

॥ 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

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २० जून २०२० रोजी संपन्न झालेल्या ४७व्या मा. विद्या परिषद बैठकीतील विषय क्र.११/४७-२०२०च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे खालील विषयांचे C.B.C.S. (Choice Based Credit System) Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्यात येत आहेत.

1. B.Sc.-II Year-Biophysics
2. B.Sc.-II Year-Bioinformatics
3. B.Sc.-II Year-Biotechnology
4. B.Sc.-II Year-Biotechnology (Vocational)
5. B.Sc.-II Year-Food Science
6. B.Sc.-II Year-Botany
7. B.Sc.-II Year-Horticulture
8. B.Sc.-II Year-Agro Chemical Fertilizers
9. B.Sc.-II Year-Analytical Chemistry
10. B.Sc.-II Year-Biochemistry
11. B.Sc.-II Year-Chemistry
12. B.Sc.-II Year-Dyes & Drugs Chemistry
13. B.Sc.-II Year-Industrial Chemistry
14. B.C.A. (Bachelor of Computer Application)-II Year
15. B.I.T. (Bachelor of Information Technology)-II Year
16. B.Sc.-II Year-Computer Science
17. B.Sc.-II Year-Network Technology
18. B.Sc.-II Year-Computer Application (Optional)
19. B.Sc.-II Year-Computer Science (Optional)
20. B.Sc.-II Year-Information Technology (Optional)
21. B.Sc.-II Year-Software Engineering
22. B.Sc.-II Year-Dairy Science
23. B.Sc.-II Year-Electronics
24. B.Sc.-II Year-Environmental Science
25. B.Sc.-II Year-Fishery Science
26. B.Sc.-II Year-Geology
27. B.Sc.-II Year-Mathematics
28. B.Sc.-II Year-Microbiology
29. B.Sc.-II year Agricultural Microbiology
30. B.Sc.-II Year-Physics
31. B.Sc.-II Year Statistics
32. B.Sc.-II Year-Zoology

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-१/परिपत्रक/पदवी-सीबीसीएस अभ्यासक्रम/
२०२०-२१/३३३

दिनांक : १५.०७.२०२०.

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 / -

उपकुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

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



**Syllabus of
Second Year B.Sc. Network Technology
(Revised CBCS pattern)
Introduced from Academic Year 2020-2021**

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, starting 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 |

Swami RamanandTeerthMarathwada University Nanded

CBCS Revised Syllabus w.e.f SY: 2020-21

Program: B.Sc. (Network Technology) – Affiliated Colleges

| Year | Semester | Course Category | Course Code | Course Title | Credits | |
|--------------|----------|---|-------------|--|-----------|--|
| Second | Third | Core Course | BNT-301 | Linux Administration Part - I | 04 | |
| | | Core Course | BNT-302 | Network Administration Part-I | 04 | |
| | | Core Course | BNT-303 | Mobile Communication | 04 | |
| | | Choose any one from the below Elective courses | | | | |
| | | Elective Subject | BNT-304 A | Ad hoc Sensor Network | 04 | |
| | | | BNT-304 B | Multimedia | | |
| | | Choose any one Open Elective courses | | | | |
| | | Open Elective | BNT-305 A | University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses | 04 | |
| | | | BNT-305 B | Logical Reasoning | | |
| | | Lab | BNT-306 | Linux Administration Part - I | 02 | |
| | | | BNT-307 | Network Administration Part -I | 02 | |
| Total | | | | | 24 | |
| Second | Fourth | Core Course | BNT-401 | Linux Administration Part – II | 04 | |
| | | Core Course | BNT-402 | Network Administration Part – II | 04 | |
| | | Core Course | BNT-403 | Windows Server 2012 ADC Part –I | 04 | |
| | | Choose any one from the below Elective courses | | | | |
| | | Elective Subject | BNT-404 A | Distributed System | 04 | |
| | | | BNT-404 B | Software Engineering | | |
| | | Choose any one Open Elective courses | | | | |
| | | Open Elective | BNT-405 A | University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses | 04 | |
| | | | BNT-405 B | Numerical Aptitude | | |
| | | Lab | BNT-406 | Linux Part – II + Win ADC Part I | 02 | |
| | | | BNT-407 | Network Administration Part – II | 02 | |
| Total | | | | | 24 | |

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|---|--|--------------------------------------|------------|
| Code BNT-301 | Third Semester | Linux Administration Part - I | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> • The main objective of Linux Operating system is to introduce students with basic concepts of Open source code operating system. • 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 • To brief the student about software management and network interface in Linux OS | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> • Appreciate the role of open source operating system as System software. • Learner will handle Linux OS for software development, web server and database administration for their carrier | | | |
| Unit I | Managing the File system | | |
| The Fedora Core Linux File system, Basics working with ext3 File system, Other File system Available to Fedora Core Linux, Creating a File system, Mounting File systems, relocating a File system | | | |
| Unit II | Managing Users | | |
| User Accounts, Managing Groups , Managing Users , Managing Passwords , Getting System Administrator Privileges to Regular Users , The User Login Process , Disk Quotas | | | |
| Unit III | Backing Up, Restoring, and Recovery | | |
| Choosing a Backup Strategy, Choosing a Backup Hardware and Media, Using Backup Software Copying Files, Undeleting Files, System Rescue | | | |
| Unit IV | Printing with Fedora | | |
| Overview of Fedora Printing, Configuring and Managing Print Services,Creating and Configuring Local Printers,Creating Network Printers, Console Print Control,Using the Common UNIX Printing System (CUPS) GUI | | | |
| Unit V | Network Connectivity | | |
| Networking with TCP/IP, Network Organization, Hardware Devices for Networking, Using Network Configuration Tools, Dynamic Host Configuration Protocol, Using the Network File System, Putting Samba to work | | | |
| Unit VI | Managing DNS | | |
| Configuring DNS, Essential DNS concept, Overview of DNS Tools, Configuring Name servers with BIND, providing DNS for Real Domain | | | |
| Reference Books: | | | |
| Red Hat Linux and Fedora Unleashed – By Bill Ball and Hoyt Duff | | | |

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| Code BNT-302 | Third Semester | Network Administration Part-I | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> Describe the role of dynamic routing protocols and place these protocols in the context of modern network design Understand N/W protocols like RIP, OSPF & EIGRP according to industry requirement Study of reference models | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> Practical hands-on will help to interconnect the N/W components & design industrial N/w Best Practices for configuring dynamic routing protocols Best Practices for network troubleshooting | | | |
| Unit I | Network Fundamentals | | |
| OSI Model, TCP/IP Model, Compare and contrast OSI and TCP/IP models, Data Encapsulation, Compare and contrast network topologies, cabling types, Configure, verify, and troubleshoot IPv4 addressing, Need for private IPv4 addressing. | | | |
| Unit II | Routing Protocol Concepts | | |
| Interior and Exterior Routing Protocols, Connected Routes, Static Routes, Extended ping Command, Default Routes, RIP Protocol, RIP-2 Basic Concepts, Comparing and Contrasting IP Routing Protocols. | | | |
| Unit III | OSPF | | |
| Compare and contrast distance vector and link state routing protocols, OSPF Protocols and Operation, OSPF Neighbors, OSPF Topology Database Exchange, OSPF Configuration | | | |
| Unit IV | EIGRP | | |
| EIGRP Concepts and Operation, Exchanging EIGRP Topology Information, EIGRP Configuring and Verification. | | | |
| Unit V | WAN Technologies | | |
| PPP Concepts, PPP Protocol Field, PPP Link Control Protocol, PPP Configuration | | | |
| Unit VI | Troubleshooting IP Routing | | |
| The Ping and trace route Commands, Internet Control Message Protocol, Troubleshooting the Packet Forwarding Process, Host Troubleshooting Tips Interface Status, Extended Ping. | | | |
| Reference Books: | | | |
| CCENT/CCNA ICND1 (Second Edition) - Wendell Odom | | | |

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| Code BNT-303 | Third Semester | Mobile Communication | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> To understand the basics of wireless voice and data communication technologies. To study about the wireless communication Techniques. To understand measurement and performance of mobile and wireless system. To understand security and privacy issues in wireless environments. | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> Evaluate the usability of mobile devices such as smart phones. Select appropriate wireless technologies in commercial and enterprise applications. Assess the capabilities of next generation networks and role of mobile technologies. | | | |
| Unit I | Introduction | | |
| Applications, Vehicles, Emergencies, Business, Replacement of wired networks, Infotainment and more, Location dependent services | | | |
| Unit II | Wireless devices | | |
| Mobile and wireless devices A short History of wireless communication, A market for mobile communication Some open research topics, A simplified reference model | | | |
| Unit III | Cellular System | | |
| Basic Cellular System Performance Criteria, Operation of Cellular System, Planning a Cellular System, Frequencies for radio transmission, Regulations, Signals, Antennas, Multiplexing Modulation, Cellular Systems | | | |
| Unit IV | Medium Access Control | | |
| Motivation for specialized MAC, SDMA, TDMA, Fixed TDM, Classical Aloha Slotted Aloha, CSMA, Multiple Access with collision avoidance, CDMA, Mobile services, System architecture, Applications of satellite systems | | | |
| Unit V | Wireless LAN | | |
| Infrared V/s Wireless LAN, Infrastructure and Ad-hoc network, IEEE 802.11 System Architecture, Protocol Architecture, HIPERLAN, HIPERLAN 1 WATM, Bluetooth, Architecture | | | |
| Unit VI | Telecommunication System | | |
| GSM, DECT, TETRA | | | |
| Reference Books: | | | |
| Mobile Communications Second Edition by Jochen Schiller (Pearson Education) | | | |
| Mobile Cellular Telecommunications Second Edition by William C.Y.Lee | | | |

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| Code-BNT 304 A Elective | Third Semester | Ad hoc Network | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> To Comprehensive knowledge of various techniques in mobile networks/Ad-hoc networks and sensor based networks Understanding of Infrastructure less networks and their importance in the future directions for wireless communications. | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> Describe the unique issues in ad-hoc sensor networks. Describe current technology trends for the implementation and deployment of wireless ad-hoc/sensor networks | | | |
| Unit I | Ad Hoc Wireless Networks | | |
| Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols. Contention-Based Protocols with Reservation Mechanisms | | | |
| Unit II | Routing Protocols for Ad Hoc Wireless Networks | | |
| Introduction to Routing algorithm, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks. Classifications of Routing Protocols. Table-Driven Routing Protocols. On-Demand Routing Protocols. Hybrid Routing Protocols. Routing Protocols with Efficient Flooding Mechanisms | | | |
| Unit III | Transport Layer and Security Protocols | | |
| Introduction. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks. Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks. Classification of Transport Layer | | | |
| Unit IV | Wireless Sensor Networks | | |
| Introduction. Sensor Network Architecture. Data Dissemination. Data Gathering. MAC Protocols for Sensor Networks. Location Discovery. Quality of a Sensor Network. Evolving Standards. Other Issues | | | |
| Unit V | Hybrid wireless Networks | | |
| Introduction. Next-Generation Hybrid Wireless Architectures. Routing in Hybrid Wireless Networks. Pricing in Multi-Hop Wireless Networks. Power Control Schemes in Hybrid Wireless Networks. Load Balancing in Hybrid Wireless Networks | | | |
| Unit VI | Wireless Geo-location Systems | | |
| Introduction. What is wireless Geolocation? Wireless Geolocation System Architecture. Technologies for Wireless Geolocation. Geolocation Standards for E-911 Services. Performance Measures for Geolocation Systems. Questions. Problems | | | |
| Reference Books: | | | |
| Toh, C. K., Ad hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall, PTR, (2001) 3rd Edition | | | |

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| Code-BNT 304 B Elective | Third Semester | Multimedia | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> To Comprehensive knowledge of various techniques in multimedia. Understanding of Data Compression & Optical Storage Media Study of multimedia applications | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> Describe the compression techniques. Describe current technology trends for the implementation and deployment of compression techniques Discuss the Graphics Formats. | | | |
| Unit I | Introduction | | |
| Definition of Multimedia elements, Multimedia Elements, Multimedia Applications, Global structure of Multimedia | | | |
| Unit II | Data Compression | | |
| Storage space, Coding requirements, Basic compression techniques (Run length& Huffman encoding) Introduction to following compression techniques: JPEG, MPEG | | | |
| Unit III | Optical Storage Media | | |
| Basic Technology, Video Disk & other WORMS, CD-ROM and Multimedia Highway, DVD- ROM | | | |
| Unit IV | Audio | | |
| Basic Concept of Sound, MIDI, Digital audio, audio file formats | | | |
| Unit V | Image & Graphics | | |
| Making Still Images: BITMAPS, Vector Drawing, Colors, Image Formats, Graphics Formats , Image File Formats: BMP, JPEG, TIFF, PNG | | | |
| Unit VI | Video& Animation | | |
| Basic concepts (Using Video), Broadcast Video Standards, Television (Conventional systems, Enhanced definition systems, High Definition system), Computer based Animation | | | |
| Reference Books: | | | |
| Multimedia : Computing Communications & Applications- By Ralf Steinmetz And KlaraNehrstedt | | | |

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| Code-BNT 305 A | Third Semester | Open Elective | Credits:04 |
| University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses | | | |

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| Code-BNT 305 B Elective | Third Semester | Logical Reasoning | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> • This course enables students to develop their ability to reason by introducing them to elements of reasoning • Basics knowledge of different types of Series • Study of Coding and Decoding • Knowledge of Blood Relations, Directions and Puzles | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> • Develops ability to think logically of student • Understanding Relations, Directions, Arrangements, Logics, Puzzles. • Improves Mental Alertness • Construct a logically sound and well-reasoned argument. | | | |
| Unit I | Series, Analogy and Classification Lectures series, Examples on continues pattern series. | | |
| A.Series: Types of series, Alphabet series, Alpha numeric | | | |
| B. Analogy: Completing the Analogous Pair, Direct/Simple Analogy, Choosing the Analogous Pair, Double Analogy, Number analogy, Alphabet analogy, Correlation between letters/numbers. | | | |
| C. Classification: Choosing the odd word, Choosing the odd numeral, Choosing the odd letter group | | | |
| Unit II | Coding-Decoding Lecturers | | |
| A. Coding-Decoding: Letter coding, Direct Letter Coding, Number/Symbol Coding. | | | |
| B. Substitution: Concept of substitution, Problem solving by using substitution | | | |
| C. Deciphering: Deciphering messages word codes, Deciphering numbers/symbol codes for messages. | | | |
| Unit III | Blood Relation Lectures | | |
| A. Introduction to relations | | | |
| B. Concepts of deciphering relations based problems | | | |
| C. Problems on deciphering jumbled up descriptions | | | |
| D. Relation puzzle | | | |
| E. Coded relations. | | | |
| Unit IV | Seating or Placing Arrangement Lectures | | |
| A. Problems based on linear and circular based arrangement | | | |
| Unit V | Direction Sense Test Lectures | | |
| A. Introduction | | | |
| B. Problems based on angular changes in direction | | | |
| C. Problems on Shadows | | | |

D. General Problems based on Pythagoras Theorem

Unit VI | **Syllogism and Data Sufficiency Lectures**

A. Syllogism: Introduction of logic, Rules of syllogism, Two statement problem, Three statement problem

B. Data Sufficiency: Problems of Data sufficiency based on all Chapters.

Reference Books:

| Sr. no. | Name of the book | Author | Publication |
|----------------|--|-----------------|-----------------------|
| 1. | A Modern Approach to Verbal & NonVerbal Reasoning | Dr.R.S Aggarwal | S.Chand andCompany |
| 2. | Test of Reasoning | Edgar Thorpe | McGraw Hill Education |
| 3. | www.practiceaptitudetests.com | | |
| 4. | www.allindiaexams.in | | |

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|---|----------------|--------------------------------------|------------|
| Code BNT 306 | Third Semester | Linux Administration Part – I | Credits:02 |
| <p>Practical List:</p> <ol style="list-style-type: none"> 1. Study of Mounting File systems 2. Study of network connectivity in Linux 3. Study of Creating and Configuring Local Printers. 4. Study of samba server. 5. Study of Backup Hardware and Media 6. Study of DHCP Server. 7. Study of TCP/IP network Configuration 8. Study of Creating and Configuring Network Printers | | | |

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| Code BNT 307 | Third Semester | Network Administration Part-I | Credits:02 |
| <p>Practical List:</p> <ol style="list-style-type: none"> 1. Study of connected route. 2. Study of static route. 3. Study of default route. 4. Study of rip protocol configuration. 5. Study of ripv2 protocol configuration. 6. Study of OSPF protocol configuration. 7. Study of EIGRP protocol configuration. 8. Study of PPP protocol configuration. 9. Study of telnet password. 10. Study of router basic show commands. | | | |

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| Code BNT-401 | Fourth Semester | Linux Administration Part - II | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> • The main objective of Linux Operating system is to introduce students with basic concepts of Open source code operating system. • 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 • To brief the student about software management and network interface in Linux OS | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> • Appreciate the role of open source operating system as System software. • Learner will handle Linux OS for software development, web server and database administration for their carrier | | | |
| Unit I | Internet connectivity | | |
| Common configuring information, Laying the foundation: the local host Interface Configuring dialup internet Access, Configuring Digital Subscriber Line Access Troubleshooting Connection Problems, Configuring a Dial –in PPP server | | | |
| Unit II | Administering Database Services | | |
| A brief Review of Database Basics, Installing & Configuring MySQL, Database Clients | | | |
| Unit III | Secure File Transfer Protocol | | |
| FTP Client, FTP Server, Installing FTP Software, FTP User, Configuring the Very Secure FTP Server, Configuring The WU-FTPd Server, Using Commands in the ftp hosts File to Allow or Deny FTP Server Connection, Server Administration | | | |
| Unit IV | Handling Electronic Mail | | |
| How Email is Send & Received, The Mail Transport Agent, Choosing a Mail Client Attachment – Sending Binary Files as Text, Basic Sendmail Configuration & Operation, Using Fetch mail to Retrieve Mail, Choosing a Mail Delivery Agent, Mail Daemons | | | |
| Unit V | Kernel & Module Management | | |
| The Linux kernel, Managing Modules, When to Re-compile modules, Kernel Versions Obtaining the Kernel Sources, Patching the kernel, compiling the kernel, a brief Review of Database Basics, Installing & Configuring MySQL, Database Clients | | | |
| Unit VI | Multimedia Applications | | |
| Burning CDs & DVDs in Fedora core Linux, Sound & Music, Viewing TV & Video Using Cameras with Fedora core Linux, Using Scanners in fedora Core Linux | | | |
| Reference Books: | | | |
| Red Hat Linux and Fedora Unleashed – By Bill Ball and Hoyt Duff | | | |

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| Code BNT-402 | Fourth Semester | Network Administration Part - II | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> • Describe the role of Virtual Trunking Protocol and place these protocols in the context of modern network design • Understand trunking protocols like IEEE 802.1Q and ISL according to industry requirement • Brief understanding of VLANs & Trunks & CISCO Switches. | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> • Inter VLAN routine will help to establish End to End communication between devices. • Best Practices for configuring IP Subnet & VLAN protocols • Best Practices for configuring NAT & ACL | | | |
| Unit I | LAN Switching | | |
| LAN Switching Concepts, Historical Progression. Hubs, Bridges, and Switches , Switching Logic, Accessing the Cisco Catalyst 2960 Switch CLI , Cisco Catalyst Switches and the 2960 Switch , Switch Status from LEDs , Accessing the Cisco IOS CLI , CLI Access from the Console , Accessing the CLI with Telnet and SSH , Password Security for CLI Access | | | |
| Unit II | Virtual LANs | | |
| virtual LAN Concepts, Trunking with ISL and 802.1Q, IP Subnets and VLANs, VLAN Trunking Protocol (VTP), VLAN and VLAN Trunking Configuration and Verification, VTP Configuration and Verification. | | | |
| Unit III | Infrastructure Services | | |
| Configure and verify DHCP on a router, Configure, verify, and troubleshoot inside source NAT, Static NAT Configuring and Verification, Dynamic NAT Configuring and Verification, PAT Configuring and Verification, BGP protocol configuration & verification. | | | |
| Unit IV | IP Version 6 | | |
| Global Unicast Addressing, Routing, and Subnetting, IPv6 Protocols and Addressing, Configuring IPv6 Routing and Routing Protocols, IPv6 Transition Options | | | |
| Unit V | Infrastructure Security | | |
| Configure, verify, and troubleshoot port security, Configure, verify, and troubleshoot IPv4 and IPv6 access list for traffic filtering – Standard ACL, Extended ACL, Configure, verify, and troubleshoot basic device -Local authentication, Secure password, Access to device Source address, Telnet/SSH | | | |
| Unit VI | Virtual Private Networks | | |
| VPN Fundamentals, IPsec VPNs, SSL VPNs, Types of VPN | | | |
| Reference Books: | | | |
| CCENT/CCNA ICND1 (Second Edition) - Wendell Odom | | | |

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| Code BNT-403 | Fourth Semester | Windows Server 2012 ADC Part –I | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> • Configure and Troubleshoot Domain Name System • Maintain Active Directory Domain Services • Manage User and Service Accounts • Implement Group Policy Infrastructure | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> • Best Practices for configuring DNS Server • Best Practices for configuring Group policy objects | | | |
| Unit I | Installing and configuring servers | | |
| Install servers, Configure servers, Configure local storage | | | |
| Unit II | Configuring server roles and features | | |
| Configure file and share access, Configure print and document services, Configure servers for remote management | | | |
| Unit III | Configuring Hyper-V | | |
| Create and configure virtual machine settings Create and configure virtual machine storage, Create and configure virtual networks | | | |
| Unit IV | Deploying and configuring core network services | | |
| Configure IPv4 and IPv6 addressing, Configure servers, Deploy and configure the DNS service | | | |
| Unit V | Installing and administering Active Directory | | |
| Install domain controllers, Create and manage Active Directory users, Create and manage Active Directory groups | | | |
| Unit VI | Creating and managing Group Policy | | |
| Create Group Policy Objects, Configure security policies, Configure application restriction policies, Configure Windows Firewall | | | |
| Reference Books: | | | |
| MCTS Self-Paced Training Kit (Exam 70-410): Installing and Configuring Windows Server 2012 | | | |

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| Code-BNT 404 A Elective | Fourth Semester | Distributed System | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> • Introduce distributed computing environment. • Emphasize on design techniques and constraints of distributed computing environment • Emphasize on analysis of distributed computing environment | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> • Distinguish between distributed computing and parallel computing. • Understand concepts of architectural Styles, Communication, and Synchronization. • Demonstrate different naming & synchronization technologies • Explore various distributed concepts | | | |
| Unit I | Introduction & Architectures | | |
| Definition of distributed system, Goals, Types of Distributed systems, Architectural styles | | | |
| Unit II | System Architectures | | |
| Centralized Architectures, Decentralized Architectures, Hybrid Architectures, Architectures Versus Middleware · Self-Management in Distributed systems | | | |
| Unit III | Processes | | |
| Threads · Virtualization · Clients · Servers · Code Migration | | | |
| Unit IV | Communication | | |
| Fundamentals · Remote Procedure Call · Message oriented communication · Stream oriented communication · Multicast communication | | | |
| Unit V | Naming System | | |
| Names, Identifiers, and Addresses · Flat Naming · Structured Naming · Attribute-Based Naming | | | |
| Unit VI | Synchronization | | |
| Clock synchronization: Physical clocks, Global positioning system, Clock synchronization Algorithms · Logical Clocks · Mutual Exclusion: Centralized Algorithm, A Decentralized Algorithm, A Distributed Algorithm, A Token Ring Algorithm. · Global Positioning of Nodes · Election Algorithms | | | |
| Reference Books: | | | |
| Distributed systems principles and Pargadigms, Second Edition- by Andrew S.Tanenbaum, Maarten Van Steen. | | | |

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| Code-BNT 404 B Elective | Fourth Semester | Software Engineering | Credits:04 |
| Course Objectives: | | | |
| <ul style="list-style-type: none"> To develop software engineering skills and testing plans. To understand system concepts and its application in Software development. To enhance skills of designing and testing software. To learn technical skills to assure production of quality software. | | | |
| Course Outcomes: | | | |
| <ul style="list-style-type: none"> Ability to learn various methods of software development. Ability to apply various software testing techniques | | | |
| Unit I | Introduction | | |
| The Evolving Role of Software, Software, Software Characteristics, Software Applications, Software Evolution, Software Crisis & Horizon, Software Myths | | | |
| Unit II | Process of Software | | |
| Software Engineering, Software Process, The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Spiral Model, Software Engineering – A Layered Technology, .Process Framework, Personal and Team Process Models | | | |
| Unit III | A Generic View of Process | | |
| Software Engineering – A Layered Technology, Process Framework, Personal and Team Process Models, Process Technology, Product and process | | | |
| Unit IV | Agile Development | | |
| What Is Agility? What Is an Agile Process? The Politics of Agile Development, Agile Process Models, Feature Driven Development (FDD) | | | |
| Unit V | Software Engineering Practice | | |
| Software Engineering Practice, The Essence of Practice, Core Principles, Communication Practices Planning Practices, Modeling Practices, Analysis Modeling Principles, Design Modeling Principles | | | |
| Unit VI | System Engineering | | |
| Computer-Based Systems, The System Engineering Hierarchy, System Modeling, System Simulation | | | |
| Reference Books: | | | |
| 1) Software Engineering- R.Pressmen. | | | |

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| Code-BNT 405 A | Fourth Semester | Open Elective | Credits:04 |
| University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses | | | |

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| Code-BNT 405 B Elective | Third Semester | Numerical Aptitude | Credits:04 |
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Course Objectives:

- Practicing Basics of mathematics
- Use of Numbers
- Finding Percentage and Profit or Loss, Average
- Finding Time, Speed, Distance,
- Use of permutation and combination and Probability

Course Outcomes:

- Develops problem solving skills of student
- Improves Basic and advanced calculations used in day to day life.
- Improves Mental Alertness
- Analytical Thinking

Unit I **Introduction of Number system**

A. Numbers: Types of numbers, Divisibility tests of numbers, arithmetic progression, Geometric progression, Relationship between Arithmetic progression and Geometric progression.

B. HCF and LCM : Methods of calculating highest common factor and greatest common divisor, factorization method, Division method, Finding HCF and LCM more than two numbers, LCM factorization method, Division method, Finding HCF and LCM more than two numbers, LCM and HCF of fractions and decimal numbers, Applications of LCM and HCF.

Unit II

A. Average: Definition of average, Formulae and theoretical problem on average.

B. Problem on ages: simultaneous equations and their applications, Theoretical problems on ages, Theoretical problems on numbers.

Unit III

A. Percentage: Concept of percentage, Application of percentage, Results on populations, Result on depreciations, Theoretical problem on percentage.

B. Profit and Loss: Definition of cost price, selling price and profit, Formulae of profit and loss, Theoretical problems on profit and loss.

Unit IV

A .Time and Distance: Concept of time and distance, Formulae of time and distance, Theoretical problems on time and distance.

B. Problems on Train: Formulae of problems on train, Theoretical problems on train

C. Boat and streams: Concept of boat and streams, Formulae of boat and streams, Theoretical problems on boat and streams.

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| Unit V | | | |
| <p>A. Time and Work: Concept of time and work, Relationship between time and work, Theoretical problems on time and work.</p> <p>B. Allegations and Mixtures: Definition of allegation and mixtures, Rules of allegation's, Theoretical problems on mixture and allegation.</p> | | | |
| Unit VI | | | |
| <p>A . Simple and Compound Interest: Definition of simple and Compound interest, Formulae of simple and compound interest, Relationship between simple and compound interest, Theoretical problems on simple and compound interest.</p> <p>B. Permutations and combinations: Definition of permutations and combinations, Formulae of permutation and combinations, Relationship between permutation and combinations, Problems on permutations and combinations.</p> <p>C. Probability: Definition of probability, Examples of performing a random experiment, Probability of occurrence of an event, Results on probability, Theoretical problems on probability.</p> | | | |
| Reference Books: | | | |
| Sr. no. | Name of the book | Author | Publication |
| 1. | Quantitative Aptitude | Dr.R.S Aggarwal | S.Chand and Company |
| 2. | Quantitative Aptitude | AbijitGuha | Tata McGraw Hill Education |
| 3. | www.indiabix.com | | |
| 4. | www.allindiaexams.in | | |

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| Code BNT 406 | Fourth Semester | Linux Administration Part – II& Win ADC 2012 | Credits:02 |
| <p>Practical List:</p> <ol style="list-style-type: none"> 1. Installation of domain controllers. 2. Creating ADDS 3. Creating users and group. 4. Study of windows firewall. 5. Study of Group Policy 6. Installing & Configuring MySQL, Database Clients. 7. Configuring Digital Subscriber Line Access & Troubleshooting Connection Problems. 8. Study of Sendmail Configuration & Operation. 9. Study of FTP Server. 10. Study of Linux Kernal | | | |

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| Code BNT 407 | Third Semester | Network Administration Part-II | Credits:02 |
| <p>Practical List:</p> <ol style="list-style-type: none"> 1. Study of virtual LAN. 2. Study of VLAN Trucking. 3. Study of IP subnet & VLAN. 4. Study of VTP protocol configuration. 5. Study of Static NAT. 6. Study of Dynamic NAT. 7. Study of PAT NAT. 8. Study of Standard ACL. 9. Study of telnet password. 10. Study of Extended ACL. | | | |