Affixes, Processes of Word Formation: Major and Minor Processes, Morphological Analysis of words</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit-4:</th>
<th>Writing Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Essay Writing, Email Writing, Resume</td>
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</table>

<table>
<thead>
<tr>
<th>Unit-5:</th>
<th>Oral Communication</th>
</tr>
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<tr>
<td></td>
<td>Group Discussion, Seminars and Conferences, Interview</td>
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</table>

<table>
<thead>
<tr>
<th>Unit-6:</th>
<th>Situational English</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dialogue Writing, Role Playing, Story Telling</td>
</tr>
</tbody>
</table>

### Reference Books
1. Modern English Grammar- L. S. Deshpande (creative Publication)
4. Writing English for You- G. Radhakrishna Pillai (Emerland Publication)
5. High School English Grammar & Composition - Wren & Martin (S. Chand)
7. English Grammer and Composition – Rejendra Pal and Prem Lata Suri (Sultan Chand and Sons)
### C Programming

<table>
<thead>
<tr>
<th>Code:</th>
<th>First semester</th>
<th>Credits: 02</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNT-106</td>
<td>C Programming</td>
<td></td>
</tr>
</tbody>
</table>

#### 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 Loopping 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

### TCP/IP

<table>
<thead>
<tr>
<th>Code:</th>
<th>First semester</th>
<th>Credits: 02</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNT-107</td>
<td>TCP/IP</td>
<td></td>
</tr>
</tbody>
</table>

#### 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)
7. Study of IP address
8. Study of Internet & e-mail
9. Creating e-mail account
10. Study of folder sharing

OR

### CCENT

<table>
<thead>
<tr>
<th>Code:</th>
<th>First semester</th>
<th>Credits: 02</th>
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</thead>
<tbody>
<tr>
<td>BNT-107</td>
<td>CCENT</td>
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</tbody>
</table>

#### 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)
7. Study of IP address
8. Study of drive map
9. Study of Remote connections
10. Study of Team viewer software
<table>
<thead>
<tr>
<th>Code: BNT-201</th>
<th>Second semester</th>
<th>Operating System Concepts</th>
<th>Credits: 04</th>
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</thead>
</table>

**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**

**Unit-2: System Structure**

**Unit-3: Processor Management**

**Unit-4: Memory Management**

**Unit-5: Multithreaded Programming**
Overview, Multithreading Models, Thread Libraries – pthreads.

**Unit-6: File System**

**Reference Books**
1. Operating System - Achyut Godbole, Atul Kahate
<table>
<thead>
<tr>
<th>Code: BNT-202</th>
<th>Second semester</th>
<th>Web Technology</th>
<th>Credits: 04</th>
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</thead>
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**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

### 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)
**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 familiarize 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 career.

<table>
<thead>
<tr>
<th>Unit-1:</th>
<th>Introduction to Linux</th>
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<tbody>
<tr>
<td>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</td>
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<thead>
<tr>
<th>Unit-2:</th>
<th>Working with Linux</th>
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</thead>
<tbody>
<tr>
<td>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</td>
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<thead>
<tr>
<th>Unit-3:</th>
<th>Linux Commands and Utilities</th>
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<tbody>
<tr>
<td>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 ifconfig ping netstat route write wall mail mesg preloginmesg motd lp lpr lpc lpq lpstat zip unzip tar cpio gzip gunzip</td>
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<tr>
<th>Unit-4:</th>
<th>System Administration</th>
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<tr>
<td>managing users and groups, system services and runlevels, managing s/w with RPM, controlling services with administrative tools, starting and stopping services manually</td>
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<tr>
<th>Unit-5:</th>
<th>The X Window System</th>
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<tr>
<td>Basic X Concepts, Using XFree86, Starting X, Selecting and Using X Window Managers</td>
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<tr>
<th>Unit-6:</th>
<th>Managing Services</th>
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</thead>
<tbody>
<tr>
<td>Fedora Core Linux Boot Process, System Services and Run levels, Controlling Services at Boot with Administrative Tools, Starting and Stopping Services Manually</td>
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</tbody>
</table>

**Reference Books**

1. Red Hat Linux and Fedora Unleashed – By Bill Ball and Hoyt Duff.
<table>
<thead>
<tr>
<th>Code: BNT-204 A</th>
<th>Elective</th>
<th>Second semester</th>
<th>Office Automation</th>
<th>Credits: 04</th>
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</thead>
</table>

**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
<table>
<thead>
<tr>
<th>Code: BNT-204 B</th>
<th>Second semester</th>
<th><strong>Network Operating System’s Administration (NOSA)</strong></th>
<th>Credits: 04</th>
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</thead>
</table>

**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**
<table>
<thead>
<tr>
<th>Code: BNT-205 A</th>
<th>First semester</th>
<th>Open Elective</th>
<th>Credits: 04</th>
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<tr>
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<td>University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses</td>
<td>OR</td>
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<thead>
<tr>
<th>Code: BNT-205 B</th>
<th>Second semester</th>
<th>Functional English</th>
<th>Credits: 04</th>
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**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

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**Reference Books**

1. Modern English Grammar-L. S. Deshpande (Creative Publication)
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 Grammar and Composition – Rejendra Pal and Prem Lata Suri (Sultan Chand and Sons)
### 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)
3. Developing Communication Skills.- Krishna Mohan & Meera Banerji (Macmillan 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
<table>
<thead>
<tr>
<th>Code:</th>
<th>Second semester</th>
<th><strong>Linux OS and Web Technology</strong></th>
<th>Credits: 02</th>
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<tbody>
<tr>
<td>BNT-206</td>
<td></td>
<td><strong>Practical List:</strong></td>
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<tr>
<td></td>
<td></td>
<td>1. Installation of Linux</td>
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<td>2. Study of files and directory related commands</td>
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<td>3. Study of process and resources related commands</td>
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<td>4. Study of compression and decompression commands</td>
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<td>5. Study of communication commands</td>
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<td>6. Introducing Web Browser and Concept of URL</td>
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<td>7. Write a programme to structure of HTML</td>
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<td>8. Write a programme on formatting tags</td>
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<td>9. Write a programme on Font, Address, Marquee Tag</td>
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<td>10. Write a programme to anchor tag with all attributes</td>
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<tr>
<th>Code:</th>
<th>Second semester</th>
<th><strong>Office Automation</strong></th>
<th>Credits: 02</th>
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<tbody>
<tr>
<td>BNT-207</td>
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<td><strong>Practical List:</strong></td>
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<tr>
<td></td>
<td></td>
<td>1. Study of Microsoft Office</td>
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<td>2. Study of Open Office</td>
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<td>3. Study of Libre office</td>
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<td>4. Study of MS-Word</td>
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<td>5. Study of Mail Merge</td>
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<td>6. Study of MS-Excel</td>
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<td>7. Study of Excel formulas</td>
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<td>8. Study of Microsoft power point</td>
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<td>9. Study of MS-Access</td>
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<td>10. Study of Creating query and creating report in MS-Access</td>
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<thead>
<tr>
<th>Code:</th>
<th>Second semester</th>
<th><strong>Network Operating System’s Administration (NOSA)</strong></th>
<th>Credits: 02</th>
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<tbody>
<tr>
<td>BNT-207</td>
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<td><strong>Practical List:</strong></td>
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<tr>
<td></td>
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<td>1. Study of Web Browsers</td>
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<td>2. Study of Web Servers</td>
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<td>3. Study of Private and Public IP Address</td>
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<td>4. Study of DNS</td>
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<td>5. Study of Proxy Server</td>
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<td>6. Study of Network Management Software</td>
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<td>7. Study of HTTP Server</td>
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<td>8. Study of Web Hosting</td>
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<td>9. Study of Disk quotas</td>
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<td>10. Study of Network Troubleshooting commands</td>
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