

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

**Detail Syllabus for
Bachelor of Vocation
(B.Voc)
General Education
Component**

(WITH EFFECT FROM 2020-2021 ONWARDS)

Bachelor of Vocation (B.Voc)
General Education Component
Semester I
Paper –I
English and communication Skill I

Unit –I

Grammar

- i) Prepositions
- ii) Articles
- iii) Synonym & Antonym

Unit-II

Written communication

- i) Integral elements of writing-Features and sub skills.
- ii) Paragraph writing,
- iii) Letter writing Formal and informal

Unit-III

Reading Skill

- 1) Reading and Comprehension
- 2) Increasing the Eye-span
- 3) Skimming the text
- 4) Scanning the text

Unit-IV

Communication Skills

- i) Introducing Oneself
- ii) Introducing Others

Recommended books

- 1. Learners English Grammar & Composition by N.D.V. Prasada Rao(s.Chand)
- 2. English Grammar & Composition by R.C. Jain (Macmillan)
- 3. Strengthen your English Bhaskaran& Hors Burgh. (Oxford)
- 4. English For Practical Purposes by
Z.N.Patil,B.walke,A.Thorat,Z.Merchant(Macmillan)
- 5. English Grammar Practice – Raj N. Bakshi (Orient Longman)

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- I)
Paper – II
Soft Skill Development-I

Unit I: Introduction to business communication, Introduction to effective writing, non verbal communication, Importance of listening and responding, SWOT analysis, Importance of Planning. Introduction to Marketing, Importance of marketing,

Unit II: Self management techniques. Self image and self esteem, Building self confidence, Personal planning and success attitude, creating the master plan, active positive visualization and positive attitude, goal setting and time management. introduction to marketing environment

Unit III: Self motivation & communication: Levels of motivation, etiquettes and manners in a group, public speaking skills, oral and written communication, Body language, Tips for technical writing. Introduction to marketing segmentation, importance of market segmentation, marketing mix.

Unit IV: Team dynamics: Introduction to team work, working in teams, personal attitude, conflicts and its resolutions assertiveness, diversity, Role of career planning in personality development, How to face personal interviews and group discussions..:

Note:

Self paced learning Industry Awareness Assignments and Discussions Reference Book:
Personality Development by Rajiv K. Mishra. Rupa & Co. The Complete Manager (Lifr Skills for Success: By ICFAI University

Reference Book:

1. Personality Development by Rajiv K. Mishra. Rupa & Co. The Complete Manager (Lifr Skills for Success: By ICFAI University
2. William M. Pride and O.C. Ferrell – Marketing.

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- I)
Paper – III
APTITUDE DEVELOPMENT-I

UNIT-I: Arithmetic Ability-Number System, Simplification, Decimal Fraction, Surds and Indices.

UNIT-II: Square roots and Cube roots, HCF and LCM of Numbers, Average, Problem on Numbers.

UNIT-III: General Mental Ability- Analogies, Series Completion, Classification and Coding-Decoding.

UNIT-IV: General Awareness on Social : Introduction , definition, scope and importance, need for public awareness Concept of Ecosystem – understanding. Degradation, resource utilization, Energy Flow in the ecosystem – water, carbon, oxygen nitrogen and energy cycles in nature. Ecological succession food chain ecosystem types, characteristic function of forest desert and aquatic ecosystem and Computer Skills.

Suggested Readings:

- 1) Quantitative Aptitude by R.S. Agarwal
2. Verbal & Non-verbal Reasoning by R.S. Agarwal
3. English Grammar, Wren & Martin
4. Cracking the Test of Reasoning & Data Interpretation, Prof. Jagdeep Vaishnav, Nishant B. Patel, Biztantra
5. Test of Reasoning, Edgar Thorpe, Tata-McGraw Hill, 2007

Bachelor of Vocation (B.Voc)
General Education Component
Semester II
Paper –I
English and communication Skill II

Unit –I

Grammar

- i) Part Of Speech
- ii) Use Correct Tenses
- iii) Change the Voice

Unit-II

Listening Skill

- i) Listening as a skill
- ii) Types of listening
- iii) Importance of listening
- iv) Barriers to listening

Unit-III

Comprehension

- i) Unseen Passage
- ii) Precise Writing

Unit-IV

Communication Skills

- i) Simple oral description: persons, pictures
- ii) Describing familiar things, places
- iii) Describing simple events,
- iv) Routine activities of oneself and others

Recommended books

1. Learners English Grammar & Composition by N.D.V. Prasada Rao(s.Chand)
2. English Grammar & Composition by R.C. Jain (Macmillan)
3. Strengthen your English Bhaskaran& Hors Burgh. (Oxford)
4. English For Practical Purposes by
Z.N.Patil,B.walke,A.Thorat,Z.Merchant(Macmillan)
5. English Grammar Practice – Raj N. Bakshi (Orient Longman)

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- II)
Paper – II
Soft Skill Development-II

Unit I : Stress: Concept of Stress, Causes of Stress, Recognizing your own stressors, Dimensions of Stress, Effects of Stress, Reactions to stress. Focus on Customers: Understanding the Customers, Understanding Customer Service, Service Triangle, Benefits of Exceptional Customer Service, Customer Delight, First Impressions, and Perception vs. Reality

Unit II : Personality Types: Perfectionists, Helpers, Achievers, Romantics, Observers, Questioners, Adventurers or Enthusiasts, Bosses or Asserters, Mediators or Peacemakers, How your beliefs and perceptions cause stress., Benefits of Self- Analysis,

Unit III : Managing Yourself : Developing a strategy for stress management, What is pressure, Self-management techniques, Managing Change, Assertiveness skills, Stress and Faith Healing. Building Customer Relationship: Why do People do Business with you,

Unit IV: Common Meditation Techniques:

1. Relaxation: BY Music, Exercise, yoga and meditation, Dancing, Zumba, Playing Sports, Spending time for Creative concepts, Spending time for hobbies. Empathy, Empathy vs. Sympathy, Problem Solving, Customer Interaction Cycle. Communication Styles: Three Main Styles. (Aggressive, Passive and Assertive), Disagreement Process, Selective Agreement, Benefits of Assertive Communication

Reference books:

Title:

1. Stress Management Publisher: Himalaya Author: Dr Satish Pai, Dr S Ravishankar, Dr H L Kaila, Shri S V Kamat Edition: Students Edition
2. Personality Development and Soft Skills: Barun K Mitra.
3. Peeru Mohammed: Customer Relationship Management

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- II)
Paper – III
APTITUDE DEVELOPMENT-II

UNIT-I: Word Problems- Problem on Ages, Percentage, Profit and Loss, Ratio and Proportion.

UNIT-II: Partnership, Chain Rule, Time and Work, Time and Distance.

UNIT-III: General Mental Ability- Blood Relations, Direction Sense Test, Alphabet Test, Logical Venin Diagrams, Number, Ranking and Time Sequence Test.

UNIT-IV: General Awareness on Social

Environmental issues Introduction bio diversity at genetic species and ecosystem levels
Threats to bio diversity habits loss, poaching of wildlife, man wild life conflicts Bio
geographic classification of India

Values of biodiversity Consumptive use of values productive use of values **Political issues
and computer skills**

Suggested Readings:

- 1) Quantitative Aptitude by R.S. Agarwal
2. Verbal & Non-verbal Reasoning by R.S. Agarwal
3. English Grammar, Wren & Martin
4. Cracking the Test of Reasoning & Data Interpretation, Prof. Jagdeep Vaishnav,
Nishant B. Patel, Biztantra
5. Test of Reasoning, Edgar Thorpe, Tata-McGraw Hill, 2007

Bachelor of Vocation (B.Voc)
General Education Component
Semester III
Paper –I
English and communication Skill III

Unit –I

Grammar

Vocabulary related to Business, Commerce, Banking, Media, and General Corporate
Phrasal Verbs, Word Pairs, Synonyms and Antonyms.

Unit-II

Written communication

- i) Planning a text, finding materials. Drafting – revising
Editing -finalizing the draft
- ii) Computer as an aid
- iii) On line writing
Planning and writing for social media

Unit-III

Communication Skills

- a) What is Communication? Importance and Scope in day to day life
- b) Communication Process
- c) Types of Communication

Unit-IV

Communication Skills

- a) Models and Barriers in Communication
- b) Role and functions of Media
- f) Characteristics of Media

Recommended books

Books recommended for further reading.

1. Macmillan Foundation English R. K. Dwivedi& A. Kumar (Macmillan)
2. English For Practical Purposes by
Z.N.Patil,B.walke,A.Thorat,Z.Merchant(Macmillan)
3. Business Communication by J.P. Parikha& Others(Orient BlackSwan)
4. Principle guide to Spoken English by Neha Bajaj (Rajat Publication)
5. Spoken English – R. K. Bansal, J.B. Harrison (Orient Longman)

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- III)
Paper – II
Soft Skill Development-III

Unit – I Introduction Time management, Identifying Time stealers: Interruptions-telephone, personal visitors, Procrastination and Indecision, Acting with incomplete information, Approach to be maintained while dealing with team members.

Unit – II Crisis management, Effects of unclear communication, How to act with Inadequate technical knowledge, Effects of unclear objectives, Lack of planning, Stress and Fatigue, Inability to say "No".

Unit – III Management of Priorities, Increasing work effectiveness and productivity, Scheduling and Planning, Organising, Staffing, Five ways to battle job stress.

Unit – IV Etiquettes: Office etiquettes, email etiquettes, telephone etiquettes, Managing a balanced lifestyle, Feeling more in control of daily activities, Reducing stress with effective planning.

Reference books:

1. Time management: Dr Vijay Agrawal
2. Time management : Dr R L Bhatia
3. Managing Time : David Fontana Excel Books

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- III)
Paper – III
APTITUDE DEVELOPMENT-III

UNIT-I: Word Problems- Pipes and Cistern, Problems on Trains, Boats and Stream, Alligation or Mixture.

UNIT-II: Simple Interest, Compound Interest, Area, Volume and Surface Areas.

UNIT-III: General Mental Ability- Mathematical Operations, Logical Sequence of Words, Inserting the Missing Character, Data Sufficiency.

UNIT-IV: General Awareness on Social issues Definition, Causes , effects and control measures of air, water soil, marine noise and thermal pollution and nuclear hazards
Environmental issues Solid waste management- causes, effects and control measures of urban and industrial waste Role of individual and institution in perventation of pollution
Disaster management – food, earthquakes , cyclone, landslides **computer skills**

Suggested Readings:

- 1) Quantitative Aptitude by R.S. Agarwal
2. Verbal & Non-verbal Reasoning by R.S. Agarwal
3. English Grammar, Wren & Martin
4. Cracking the Test of Reasoning & Data Interpretation, Prof. Jagdeep Vaishnav, Nishant B. Patel, Biztantra
5. Test of Reasoning, Edgar Thorpe, Tata-McGraw Hill, 2007

Bachelor of Vocation (B.Voc.)
General Education Component
Semester IV
Paper –I
English and communication Skill IV

Unit –I

Grammar

- i) Narration
- ii) Use of Model Auxiliary

Unit-II

Written communication

- i) Writing as a skill its importance
- ii) Mechanism of writing
- iii) Paragraph as a unit of structuring a whole text
Combining different sources
Functional use of writing

Unit-III

- i) Unseen Passage
- ii) Story Developing
- iii) Paragraph writing

Unit-IV

Communication Skills

Media Literacy

- a) What is Media Literacy?
- b) How to `Read` Media Texts
- c) Media Content and Style

Recommended books

1. Business Communication by J.P. Parikha & Others (Orient BlackSwan)
2. Principle guide to Spoken English by Neha Bajaj (Rajat Publication)
3. Learners English Grammar & Composition by N.D.V. Prasada Rao (s.Chand)
4. English Grammar & Composition by R.C. Jain (Macmillan)
5. Strengthen your English Bhaskaran & Horsburgh. (Oxford)
6. Basic Journalism by R. Parthasarathy (Macmillan)
7. English Grammar Practice – Raj N. Bakshi (Orient Longman)

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- IV)
Paper – II
Soft Skill Development-IV

Unit - I Introduction, Corporate Culture: Definition and Meaning, Professionalism at the workplace, Youthfulness and its role in professional growth, Dynamism and its contribution towards success, The concept of being Goal-Oriented, How to be a team player

Unit - II How to be an effective leader: The role of Emotional Intelligence, Managing your state of mind, Emphatic Listening, Developing a WIN-WIN attitude, Using the right style- Situational leadership, Adaptability to change.

Unit-III The Importance of Employees in an Organisation: The importance of employee evaluation, How to prepare an evaluation, How to motivate employees, Authority and Responsibility, Delegation Process, Decision making process.

Unit-IV The management model: Introduction, The CRM Management Model, Centralization, Decentralization, Social Responsibilities of Organization, Inter-organizational Communication, Being proactive.

Reference books:

1. Effective Human Resource Training And Development : Dr B Rathan Reddy, Himalaya
2. Communication Skills : Sanjay Kumar , Datta
3. Principles of management – R N Tripathi, P.C. Tripathi, P.N.Reddy.

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- IV)
Paper – III
APTITUDE DEVELOPMENT-IV

UNIT-I: Word Problems- Calendar, Clocks, Stock and Shares, Odd Man Out and Series.

UNIT-II: Permutations and Combinations, Probability, Logarithms, Heights and Distances.

UNIT-III: Non-Verbal Reasoning- Analytical Reasoning, Mirror-Images, Water Images, Problems on Cubes and Dice.

UNIT-IV: General Awareness on Social issues

Issue and possible solutions Resource consumption pattern and need for equitable utilization of resource, climate changes global warming acid rains ozone layer depletion The Environment Acts, Water Prevention and control of Pollutions Acts

Suggested Readings:

- 1) Quantitative Aptitude by R.S. Agarwal
2. Verbal & Non-verbal Reasoning by R.S. Agarwal
3. English Grammar, Wren & Martin
4. Cracking the Test of Reasoning & Data Interpretation, Prof. Jagdeep Vaishnav, Nishant B. Patel, Biztantra
5. Test of Reasoning, Edgar Thorpe, Tata-McGraw Hill, 2007

Bachelor of Vocation (B.Voc.)
General Education Component
Semester V
Paper –I
English and communication Skill V

Unit –I

Grammar

- i) Suffix
- ii) Prefix
- iii) Abbreviation

Unit-II

E-Communication

- Internet and its uses
- Social media (Whatsapp, Facebook, YouTube& Zoom etc.),Cybercrime
- Mobile governance , E governance Right to privacy

Unit-III

Communication Skills

- i) Group Communication: The Basics of Group Dynamics,
Group Interaction and Communication, How to Be Effective in Groups,
- ii) Handling Miscommunication, Handling Disagreements and Conflicts,
- iii) Constructive Criticism.

Unit-IV

Communication Skills

- i) Elements of presentation strategies ,Audience, objectives, medium,
Key ideas - structuring the material & content
- ii) Audio-visual aids

Recommended books

1. Business Communication by J.P. Parikha& Others(Orient BlackSwan)
2. Principle guide to Spoken English by Neha Bajaj (Rajat Publication)
3. Spoken English – R. K. Bansal, J.B. Harrison (Orient Longman)
4. Learners English Grammar & Composition by N.D.V. Prasada Rao(s.Chand)
5. Computer Basics by G.Manjunath (Vasan's Publication)
6. Developing Communication Skills – Krishna Mohan and MeeraBanerji (Macmillan)
7. Online Resources.

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- V)
Paper – II
Soft Skill Development-V

Unit-I Achieving excellent customer service through CRM: Introduction, CRM Concept - Customer and Centre of Activity: Definition and Meaning of a Customer, Developing a customer-oriented perspective, Self Assessment, Viewing Customer needs, Commitment to Customers.

Unit-II Selling skills: Introduction, Selling Skills: The psychology and Principles of Selling, Making an Appointment, How to create positive first impressions, Building trust and rapport with your customers, Listening Skills, Tactics to get new customer's.

Unit-III Understanding features and selling benefits, Identifying buying signals, Understanding and handling objections, Closing the sale, Changing mind-set of Customers.

Unit-IV Call handling skills: Introduction, Call Handling Skills: Telephone etiquette, Customer Service via the telephone: Handling a customer who calls for help or support, Cultural influences on consumer behavior, Managerial Responsibilities.

Reference books:

Effective Human Resource Training And Development : Dr B Rathan Reddy, Himalaya
Communication Skills : Sanjay Kumar , Datta

Bachelor of Vocation (B.Voc.)
General Education Component
(Semester- V)
Paper – III
APTITUDE DEVELOPMENT-V

UNIT-I: Data Interpretation-Tabulation, Bar Graphs, Pie Charts, Line Graphs.

UNIT-II: General Mental Ability-Decision Making, Assertion and Reason, Syllogism-Statement and Conclusion, Sequential Output Tracing.

UNIT-III: Logic Reasoning-Statement-Argument, Statement-Assumptions, Statement-Courses of Action, Statement-Conclusion. Puzzle Test-Classification Type Question, Seating/Placing Arrangement, Comparison Type Questions, Sequential Order of Things.

UNIT-IV: General Awareness on Social issues

Population explosion. Family welfare program Environment and human health – climate and health, infection diseases, water related diseases Human rights – equity, nutrition and health rights , intellectual property rights (IPRS),

Value education Environment values, valuing nature , valuing cultural, social justices, human heritage equitable use of resources HIV/ AIDS women and child welfare and information technology in environment

Suggested Readings:

- 1) Quantitative Aptitude by R.S. Agarwal
2. Verbal & Non-verbal Reasoning by R.S. Agarwal
3. English Grammar, Wren & Martin
4. Cracking the Test of Reasoning & Data Interpretation, Prof. Jagdeep Vaishnav, Nishant B. Patel, Biztantra
5. Test of Reasoning, Edgar Thorpe, Tata-McGraw Hill, 2007

Bachelor of Vocation (B. Voc)
General Education Component
(SEMESTER-VI)
Paper – I
Applied Computer Skill-I

Unit -I:

Word Processing: Introduction, Starting word, Creating document, Structure of Ms-word window and its application, Mouse & keyboard operations, designing a document; formatting-selection, cut, copy, paste, Toolbars, operating on text; Printing, Saving, Opening, Closing of document; creating a template

Unit-II :

Tables, borders, textbox operations; Spelling and Grammar check, Mail merge, Envelope and Label, Protection of document, Change the view of document.

Unit-III:

PowerPoint Presentation-Working with PowerPoint Window, Standard Toolbar, Formatting Toolbar, Drawing Toolbar, Moving the Frame, Inserting Clip Art, Picture, Slide; Text Styling, Send to Back.

Unit- IV :

Entering Data to Graph, Organization Chart, Table, Design Template, Master Slide, Animation Setting, Saving and Presentation, Auto Content Wizard, Package for CD (Pack & Go Feature).

Reference Books:

1. Ms office by Dr. S. S. Shrivastava, FIREWALL MEDIA, an imprint of Laxmi publication Pvt. Ltd.
2. Microsoft Office 2016 Step by Step: MS Office 2016 Step by S_p1 by Joan Lambert, Curtis Frye.
3. Information technology concepts by Dr. Madhulika Jain, Shashank & Satish Jain, [BPB Publication, New Delhi.]
4. Fundamentals of Information Technology By Alexis And Mathews Leon [Leon Press, Chennai & Vikas Publishing House Pvt Ltd, New Delhi]
5. Computer Fundamentals by P. K. Sinha.
6. Microsoft Office –2008 – Gini Courter , Annelte Marquis BPB.

Bachelor of Vocation (B. Voc)
General Education Component
(SEMESTER-VI)
Paper – II
Applied Computer Skill-II

Unit- I:

Introduction To Ms-Excel- Navigating, Excel Toolbars and Operations, Formatting Features Copying Data Between Worksheets; Entering and Editing Cell Entries, Creation of Charts, Editing and Formatting Charts, Working with Multiple Spreadsheets: Working with Sheet Tabs, Retrieve Data from Other Workbooks.

Unit -II:

Goal Seek, Auditing, Linking, Workbook, Database in Excel (Auto Filter, Advanced Filter, Sort, Form), Mathematical, Statistical and Financial Functions in Ms-Excel.

Unit -III:

MS-Access- Introduction to database management system, fields, records, creating database, tables, defining table using datatypes, entering data into table, closing and reopening database.

Unit- IV:

Database Administrator (DBA) and its role, DBMS Vs RDBMS.

Reference Books:

1. Microsoft Office Excel 2007 Step by Step By Curtis Frye.
 2. Introduction to Data Base Management by NAVEEN PRAKASH [Tata McGrawHill ltd.]
 3. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications.
 4. Raghu Ramakrishnan & Johannes Gerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000.
 5. Data Base System Concepts By A SilbersChatz By Henry Korth And S.Sudarshan [Mcgraw-Hill ltd. New Delhi] 3rd Edition.
- Microsoft Access Basics Database Fundamentals, UFHealth Information technology training.

Bachelor of Vocation (B. Voc)
General Education Component
(SEMESTER-VI)
Paper – III
Applied Computer Skill-III

Unit-I:

MIS- Systems Concepts: Systems approach, characteristics, Types of Systems; Elements – input, Output, environment, Boundary Interface, Feedback & Control.

Unit II:

Systems Life Cycle, MIS, TPS, OAS, DSS,KMS, Value of information, information life cycle, Data Vs Information, Components of MIS, characteristics of MIS.

Unit III:

System Analysis & Design: System development life cycle. Modeling the required system, System Analyst: Duties and roles.

Unit IV:

E-R diagrams, ELHs, ECDs, user view of processing, modeling input output data.

Reference books:

1. First Text Book On Information Technology – Srikant Patnaik.
2. Management Information System – Goyal.
3. Management Information System : Jawadekar (TMH).
4. System Analysis & Design - Edward –TMH
5. System Analysis and Design- Don Yeates, shiebls, Helmy (M).

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

**Detail Syllabus for
Bachelor of Vocation
(B.Voc)**

**Skill Development Component
Software Development**

(Faculty of Science & Technology)

(WITH EFFECT FROM 2020-2021 ONWARDS)

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
(Semester I)
Paper – I
Computer Fundamentals & Networking

NSQF : LEVEL - 4

JOB ROLE: JUNIOR SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	Individuals in this job are assigned one of the many entry level roles in the software industry including support and help desk, testing, user interaction design, maintenance, enhancement, development and documentation. They are responsible for assisting in performing the key activities and tasks involved in the assigned role.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.2. demonstrate aptitude for analyzing information and making logical conclusions.3. demonstrate knowledge of the foundational mathematical concepts in computing.4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.5. read and execute a test case and record the outcome in the appropriate template.6. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

UNIT - I:

Basic Components of Digital Computers: Block Diagram, Types: Digital, Analog, Hybrid. Generation of Computers.

Number Systems: Binary, Octal, Decimal, Hexa Decimal, their Conversions, Binary Arithmetic, ASCII, BCD, EBCDIC.

Generation of Languages: Machine, Assembly, High Level Languages.

Translators: Compiler, Interpreter and Assembler, Source and Object Program.

UNIT - II:

Memory: Static & dynamic, RAM, ROM, PROM, EPROM, EEPROM, flash and Cache.

Storage Devices: Hard Disk, Zip Disk and Optical Disk, Pen Drive, Blu Ray.

Input Devices: Light Pen, Touch Screen, Voice Input, MICR, OCR, OMR, Barcode Reader and Flatbed Scanner.

Output Devices: VDU, Printers: Dot Matrix, Laser and Inkjet.

Plotters: Drum, Flat-Bed and Inkjet.

UNIT - III:

DOS and WINDOWS OPERATING SYSTEMS:

Introduction to OS: Functions and Classification,

DOS: warm booting & cold booting, Types of commands: Internal & External, command format, directory, file management, disk management and general commands, file naming conventions, dos editor, batch file.

WINDOWS OS: Introduction & features

MODULES : Program, File and Print Managers, Control Panel, Icons, switching between applications, running MS Dos application , Help and Recycle bin.

Windows accessories : Notepad, Paint and Calculator.

UNIT - IV:

Network: Network terminology, Topologies: Linear, Circular, Tree and Mesh.

Types of Networks: LAN, WAN, MAN. Repeaters, Bridge, Routers, Brouters and Gateway. Modem for Communication between pc's, wi-fi network, Introduction of Bluetooth and Infrared devices.

Network Protocol Architecture : OSI Model & their layers ,TCP/IP Model & their layers, Addressing in TCP/IP

Internet: Brief history of internet, World Wide Web, Websites, URL, Browsers, Email & its features.

Reference Books:

1. Information technology concepts by Dr. Madhulika Jain, Shashank & Satish Jain, [BPB Publication, New Delhi.]
2. Fundamentals of Information Technology by Alexis And Mathews Leon [Leon Press, Chennai & Vikas Publishing House Pvt. Ltd., New Delhi]
3. Computer Fundamentals by P. K. Sinha.
4. Data Communications & Networking by B. A. Forouzan.
5. Data & Computer Communications by William Stallings.

List of Practical's:

Sr. No.	List of Practical's
1	Demonstrate the working of following General Purpose commands in Disk Operating System <ol style="list-style-type: none"> 1. CLS 2. VER 3. VOL 4. DATE 5. TIME
2	Demonstrate the working of DIR commands along with the switches used with the command in Disk Operating System
3	Demonstrate the working of following File Management Commands in Disk Operating System <ol style="list-style-type: none"> 1. COPY CON 2. TYPE 3. COPY 4. REN 5. DEL
4	Demonstrate the working of following Directory Management Commands in Disk Operating System <ol style="list-style-type: none"> 1. MD 2. CD 3. RD
5	Demonstrate the working of following External commands in Disk Operating System <ol style="list-style-type: none"> 1. MORE 2. MEM 3. SYS 4. XCOPY 5. MOVE 6. FC 7. CHKDSK 8. SORT 9. FIND 10. DISKCOPY
6	Demonstrate the Working of Recycle Bin in Windows Operating System <ol style="list-style-type: none"> a) Restore a Single deleted file from recycle Bin b) Restore all deleted files from Recycle Bin c) Empty recycle bin d) Resizing Recycle Bin
7	Demonstrate the use of wildcard Character in DOS.
8	Demonstrate Calculator Facilities in Windows Accessories. <ol style="list-style-type: none"> a) Using Simple Calculator b) Using Scientific Calculator.
9	Demonstrate Notepad Facilities in Windows Accessories. <ol style="list-style-type: none"> a) Creating Simple Text file b) Creating Batch file.
10	Demonstrate Paint Facilities in Windows Accessories. Draw a picture using all the tools in the tool box.
11	Demonstrate the Display Properties of Control Panel. <ol style="list-style-type: none"> a) Change The Wallpaper of the desktop to image sunset.jpeg b) Set The Screen Saver of the desktop to time duration 1 min.
12	Demonstrate the Search Option in Windows Operating System.
13	Demonstrate the use of shortcut facility in Windows Operating System.

	a)Creating Shortcut b)Renaming Shortcut c) Deleting Shortcut.
14	Demonstrate the Disk Clean up utility in Windows Accessories.
15	Demonstrate the MS-editor of Disk operating System. a) Create a BAT file using Editor and run that file through command prompt.
16	Demonstrate Backup Status and Configuration Utility of Windows Accesories.
17	Demonstrate the use of add or remove hardware utility of control panel. A CD is provided for printer installation. Install printer using control panel.
18	Demonstrate user account facility of control panel. a) Create an account name "Students" b) Assign limited privileges to user "Students"
19	Set the home page of default browser to "http:\\www.dbscience.org" Using network and internet connection facility of control panel.
20	Demonstrate user account facility of control panel. a)Create an account name "Admin" b) Assign system administrator privileges to user "Admin" c) Create a password "dbsciorg" for user "Admin"
21	Explain Network Devices in detail a) Repeater b) Bridge c) Router d) Gateway
22	To study Bluetooth technology

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
(Semester I)
Paper – II
C Programming

NSQF : LEVEL - 4

JOB ROLE : JUNIOR SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	Individuals in this job are assigned one of the many entry level roles in the software industry including support and help desk, testing, user interaction design, maintenance, enhancement, development and documentation. They are responsible for assisting in performing the key activities and tasks involved in the assigned role.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.2. demonstrate aptitude for analyzing information and making logical conclusions.3. demonstrate knowledge of the foundational mathematical concepts in computing.4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.5. read and execute a test case and record the outcome in the appropriate template.6. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

UNIT- I:

Problem Solving: Problem Identification, Analysis, Flowcharts, algorithms and Pseudocode, Flowcharting symbols, Converting algorithms to flowcharts.

Control structures : Sequence, Selection, Iteration & Modular.

UNIT- II :

Introduction to C: Character set, C Tokens, Identifier, Keywords, Variables, Data types, Constants, Operators and Expressions, Character Strings, Enumerated Data Types, Operator Precedence and Associativity.

Decision making & Branching: if, if..else, nesting of if..else if..else ladder, switch statement, goto statement.

Decision making & Looping: while loop, do while, for loop, Nested loops.

UNIT- III:

Arrays: Single and Two Dimensional Array.

Strings: Strings Manipulation, Arrays of Strings.

Functions: Definition, Return values & their types, function call, recursion, passing Arrays to Functions, Storage classes.

UNIT- IV:

Structure: Declaration, Accessing structure members, Structure initialization, Structure & Functions, Array of Structures.

Union: Unions, Differences between Structure and Union.

Pointer: Introduction, accessing the address of variable, declaring & initializing pointer variables, accessing variables through pointers, void pointers.

File management in C: Introduction, Defining & Opening a file , closing a file, Input/Output operations on file, Random Access to files, Command Line arguments.

Reference Books:

1. The Art of programming through flowcharts & algorithm by Anil B. Chaudhari Firewall Media, Laxmi publication, New Publication.
2. Programming in C by E. Balagurusamy TMH Publications.
3. C Programming - Kernighen and Ritchie.
4. Let us C – Y. Kanetkar.
5. C Programming – Holzner, PHI Publication.
6. Programming in C – Ravichandran.
7. Programming in C by Kamthane Ashok.

List of Practical's:

Sr. No.	List of Practical's
1	A five digit number is input through a keyboard. Write a program in C to reverse the number and to determine whether the original and reversed numbers are equal or not.
2	WAP in C to determine whether the pressed key is upper case letter or lower case letter or digits or any special symbol by using following table. Character ASCII Values A-Z 65-95 a-z 97-120 0-9 48-57
3	Program to compute Sine and cosine series : $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$
4	WAP in C to find if a given no. is prime or not
5	WAP in C to compute Fibonacci series
6	WAP in C to insert an element in one dimensional array at a given position
7	WAP in C to delete an element from one dimensional array
8	WAP in C to search the element in an array of N element using Linear search.
9	WAP in C to search the element in an array of N element using Binary search.
10	WAP in C to multiply a 3*3 matrix.
11	WAP in C to find largest element in TDA(3*3)
12	WAP in C to check if given string is palindrome or not.
13	WAP in C using function to find sum of two numbers with no argument & no return value
14	WAP in C using function to find sum of two numbers with argument & return value
15	WAP in C to factorial of a given number using recursive function
16	WAP in C to swap values of two variables by passing pointers.
17	WAP in C to add two complex no. By passing structure to a function.
18	Program to Read two integers and determine bigger of the two with the help of function big() returning an integer pointer.
19	WAP in C to create a sequential file and perform the following operation fields are Roll No., Name, M1, M2, M3. a) Process & display output.
20	WAP to accept Marks of 'N' Students in three subjects and print average and Grade of each student
21	Write a C Program to reverse the entered string from command line arguments

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
(Semester II)
Paper –I
OPERATING SYSTEM CONCEPTS & LINUX

NSQF : LEVEL - 5
JOB ROLE: WEB DEVELOPER

Title	Details
Brief Job Role Description	After completing this programme, participants will be able to: Contribute to the design of software products and applications Develop media content and graphic designs for software products and Applications
Knowledge Description	To be competent, you must be able in: <ol style="list-style-type: none">1. Programming for the Web2. Analysis and Design of Web based Applications3. Media Content and Graphics Design

UNIT- I:

Operating system: Introduction, computer system organisation and architecture, operating system structure and functions.

Management: Process, Memory and Storage.

System structures: Operating system Services, system calls & Types of system call.

Process scheduling: Introduction, Scheduling algorithms- First Come First served scheduling, Shortest job first scheduling, Priority scheduling, Round Robin scheduling

Unit- II:

Memory management: Introduction, swapping, contiguous memory allocation, paging, segmentation, Segmentation with paging.

I/O Management: I/O hardware, I/O Buffering, Disk I/O, Raid, Disk Cache.

File Management: File Management system, File Accessing Methods, File Directories, File Allocation Methods, File Space Management, Disk Space Management.

UNIT- III :

Linux OS : Introduction, Logging In and Logging Out, Anatomy of Linux OS, Directory Structure, /usr Directory, File Types.

Commands: Basic Syntax for a command, Home Directory, ls, mkdir, rmdir, stat, cat, rm, mv, cp.

Editor: Vi editor.

System: Simple Backup, gzip, gunzip, tar.

UNIT- IV:

Working with Processes: Types of processes, ps Command, Creating process, killing process, free command and top utility.


Managing Disk Space: df, du commands, Creating Additional Free Disk Space, Locating Unused Files, Setting System Clock.

Communication Utilities: who, who am i, finger, mesg, write, wall, talk.

Reference Books:

1. Operating Systems by P. Balakrishna Prasad [Scitech Publication]
2. Operating System Concepts : Silbershatz, Galvin, Gagne (Addision Education)
3. Operating Systems - H.M. Deitel - Addision Wesley.
4. Operating Systems- John J. Donovan.
5. Modern Operating Systems : Tenenenbaum. (Pearson Education)
6. SAMS Teach Yourself Linux by Craig and Coletta Witherspoon.[Techmedia]
7. LINUX complete reference by Richard Peterson.

List of Practice's

SR. NO.	NAME OF PRACTICALS
1.	Create a directory called stud. Change to the stud directory. Verify you have actually changed to stud directory. Return to your original directory. Also create a file called top. Display the first three and last three lines of the file top in the same directory.
2.	Change to stud directory. Create a directory under stud directory called "marks". Copy any two files from home directory to "marks". Delete the directory marks using - roption. Change to home directory copy any two files from current directory to stud directory. create additional names for them.
3.	Create a directory called Target .Move any two files to directory Target. Display the contents of the above mentioned file .Remove the file .List the contents of the directory and change to home directory.
4.	Redirect the contents of ls -p to a file called dir. Give the command to redirect the output of long listing files and append it to the file dir. Change the mode of those file which begin with "s" in such a way that the owner has read and execute permission ,the group has read and write permission and others only read permission (use octadecimal representation).
5.	What command will display the list of all files starting from our current directory? Display the names of all ordinary files from the current directory and all its sub directories whose name ends in "ing" and which have been modified within last 3 days
6.	Display the details (including permission of read/write/execute) of the files /directories whose names begin with "s".Also display the contents of directories at home directory
7.	List the names of the files according to their last access time along with their creation date and time. Also give the command to extract the links, file owner and the file name only in the current directory/
8.	What is the command to display the entire text of file into uppercase and vice versa.
9.	Write Script to see current date, time, username, and current directory
10.	Write shell script to display the following details in a payslip PAY SLIP DETAILS 1.House Rent Allowance 2.Dearness Allowance 3.Provident Fund HRA is to be calculated at the rate of 20% of the basic. DAIs to be calculated 40% of the basic and PF is calculated 40% of the basic echo "Please enter your basic"
11.	How to write shell script that will add two nos, which are supplied as command line argument, and if this two nos are not given show error and its usage
12.	Write Script to find out biggest number from given three nos
13.	Write script to print given numbers sum of all digit, For eg. If no is 123 it's sum of all digit will be 1+2+3 = 6.
14.	Write script to determine whether given file exist or not, file name is supplied as command line argument, also check for sufficient number of command line argument
15.	Write shell script using for loop to print the following patterns on screen  Write script to print nos as 5,4,3,2,1 using while loop.

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
(SEMESTER-II)
Paper – II
Programming in ‘C++’

NSQF : LEVEL - 5

JOB ROLE: WEB DEVELOPER

Title	Details
Brief Job Role Description	After completing this programme, participants will be able to: Contribute to the design of software products and applications Develop media content and graphic designs for software products and Applications
Knowledge Description	To be competent, you must be able in: <ol style="list-style-type: none">1. Programming for the Web2. Analysis and Design of Web based Applications3. Media Content and Graphics Design

Unit - I:

OBJECT ORIENTED PROGRAMMING: Object-Oriented Programming Paradigm, Basic concepts of OOPS and Benefits of OOPS.

CLASSES AND OBJECTS: Specifying a Class, Creating Objects, Accessing Class members, Defining member function, Outside Member Functions as inline, Accessing Member Functions within the class, Static data member, Array of objects, friendly function .

ACCESS SPECIFIERS: Private, Protected and Public Members.

UNIT - II:

CONSTRUCTORS & DESTRUCTORS: Introduction, Parameterized Constructors, Constructor Overloading, Constructors with Default Arguments, Copy Constructor, Dynamic Constructor, Destructor.

OPERATOR OVERLOADING: Definition, Overloadable Operators, Overloading Unary Operator, Overloading Binary Operator, Rules for Operators Overloading.

UNIT - III:

INHERITANCE: Defining derived classes, Single, Multilevel, Multiple, Hierarchical, Hybrid Inheritance, virtual base class, Abstract classes, Constructor and Destructor in Derived Classes.

DYNAMIC OBJECTS: Introduction, Pointers to Objects, this Pointer, Creating and Deleting Dynamic Objects, New and Delete operators.

UNIT - IV:

VIRTUAL FUNCTIONS: Need for Virtual Functions, definition, Pure Virtual Functions, Abstract Classes, Rules for Virtual Functions.

EXCEPTION HANDLING: Exception Handling Model, List of Exceptions, Handling Uncaught Exceptions, Fault Tolerant Design Techniques, Memory Allocation Failure Exception, Rules for Handling Exception Successfully.

Reference books:

1. Mastering C++ by K R Venugopal Tata McGraw-Hill , New Delhi.
2. The C++ Programming Language –Bjarne Stroustrup
3. Programming with C++ - Ravichandran
4. Object Oriented Programming with C++ by E. Balagurusamy, McGraw Hill
5. Ashok N. Kamthane, Object oriented Programming with ANSI & Turbo C++, Pearson

List of Practical's

Sr. No.	List of Practical's
1.	WAP to find average of two number
2.	WAP to find no. is prime or not and factorial of a no.
3.	WAP to accept the distance between city 1 st &2nd,city 2 nd &3rd. Calculate the distance between city 1st &3rd. Define a class road with private data member km,m,d1,d2,d3 containing member function getdata to accept values of d1,d2 and calculate for calculating distance
4.	WAP to demonstrate nesting of member function.
5.	WAP to demonstrate static class member.
6.	WAP to demonstrate object as argument.
7.	WAP to demonstrate Class with constructors
8.	WAP to demonstrate the usage of constructor and destructor. 1) Define a class data with data member acct-no., balance constructor data to initialize data member and a member function display for output.
9.	WAP demonstrate usage of a constructor and destructor function. Declare a class with public data member count. The class containing one constructor and destructor to maintain update information about active objects i.e. 1.No. of object created. 2.No. of objects destroyed.
10.	WAP to demonstrate copy constructor
11.	WAP using function to find the sum of two no. with argument and return value
12.	WAP to demonstrate overloading Binary operators.
13.	WAP to demonstrate overloading unary minus.
14.	WAP to illustrate array of objects in classes
15.	WAP for pointer to object, pointing to dynamically created objects.
16.	WAP to implement Hierarchical inheritance using parameterized constructor in classes..
17.	WAP to illustrate hybrid inheritance.
18.	WAP to find out square and cube of given no. using multilevel inheritance
19.	WAP for Student details using multiple inheritance
20.	WAP to demonstrate a pure virtual function, and invoked from the object of derived class through the pointer of the base class.
21.	WAP to find out maximum number using This pointer.
22.	WAP to demonstrate use of virtual functions .
23.	WAP for payroll system using single inheritance
24.	WAP to perform exception handling with multiple catch.

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
(SEMESTER-III)
Paper – I
DATA STRUCTURES

NSQF : LEVEL – 6

JOB ROLE : MASTER TRAINER FOR JUNIOR SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	Master Trainer for Junior Software Developer will be accountable to train and equip students of 0 to 2 years' experience. Major responsibility being to prepare trainees and enable them to procure, and perform to a reasonable extent, at entry level jobs that exist in the IT Services Industry.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.2. demonstrate aptitude for analyzing information and making logical conclusions.3. demonstrate knowledge of the foundational mathematical concepts in computing.4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.5. read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Unit I:

INTRODUCTION: Basic principle of Data structure ,Abstract data type.

ALGORITHMS: Complexity, Time space Trade-offs.

SEARCHING TECHNIQUES: Linear search, Binary search.

SORTING TECHNIQUES: Bubble sort, Insertion sort, Selection sort, Merge sort.

HASHING : Hash Tables, Hashing Technique, Collision Resolution Technique.

Unit II:

LINKED LIST: Introduction, Representation of Linked list in memory, All possible operations on Single and Double linked List using Dynamic representation, Header linked lists.

Unit III:

STACKS : Stacks terminology, Representation of Stacks in Memory, Operation on Stacks, Polish Notations, Quick Sort-an application of stacks

RECURSION: Problems on Recursion and Tower of Hanoi Problem.

QUEUE: Introduction to queue, Linked Representation of Queue, Circular Queue, Dequeue and Priority Queues in Memory.

Unit IV:

TREES: Basic Terminologies, Representation of Binary Trees in Memory, Traversing of Binary tree, Binary Search Tree, Operation on Binary Search Tree: Searching, inserting & deleting, Heap Tree, Operation on Heap Tree, Heap Sort Method.

GRAPHS : Graph theory terminologies, Sequential representation of Graphs : Adjacency & Path Matrix, Shortest Path algorithm: Warshall's Algorithm, Linked representation of graph, Traversing graphs : BSF, DFS Method.

Reference books:

1. Classical Data Structures : D. Samanta. PHI, New Delhi.
2. DATA STRUCTURE : LIPSCTUZ SCHUM OUTLINE SERIES.
3. Data structure Using C++ : Y. Kanetkar.
4. Data Structures Using C++: Tennenbaum.
5. Handbook of Data Structures and Applications by Dinesh mehta and Sartaj sahni.

List of Practical's

Sr. No.	List of Practical's
1.	Program to insert a node at the beginning, at the end and in the middle of the given linked list.
2.	Program to delete a node at the beginning, at the end and in the middle of the given linked list.
3.	Program to create a linked list of customer names and their telephone numbers. (Using Menu Driven and include features of adding a new Customer and deleting an existing Customer.)
4.	Program to reverse a linked list.
5.	Program to search a value in the given linked list.
6.	Program to insert a node at the beginning, at the end or in the middle of a given doubly linked list.
7.	Program to delete a node from the beginning, at the end or in the middle of a given doubly linked list.
8.	Prog. to create, insert & delete a node in Circular linked list.
9.	Program to push and pop an element into / from a stack implemented using linked list.
10.	Program to push and pop an element into / from a stack implemented using Array.
11.	Program to evaluate postfix expression.
12.	Program to sort an array using quick sort.
13.	Program to solve Towers of Hanoi problems using recursion.
14.	Program to perform insertion and deletion operation in linear queues.
15.	Program to perform insertion and deletion operation on circular queues.
16.	Program to sort an array using Insertion sort.
17.	Program to sort an array using Selection sort.
18.	Program to insert an element in a binary search tree.
19.	Program to traverse inorder of a binary tree.
20.	Program to traverse preorder of a binary tree.
21.	Program to traverse postorder of a binary tree.

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
Semester III
Paper – II
Web Designing

NSQF : LEVEL – 6

JOB ROLE : MASTER TRAINER FOR JUNIOR SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	Master Trainer for Junior Software Developer will be accountable to train and equip students of 0 to 2 years' experience. Major responsibility being to prepare trainees and enable them to procure, and perform to a reasonable extent, at entry level jobs that exist in the IT Services Industry.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.2. demonstrate aptitude for analyzing information and making logical conclusions.3. demonstrate knowledge of the foundational mathematical concepts in computing.4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.5. read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

UNIT - I :

HTML: Introduction, Objective, HTML Browsers, Windows Switching, HTML Command Tags, URLs, links, new web page creation, main body of the text, putting headers, adding paragraph , formatting text in HTML and font mechanism, Color settings, superscripts and subscripts and other manipulations on text and paragraphs, using directory and menu lists, creation of links, inserting graphics, using images, all manipulations on tables and its display, Detailed working with forms, allowing visitors to upload files, active images ,working with frames & framesets, Frames handling, scroll bars, alternatives to frames

UNIT - II :

HTML5: Introduction, Media, Audio, Video.

DHTML: using DHTML in internet explorer, heading and horizontal line, hidden message, the message at the center of the page, moving boxes ,changeable box. Introduction to browsers, Working with e-mail, Parts of e-mail text, working with messages.

UNIT - III :

Cascading style sheets: Introduction to CSS, creating style sheets, common tasks with CSS, Colors, the font -family, font metrics ,length units ,absolute units ,relative units ,the pixel unit ,percentages as values, keywords as values, various properties such as the font -size property, font -size property etc, Assigning classes ,tags and attributes for applying classes, applying classes to an HTML tag, applying classes to other document parts ,the layer tag, CSS Tags.

UNIT IV:

JavaScript: Variables, Operators, Functions, Conditional Statements, Looping, Built-in objects: String, Arrays, Date, Math. Document Object, Method of document object, Handling events in Javascript. Introduction to JQuery

Graphic Design :Introduction to Adobe Photoshop and Adobe Dreamweaver

Reference Books:

1. JavaScript & jQuery: The Missing Manual, 2nd Edition By David Sawyer McFarland Publisher: O'Reilly Media.
2. Javascript : the definitive guide ,By David Flanagan.
3. Internet and web designing by ITELS (Macmillan).
4. Web Enabled Commercial Application Development Using HTML, DHTML, JS, Perl by Ivan Bayross.
5. Deitel, Deitel & Nieto, Internet and Worldwide Web how to Program, Pearson Education, PHI.
6. Internet Programming with VBScript and Java Script. Kathhleen Kalata (Thomson Publication)
7. Programming the World Wide Web by Robert W. Sebesta. (Pearson)
8. Internet and web design by R Bangia, Second edition , firewall media.
9. Multimedia and Web technology by R Bangia.
10. Adobe Photoshop CS6 : Classroom in a Book by Brie Gyncild
11. Adobe Dreamweaver CS6 : Classroom in a book by James J. Maivald

List of Practical's

SR.NO	List of Practical's
1.	Write a Program to demonstrate the use of heading tag in html.
2.	Write a Program to demonstrate the use of table in html document and also explain their various related table tags (TD, TR and TH).
3.	Write a Program to demonstrate the use of table with different style using id in html.
4.	Write a Program to demonstrate the use of horizontal and vertical table heading in html.
5.	Write a Program to demonstrate to create hyperlink on a web page using client side image mapping in html.
6.	Write a Program to demonstrate to show image height and width using both in html.
7.	Write a Program to demonstrate the use of form in html.
8.	Write a Program to demonstrate the use of FRAMESET in html.
9.	Write a Program to demonstrate the use of horizontal list Menu in html.
10.	Write a Program to demonstrate the use of send Email for a form in html.
11.	Write a Program to demonstrate the use of HTML5 audio and video element
12.	Write a Program to demonstrate the CSS using the font in html.
13.	Write a Program to demonstrate the CSS using the class attributes in html.
14.	Write a Program to demonstrate using CSS(Internal) in html.
15.	Write a Program to demonstrate using CSS(External) in html
16.	Write a Program to demonstrate the use of element defines the base URL for all URLs in html.
17.	Write a Program to demonstrate the use of All Arithmetic operation in Javascript
18.	Write a Program to search an element in an array of size "n" in Javascript
19.	Write a program to compute the gcd of 2 numbers using function in javascript
20.	Write a program to illustrate different in-built string functions in javascript
21.	Write a program to demonstrates how to get content with the jQuery text() and html() methods
22.	Write a program to demonstrate how to set content with the jQuery text(), html(), and val() methods

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
Semester IV
Paper- I
Database management system

NSQF : LEVEL – 6

JOB ROLE : MASTER TRAINER FOR JUNIOR SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	Master Trainer for Junior Software Developer will be accountable to train and equip students of 0 to 2 years' experience. Major responsibility being to prepare trainees and enable them to procure, and perform to a reasonable extent, at entry level jobs that exist in the IT Services Industry.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. demonstrate basic computer and internet literacy including operating a computer, describing its major components and how they work, using Windows and Linux OS, operating a browser, searching the internet, managing mails and using social internet media.2. demonstrate aptitude for analyzing information and making logical conclusions.3. demonstrate knowledge of the foundational mathematical concepts in computing.4. design algorithms to solve problems and convert them into code using the appropriate programming language constructs.5. read and execute a test case and record the outcome in the appropriate template. be able to communicate effectively with appropriate people w.r.t. assigned roles in simple English – both oral and written.

Unit-I:

Database concept: what is database, what is database management system, benefit of DBMS, what is relational database management system, codd's rule for RDBMS, DBMS vs RDBMS, Normalization, introduction to Oracle, introduction to structured query language.

Table fundamentals: Oracle data type, basic data type, dml, ddl, tcl, drl.

Unit- II:

Interactive SQL- I : Create command ,viewing data in the tables, eliminating duplicate rows when using a select statement, creating a table from a Table, inserting data into a table from another table, delete operation, update the contents of a table, modifying the structure of a table, rename table , truncate table destroying table, data constraints ,types of data constraint , the primary key constraint, the foreign key constraint ,the unique constraint ,business rule constraint , dropping constraint.

Unit- III:

Interactive SQL- II : Computation done on table data, Oracle function, group data from table, subqueries, joins using the union intersect and minus clause, Dynamic SQL, Dynamic SQL statement using DBMS SQL , Indexes, views, clusters, sequence .

Unit- IV:

Introduction to PL SQL: Advantage of PL/ SQL, the generic pl/sql block, the PL/ SQL execution environment , control structure.

PL/ SQL database object: Database triggers, types of triggers, deleting a triggers.

Reference books:

- 1.Understanding ORACLE By Ivan Bayross [BPB Publication]
2. Database System Using Oracle: A Simplified Guide to SQL & PL-SQL: Nilesh Shah, PHI Publication.
3. Database Management Systems (Complete practical approach) by Sharad Maheshwari & Ruchin Jain, Firewall media.
4. Dr. P.S.Deshpande SQL & PL/SQL for Oracle 10g Black Book.
5. Scott Urman Programming PL/SQL TMH

List of Practical's

Sr. No.	List of Practical's
1	Create a table "Route_Header" containing fields. (Route_id number(8), Route_no number(8), Cat_code number(8), Origin varchar2(8), Destination varchar2(8), Distance number(8), Capacity number(8), fare number(8))
2	Insert the data into "Route_Header" table.
3	Write a query to add the field description whose data type is varchar2.
4	Describe structure of Route_Header.
5	Display only distinct category code in descending manner.
6	Alter the table to modify the length of column "distance" in the table to 10.
7	Delete only those rows that have DESTINATION as cochin and ORIGIN as Madurai.
8	Display any those rows whose ORIGIN with 'm%'.
9	Display any those rows fare ranges from 30 and 40.
10	Show the last name job and commission of those employee who earn commission and sort the data by salary in descending order.
11	Show the employee that have an commission with 10% in this salary.
12	Create table emp1 with same structure as the table EMP. Insert row into using select clause.
13	Write a query to display the name of employee who join the organization between 04-dec- 14 and 05-dec-15.
14	Write a pl/sql block to display the even and odd numbers starting from 100.
15	Write query to display the following grouping a) DEPARTMENT_ID and JOB_ID b) The query should calculate maximum salary for the above group.
16	Update the table Route_Header set distance of Madurai to mumbai to 2589
17	Display the destination origin starts with 'p%'
18	Show all the data of employees who have been hired before 1997?
19	How many employees have name that end with n.
20	Show the department name, location, job titles, lastname and salary of employees to work in location 1800
21	List maximum, minimum, average and sum of salary.
22	List the maximum salary and number of employees working as Salesman.
23	Create Procedure to swap two values
24	Create Trigger that restricts the user from performing a DML on movie table on 'Monday'
25	Explain Codd's rules for relational database models.
26	Write a PL/SQL program to check number is palindrome or not
27	Write a PL/SQL program to find number is Armstrong or not
28	Write a PL/SQL program to generate Fibonacci series
29	Write a PL/SQL program to find reverse of a string
30	Write a PL/SQL program to calculate total and percentage of marks of the students in four subjects.

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
Semester IV
Paper – II
Web development in PHP

NSQF : LEVEL – 6

JOB ROLE : MASTER TRAINER FOR JUNIOR SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	Master Trainer for Junior Software Developer will be accountable to train and equip students of 0 to 2 years' experience. Major responsibility being to prepare trainees and enable them to procure, and perform to a reasonable extent, at entry level jobs that exist in the IT Services Industry.
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Unit I:

Introduction to PHP: PHP Introduction-Installing PHP

Building blocks of PHP: PHP Variables, PHP Data Types, PHP Strings, PHP Constants, PHP Operators, PHP Programming Loops, PHP Functions, PHP Arrays

Control flow functions: if, else, else if, switch, Loops: for, while, do while.

Unit II:

Functions: Definition, Calling function, defining a function, returning Values from User-Defined Functions, Variable Scope, Accessing Variables with the global Statement From, setting default values for arguments, passing variable reference.

Arrays : Definition, Creating Arrays: Associative Arrays & Multidimensional Arrays, Array-Related Constructs and Functions.

Objects: Working with Objects, the basic structure of an object, creating and manipulating objects and the data.

Working with Strings: Formatting Strings, String functions.

Unit III:

Working with Forms: Creating Form, Form elements: Text Box, Text Area, Password, Radio Button, Checkbox, The Combo Box, Hidden Field and image.

Working with Cookies and Sessions: Introducing Cookies, Setting a Cookie with PHP, Deleting a Cookie with PHP, Session Function, Starting a Session, Working with Session Variables.

Unit IV:

PHP with Mysql: Creating PHP Mysql Database, creating new table, putting data into new database, accessing Database in PHP, updating databases, PHP Creating Records, PHP Selecting Records, PHP Deleting Records.

Reference books:

1. Sams teach yourself PHP, MySQL and Apache : all in one by julie C.Meloni.
2. PHP: The Complete Reference by Steven Holzner.
3. Mastering PHP, WebTech Solutions, Khanna Publishing House.
4. Learning PHP, Ramesh Bangia, Khanna Publishing House.

List of Practical's

SR.NO	List of Practical's
1.	Create a PHP program to find odd or even number from given number.
2.	Write a PHP program to swap two numbers with and without using third variable.
3.	Write a PHP program to print Fibonacci series without using recursion and using recursion.
4.	Write a PHP Program to demonstrate the variable function: Gettype()
5.	Write a PHP Program to demonstrate the variable function: Settype()
6.	Write a PHP Program to demonstrate the variable function: isset()
7.	Write a PHP Program to demonstrate the variable function: unset()
8.	Give the example of variable function:strval()
9.	Give the example of variable function:floatval()
10.	Give the example of variable function:intval()
11.	Give the example of variable function: print_r()
12.	Give the example of variable function: var_dump()
13.	Give the example of string function: substr()
14.	Give the example of string function: strcmp()
15.	Give the example of string function: strpos()
16.	Write a PHP program that demonstrate form element(input elements).
17.	Write a PHP program that demonstrate passing variable using URL.
18.	Write a PHP program that demonstrate use of session.
19.	Write a program that demonstrate use of cookies.
20.	Write a PHP program to create a database using MySQL.
21.	Write a PHP program to drop a database using MySQL.
22.	Write a PHP program to create a table in MySQL.
23.	Write a PHP program to insert record into a table using MySQL.
24.	Write a PHP program to drop table using MySQL.
25.	Write a PHP program to update table
26.	Write a PHP program to select data and show into table format.
27.	Create a student Registration in PHP and Save and Display the student Records.

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
Semester V
Paper – I
System Analysis & Software Engineering

NSQF : LEVEL – 7

JOB ROLE : SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	After completing this programme, participants will be able to: <ul style="list-style-type: none">• Contribute to the design of software products and applications Develop software code to specification.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. Design basic programming structures to implement functionality in line with requirements defined in BRS/URS, SRS and HLD2. Check the understanding of the Business Requirements Specification (BRS)/User Requirements Specification (URS) with appropriate people3. Check the understanding of the Software Requirements Specification (SRS) with appropriate people4. Check their understanding of High Level Design (HLD) with appropriate people5. Review their designs with appropriate people & Analyse inputs from appropriate people to identify, resolve and record design defects and inform future designs6. Document designs using standard templates and tools Comply with organization's policies, procedures and guidelines when contributing to the design of software products and applications

UNIT - I:

Introduction: System, Types, Components of Computerized Information System, Systems Analysts: Duties, Role. SDLC.

Feasibility Study and Analysis: Identifying Problems, Organizing Feasibility Analysis, Feasibility Decision, Choice of a solution.

Data Collection: Interviews, Brain Storming, Questionnaires, Document Search, Observation.

Structured tools and techniques of Data analysis: Structured English, Decision Tables and Decision Trees, Data Flow Diagram, Data Dictionary.

Unit- II:

THE NATURE OF SOFTWARE: The Nature of Software , The Changing Nature of Software..

SOFTWARE ENGINEERING: Defining the Discipline, The Software Process, Software Engineering Practice, Software Development Myths.

PROCESS MODELS: Prescriptive Process Models, The Unified Process.

AGILE DEVELOPMENT: What is agility? Agility and the Cost of Change, What Is an Agile Process?, Extreme Programming.

Unit -III:

UNDERSTANDING REQUIREMENTS : Requirements Engineering, Developing Use case.

DESIGN CONCEPTS: Design within the Context of Software Engineering, Design Concepts, The Design Model.

ARCHITECTURAL DESIGN: Software Architecture, Architectural Genres, Architectural Styles.

COMPONENT-LEVEL DESIGN: What is a Component?, Designing Class-Based Components.

USER INTERFACE DESIGN : The Golden Rules, User Interface Analysis and Design.

QUALITY CONCEPTS: What Is Quality?, Software Quality.

Unit- IV:

SOFTWARE TESTING STRATEGIES: A Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging.

TESTING CONVENTIONAL APPLICATIONS: Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing .

SOFTWARE REENGINEERING: Reengineering, Business Process Reengineering, Reverse Engineering, The CMMI.

Reference books:

1. Software Engineering A Practitioner's Approach eighth edition by Roger Pressman and Bruce R. Maxim.
2. Information Systems Analysis, Design and Implementation by K. M. Hussain, Donna Hussain
[Tata McGraw-Hill Publishing Company Ltd, New Delhi]
3. Fundamentals of Software Engineering by Rajib Mall [PHI Publication]
4. Workbook on Systems Analysis & Design by V. Garg [PHI Publication]

List of Practical's

Sr. No.	List of Practical's
1.	Write note on Structured English.
2.	<p>To buy a computer science book follow the steps and write the Structured English</p> <ol style="list-style-type: none"> Pick out a desirable book. Take it to the sells counter. Pay cash for the book. Collect cash receipt. Collect the book and leave the store.
3.	Write note on decision table.
4.	<p>Draw decision table for an insurance company uses the following rule to determine the eligibility of a driver for insurance. The driver will be insured if:</p> <ol style="list-style-type: none"> The driver lives in the city with population less than 5000 and he is married man. The driver lives in the city with population less than 5000 and he is married and age is over 30 years old. The driver lives in the city with population is 5000 or more and it is married female. The driver is male over 30. The driver is married and under 30.
5.	<p>Draw a decision table for a company with three people A, B, C whose share in the company are 50%, 20%, 30% sequentially. Any low arises in the company will be passed if it is supported by shareholders and whose shareholding exceed 2/3 of the total shares.</p>
6.	<p>Study following conditions and draw a decision table</p> <p>If product code=A And customer type=1 And the order amount<=700 Then 5% discount allowed</p> <p>If product code=A And customer type=2 And the order amount<=700 Then 7.5% discount allowed</p> <p>If product code=A And customer type=1 And the order amount>=700 Then 7.5% discount allowed</p> <p>If product code=A And customer type=2 And the order amount>700 Then 10% discount allowed</p> <p>A flat discount of 5% on product code=B regardless of customer type and the order amount</p>
7.	Write note on Decision Tree.
	<p>Draw a decision tree for policy followed by a company in giving discount to its customers as follows.</p> <ol style="list-style-type: none"> If transaction is on credit and customer's record is good the order will be accepted but do not give any discount.

	<p>If customer's record is not good do not accept any order.</p> <p>2. If transaction is on cash and sells amount is more than 100 rupees discount will be given 20%.</p> <p>3. If transaction is on cash and sells amount is between 50 & 100 rupees than discount will be given 10%.</p> <p>4. If transaction is on cash and sells amount is less than 50 rupees, order is accepted but no discount will be made.</p>																																			
8.	<p>A Co-operating bank xyz granted loan under following conditions draw decision table and tree</p> <p>1. If a customer has a account with the bank and has no loan outstanding (no dues), loan will be granted.</p> <p>2. If a customer has an account is outstanding from previous loan, loan will be granted if special management approval is obtained.</p> <p>3. Reject loan application in all other cases.</p>																																			
9.	Write note on Data Flow Diagram (DFD)																																			
10.	Draw DFD for Food Ordering System.																																			
11.	Write note on Data Dictionary.																																			
12.	Develop Data dictionary for data element Employee code in dictionary																																			
13.	Calculate Overall risk exposure for the software reliability																																			
14.	<p>Write a program using html for implementing online banking system including</p> <p>i) Deposit Funds in Saving Account</p> <p>ii) Withdraw Funds from Saving Account</p>																																			
15.	Write a program using html for implementing online Hotel Management System.																																			
16.	Write a program using html for online Library Management System.																																			
17.	Design a Registration form for workshop on Computer Maintenance web designing(HTML)																																			
18.	<p>Create a decision table using MS-Excel</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>ACTIONS:</th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Serve cocktails</td> <td></td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>Charge for cocktails</td> <td></td> <td>X</td> <td></td> <td>X</td> </tr> <tr> <th>CONDITIONS:</th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td>SeatsOccupied > SeatsCapacity / 2</td> <td>n</td> <td>y</td> <td>y</td> <td>y</td> </tr> <tr> <td>FlightType = "domestic"</td> <td>-</td> <td>n</td> <td>n</td> <td>y</td> </tr> <tr> <td>SeatCost > 350</td> <td>-</td> <td>n</td> <td>y</td> <td>-</td> </tr> </tbody> </table>	ACTIONS:					Serve cocktails		X	X	X	Charge for cocktails		X		X	CONDITIONS:					SeatsOccupied > SeatsCapacity / 2	n	y	y	y	FlightType = "domestic"	-	n	n	y	SeatCost > 350	-	n	y	-
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19.	<p>Draw the following basic UML Class diagram Notation</p> <p>i. Class</p> <p>ii. Abstract class</p> <p>iii. Object</p> <p>iv. Inheritance (is-a) relationship</p> <p>v. Aggregation and Composition (has-a) relationship</p> <p>vi. Association (uses, interacts-with) relationship</p> <p>vii. Multiplicity in Aggregation, Composition, or Association</p>																																			
20.	Draw Use case diagram for order management system to show actors, use case and relationship																																			
21.	Draw basic UML Sequence Diagram Notation																																			
22.	Draw class diagram for order management system																																			
23.	Draw sequence diagram for order management system																																			

24.	Draw Activity Diagram for order management system
25.	Study system specifications and report the various bugs of ATM system
26.	Write the test cases for Banking application
27.	Study of Any Testing Tool (Win Runner)

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
(SEMESTER-V)
Paper – II
Java Programming

NSQF : LEVEL – 7

JOB ROLE : SOFTWARE DEVELOPER

Title	Details
Brief Job Role Description	After completing this programme, participants will be able to: <ul style="list-style-type: none">• Contribute to the design of software products and applications Develop software code to specification.
Knowledge Description	To be competent, you must be able to: <ol style="list-style-type: none">1. Design basic programming structures to implement functionality in line with requirements defined in BRS/URS, SRS and HLD2. Check the understanding of the Business Requirements Specification (BRS)/User Requirements Specification (URS) with appropriate people3. Check the understanding of the Software Requirements Specification (SRS) with appropriate people4. Check their understanding of High Level Design (HLD) with appropriate people5. Review their designs with appropriate people & Analyse inputs from appropriate people to identify, resolve and record design defects and inform future designs6. Document designs using standard templates and tools Comply with organization's policies, procedures and guidelines when contributing to the design of software products and applications

UNIT - I :

INTRODUCTION TO JAVA: Java history, Java features, Java environment. Java program structure, Java Tokens, Java Statements, Java virtual machine, Constants, Variables, Data Types, Declaration of Variables, Scope of Variables, Symbolic Constants, Type Casting.

UNIT - II :

CLASS & OBJECTS: Defining a Class, field declaration, method declaration, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods.

INHERITANCE: Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

INTERFACES : Defining interfaces, extending interfaces, implementing interfaces.

UNIT - III :

PACKAGES : Creating Packages, accessing & using a Packages , using System Package, adding a class to packages, hiding Classes.

EXCEPTION HANDLING AND MULTITHREADING: Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface, Types of error, exception handling techniques, using exception for Debugging.

UNIT - IV :

APPLETS: Introduction to Applets , how applets differ from application, writing an applet. Applets life cycle, creating an executable applet, designing a web page, running the applet, applet tags, adding applet to HTML file ,running the applet passing a parameter to applet, , Converting applet to application.

GRAPHIC PROGRAMMING: Introduction to AWT Package, Layout Managers, Handling events on AWT Component, Introduction to swing package, Components & Containers.

Reference Books:

1. Programming with Java a primer II edition by E. Balaguruswamy (Tata McGraw-Hill).
2. Java Programming (For absolute beginners) by Russell PHI.
3. Black Book on Java.
4. Java: A beginner's Guide by Herbert Schildt.
5. Java2- The Complete References by Herbert Schildt.

List of Practical's

Sr. No.	List of Practical's
1.	Write a program that declares a class, object and also it access the data member of it's class.
2.	Write an applet that accepts a value from the user and display it.
3.	Write a program that accept marks of 5 subject, calculate total, percentage and display the grade according to their percentage.
4.	Write a program that will print the multiplication table from 1 to 10.
5.	Write an program to accept a set of values from the user into an array, display the values as well as their average.
6.	Accept string into a text field, sort the characters in the string and display the sorted string in another text field.
7.	Write a program to demonstrate the overloading & constructor.
8.	Write an applet that accepts two numbers from the user and display all the numbers between them.
9.	Write a program to demonstrate the single inheritance.
10.	Write an applet to accept ten numbers into array sort the array and display the sorted array. Accept the ten numbers into the ten different text fields.
11.	Write a program to create a multiple selection list and also display the list of items selected by the user.
12.	Write an applet to demonstrate the user menu Bar.
	Write a sample program that will convert the applet to application.
13.	Write a program to demonstrate the Interfaces.
14.	Write a program for exception handling that accept two no as textfields, the values are added & their sum is displayed. The code traps the error when user could enter text instead of an numbers.
15.	Write a program that would accept it input for the user & store it in a file called Test.java.
16.	Write a program to implement graphic class draw (line, rectangle, fill rectangle, Circle, oval).
17.	Write an applet that display a choice menu of three buttons (Add, Modify, Delete) selecting a choice from the menu should display the appropriate button Use the show () method of the layout Manager.
18.	Write a java program to read & display the information from the file ABC. dat.
19.	Write a program to implement the concept of loading & displaying images.
20.	Write a program to demonstrate the Animation in Java.

Bachelor of Vocation (B. Voc)
Skill Development Component
Software Development
SEMESTER-VI

IT Integrated Industry Based Project

❖ Project Work

❖ Project Seminar

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

**Detail Syllabus for
Bachelor of Vocation
(B.Voc)**

**Skill Development Component
Food Processing and Engineering**
(Faculty of Science & Technology)

(WITH EFFECT FROM 2020-2021 ONWARDS)

DETAIL OF JOB ROLE

B.VOC (BACHELOR OF VOCATION) FOOD PROCESSING AND ENGINEERING

Sr. No.	Programmed	Semester	NSQF Level	Job Role	Learning Outcomes
1.	Certificate	I ST	4th	Assistant Lab Technician - Food and Agricultural Commodities	<ol style="list-style-type: none"> 1. Prepare and maintain work area and equipment's for food lab testing. 2. Prepare quality analysis and manage housekeeping for food lab activities. 3. Sampling and quality analysis for food lab activities. 4. Complete documentation and record keeping related to performing food lab activities. 5. Food safety, hygiene and sanitation for food lab testing.
2.	Diploma	II ND	5	Dairy Product Processor	<ol style="list-style-type: none"> 1. Prepare and maintain work area and process machineries for processing dairy products. 2. Prepare for processing dairy products. 3. Process dairy products. 4. Complete documentation and record keeping related to processing dairy products. Food 5. safety, hygiene and sanitation for processing food products. Manage and lead the team.
3	Advance Diploma	III RD	6	Quality Assurance Manager	<ol style="list-style-type: none"> 1. Lead quality function in food processing units. 2. Manage quality in food processing units. 3. Manage audit and implement health and safety system in food processing uni
		IV TH			
4	B.Voc Degree	V TH	7	Production Manager	<ol style="list-style-type: none"> 1. Manage production process in food processing unit. 2. Manage production optimization and cost efficiency in food processing unit. 3. Manage documentation system and implement safety and environmental policies in food processing unit.
		VI TH			

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester I)
Paper – I

FUNDAMENTALS OF FOOD & NUTRITION

NSQF : LEVEL - 4

JOB ROLE: ASSISTANT LAB TECHNICIAN - FOOD AND AGRICULTURAL COMMODITIES

UNIT NO.	CONTENT
I	Introduction of Nutrition
	<ul style="list-style-type: none"> ▪ Definition of nutrition and health, Nutritive value of foods, Nutritive classification of foods, Macronutrients and micronutrients- Classification and functions, Inter-relationship between nutrition and health, Basic five food groups and Balance Diet, Malnutrition: Definition and types, Reference man and reference women, Food in relation to health and diseases, Digestion, absorption of nutrients (carbohydrates, proteins and fats) in human system, Inborn errors of metabolism, Hypovitaminosis and Hypervitaminosis, Losses of vitamins and minerals due to food processing, Food pattern. Food policies – applied nutrition programme, Food Adulteration: Definition, types of adulterants and their detection
II	Food and water
	<ul style="list-style-type: none"> ▪ Concept of food and food science <ul style="list-style-type: none"> - Objectives of food - Functions of food ▪ Definition of food, classification of foods based on origin, pH, nutritive value. food guide pyramid. ▪ Functions of foods. New concepts of food: ▪ Methods of cooking <ul style="list-style-type: none"> - Traditional cooking methods - Modern cooking methods - Objectives and importance of cooking ▪ Food Preparation and storage: <ul style="list-style-type: none"> - Basic terms used in food preparation - Pre-preparation for cooking - Storage of raw and cooked food ▪ Health foods, ethnic foods, organic foods, functional foods, nutraceuticals, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods. ▪ Water quality - water standards and analysis of physical, chemical and microbiological characteristics of water. Waste treatment - fundamentals of physical, biological & chemical waste treatments
III	Nutritional Composition of Food
	<p>Food constituents - Definition, occurrence, properties and metabolism of Protein, Carbohydrate and Lipids</p> <p>Carbohydrates</p> <ul style="list-style-type: none"> ▪ Nomenclature, composition, sources, structure, reactions, ▪ Functions and classification - <p>Proteins</p> <ul style="list-style-type: none"> ▪ Nomenclature, sources, structure, functions, classification - ▪ essential and nonessential amino acids,

	<p>Fats and oils</p> <ul style="list-style-type: none">▪ Nomenclature, composition, sources, structure, functions and Classification <p>Vitamins</p> <ul style="list-style-type: none">▪ Classification, structure, function, sources, general causes for loss in foods, Units of measurement.▪ Deficiency and toxicity disorders <p>Enzymes - Definition, classification, enzyme kinetics. Browning reactions in foods: i. Non enzymic browning: Maillard reaction, browning of ascorbic acid, caramelization of sugars. ii. Enzymic browning: Definition, mechanism, control measures.</p>
IV	Food Hygiene and Sanitation
	<p>Minerals and Energy</p> <ul style="list-style-type: none">▪ Classification of minerals. Functions, sources, bioavailability and deficiency of the following minerals- Calcium, Iron, Iodine, Fluorine, Sodium, Potassium. <p>Energy</p> <p>Units of energy, food as a source of energy, basal metabolic rate, factors effecting BMR, total energy Requirement.</p> <p>Hygiene and Sanitation :Principles of hygiene and its relation to food preparation, General hygienic and sanitary practices to be followed by different food business operators - fruits and vegetable, milk and milk product, meat and meat product, catering etc. General hygienic and sanitary requirements for different areas - location and surroundings, layout and design of food establishment premises, equipment & containers, facilities, food operations and controls, management and supervision, food testing facilities, audit, documentation and records, sanitation and maintenance of establishment premises, personal hygiene, product information and consumer awareness, training.</p>

References Book:

1. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", Newge international publishers, New Delhi.
2. Meyer, L.H. (2002), "Food Chemistry". CBS publishers and Distributors, NewDelhi.
3. Robert J Cousins, (2006), "Modern Nutrition in Health and Disease", Lippincott Williams al Wilkins.
4. Michael J Gibney, Ian A Macdonald and Helen M Roche (2003) "Nutrition and Metabolism", The Nutrition Society Textbook Series, Blackwell Publishing, First Edition.
5. Food plant sanitation – Packer and Litchfield (Reinhold Publ.)
6. Handbook of analysis and quality control for fruits and vegetables products by S. Ranganna, Mcgraw Hill Pub. Co. New York.

LIST OF PRACTICAL

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	SR. NO.	NAME OF PRACTICAL
I	PRACTICAL:-I (FUNDAMENTALS FOOD & NUTRITION)	1.	Introduction to various method of sampling of food samples.
		2	To determine pH of provided food sample
		3(A)	Determination of titrable acidity of food sample (Mango juice)
		3(B)	Determination of titrable acidity of food sample (Milk)
		3(C)	Determination of titrable acidity of food sample (Tomato sauce)
		4	To determine salt content (NaCl) of provided food Sample
		5	To determine the total solids as soluble and insoluble in food sample
		6	Determination of Total dissolved solid of sewage water & fresh water
		7	Determination of moisture content in food sample by Hot air oven method
		8 A)	To determine specific gravity of the solids by density bottle method
		8 (B)	To determine specific gravity of the liquid by Hydrometer
		9	Estimation of fat by Soxhlet Extraction method
		10	Detection of protein by Ninhydrine methods.
		11	Estimations of amino acids in foods.
12	Preparation and sterilization of culture media		
13	Demonstration of the Kjeldahl's method for estimation of protein content		
14	Preparation and sterilization of culture media using the autoclave/pressure cooker		

**Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester I)
Paper – II**

(INTRODUCTION TO FOOD PROCESSING)

NSQF : LEVEL - 4

JOB ROLE: ASSISTANT LAB TECHNICIAN - FOOD AND AGRICULTURAL COMMODITIES

UNIT NO.	CONTENT
I	Introduction of Food processing
	<p>Introduction: Definition and scope of Food Science and Technology, Sources of food, scope and benefit of industrial food preservation, perishable, non perishable food.</p> <p>Natural toxins. Contaminants formed during processing: – nitrosamines, acrylamide etc. natural food contaminants and contaminants from packaging materials.</p> <p>Sweeteners:- Introduction, importance, classification- natural and artificial, chemistry, technology and toxicology, consideration for choosing sweetening agents.</p> <p>Antimicrobial agents:-Nitrites, sulphides, sulphur-di-oxide, sodium chloride, hydrogen peroxide.</p> <p>Antioxidants:- Introduction, mechanism of action, natural and synthetic anti-oxidants, technological aspect of antioxidants.</p> <p>Food Spoilage: Definition, types of spoilage - physical, enzymatic, chemical and biological spoilage. causes of food spoilage causes of food spoilage. Mechanism of spoilage and its end products, shelf life determination.</p>
II	Food preservation
	<p>Definition, Importance of Food preservation.</p> <p>Thermal processing methods of preservation: Principle: Canning, blanching, pasteurization, sterilization, evaporation.</p> <p>Use of low temperature: Principle and effect on quality. Chilling, cold storage, freezing.</p> <p>Preservation by drying dehydration and concentration: Principle, Methods and effect on quality.</p> <p>Preservation by radiation: Definition, Methods of Irradiation, Direct & Indirect effect, measurement of radiation dose, dose distribution, effect on microorganisms.</p> <p>Presentation of foods by Preservatives: chemicals, antioxidants, mould inhibitors, antibodies, acidulants etc. Preservation by salt & sugar: Principle, Method and effect on food quality.</p> <p>Preservation by fermentation: Definition, Advantages, disadvantages.</p> <p>Recent methods in preservation: Pulsed electric field processing, High pressure processing, processing using ultrasound, dielectric, ohmic and infrared heating</p>
III	Food Processing Equipments
	<p>Food Processing equipments: Types and Principle of dryers.</p> <p>Types of heat exchanger, Principle of heat Exchangers and pasteurizer, Blancher, Retorts and boilers.</p> <p>Evaporation: Needs, basic principles, Calculations, Single and multiple effect evaporation, elevation, Falling film, climbing film tubular evaporators, plate evaporators, thin film and scraped surface evaporators.</p> <p>Distillation: Distillation, Steam distillation, applications and equipment</p> <p>Low Temperature processing equipment: Refrigeration system and freezer.</p> <p>Material handling equipment's like belt conveyor, screw conveyor, bucket elevator</p>

	<p>and pneumatic conveyors. Mechanical separation: filtration, sieving, centrifugation sedimentation. Equipment's for size reduction, Mixing, and Extrusion etc. Use and handling of microscope, laminar flow, vacuum pumps, viscometer, thermometer, magnetic stirrer, micro-ovens, incubators, sandbath, waterbath, oilbath; Electric wiring and earthing.</p>
IV	Waste Management and Effluent Treatment
	<p>Selection of sanitizing agents for cleaning, packaging sanitation, food storage sanitation, transport sanitation and water sanitation. Characterization of food industry wastes e.g., BOD, COD and total organic content, floatable and suspended solids in water. Pretreatment, secondary treatments of solid waste, sludge volume index, advanced techniques activated biofiltration, biological fluidized bed reactor, dried bacteria culture process. Tertiary treatments or advanced waste water treatment system (AWT); polishing ponds, DAF Techniques, micro trainers treatment and disposal of sludge, sand filters, removal of nitrogen, phosphorus, sulphur, physical chemical treatment process. Introduction : Plant design concepts - situations giving rise to plant design problems - differences in design of food processing and non-food processing plants, Plant layout : Importance, Flow Patterns, Basic Types of plant layouts, Product or line layout, Process or functional layout, Cellular or group layout, and Fixed position layout, Plant Layout factors, Layout design Procedure., Maintenance of Food Plant Building</p>

Reference Books:

- 1) Food Processing Technology by P. J. Fellows, Woodhead publishing ltd.
- 2) Food Science by N.N. Potter, CBS publishing.
- 3) Physical principles of Food Preservation. Vol. II by M. Karel, O.R. Fenema and D.B. Lurd, Maroel, Dekker Inc. New York.
- 4) The technology of food preservation by N.W. Desrosier and J.N. Desrosier, CBS publishing.
- 5) S. K. Sharma, S.J. Mulvaney, and S.S.H. Rizvi, Food Process Engineering: Theory and Laboratory Experiments, Wiley and Sons, 2000
- 6) H. Pandey, H.K. Sharma, R.C. Chouhan, B.C. Sarkar and M.C. Bera, Experiments in Food Process Engineering, CBS Publishers and Distributors, 2004 □
- 7) M.A. Rao, S.S. H. Rizvi and A.K. Dutta, Engineering properties of Foods, 3rd ed., Marcel Dekker, 2005.
- 8) Energy Conservation through Waste Utilization, American Society of Mechanical Engineers, New York.
- 9) Z. B. Maroulis and G. D. Saravacos, Food Process Design, Marcel Dekker 2003.
- 10) Prakash Triveni : Food Preservation, Aadi Publication, Delhi.
- 11) M. ShafiurRahman : Hand Book of Food Preservation, Marcel Dekker Inc, New york.
- 12) McWillims and Paine : Modern Food Preservation, Surjeet Publication.
- 13) Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
- 14) Srilakshmi, B. (2003), "Food Science", New Age International Publishers, New Delhi.
- 15) Subalakshmi, G and Udipi, S.A. (2001), "Food processing and preservation". NewAge International Publishers, New Delhi.

List Of practical

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	SR. NO.	NAME OF PRACTICAL
I	PRACTICAL:-II (INTRODUCTION TO FOOD PROCESSING)	1	Determination of Ash Content of provided food sample
		2	Detection of Carbohydrate from food sample by Anthrone method.
		3	To detect the presence of carbohydrate in given sample by Molisch's test.
		4	To detect the presence of polysaccharides (Starch and Glycogen) in the given food sample by Iodine test
		5	To detect the presence of Reducing sugar in The given samples by Benedict's Test.
		6	To detect the presence of starch in given samples by anthrone reagent Materials
		7	To detect the presence of protein in terms of peptide bonds in the given sample by Biuret test.
		8	Estimate the protein content of provided food sample by Folin/ Ciocalteu method.
		9	Determine Saponification value of rancid fat & oil Sample
		10	Determine Iodine value of rancid fat & oil sample
		11(A)	Determination of peroxide value from rancid fat (soyabean oil)
		11 (B)	Determination of peroxide value from rancid fat (mustard oil)
		12	Determination of free fatty acid value from rancid fat & Oil
		13	Determination of acid value from rancid fat & oil
		14	Determination of acid number from rancid fat & oil
		15	Determine Vitamin A content of provided food sample
		16	Determine Vitamin C (Ascorbic acid) content of provided food sample by Volumetric method
		17	Determine Anthocyanin content of provided food sample
18	Determine Chlorophyll content of provided food sample		

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester II)
Paper – I
(FOOD MICROBIOLOGY)

NSQF : LEVEL - 5

JOB ROLE: DAIRY PRODUCT PROCESSOR

UNIT NO.	CONTENT
I	Food Microbiology
	<p>Introduction of microbiology- definition, History and significance of food microbiology. Types of microorganisms normally associated with food- bacteria, yeast and moulds.</p> <p>ii.Spoilage of food; factors affecting spoilage of foods and associated microflora.</p> <p>iii.Biochemical changes caused by microorganisms- putrefaction, lipolysis, etc.</p> <p>Factors affecting growth and survival of microorganisms:</p> <p>i.Extrinsic factors- relative humidity, gaseous atmosphere.</p> <p>ii. Intrinsic factors- nutrient content, water activity, oxidation reduction potential.</p> <p>iii. Sources of contamination. Contamination of food-stuff, vegetables, fruits, cereals, pulses, oilseeds, milk and meat during handling and processing</p> <p>Deterioration and spoilage of various types of food products-</p> <p>i.Fruits, vegetables, cereal and cereal products, meat and meat products, fish and other sea foods</p> <p>ii. Prevention of spoilage of these foods</p> <p>Thermal inactivation of microbes: pasteurization, sterilization etc. concept of TDT, F, Z and D values. Factors affecting heat resistance Antimicrobial agents: mechanism and action</p>
II	Principles of food preservation-I
	<p>Principles of Food Preservation, microorganisms associated with foods- bacteria, yeast and mold, Importance of bacteria, yeast and molds in foods. Classification of microorganisms based on temperature, pH, water activity, nutrient and oxygen requirements, typical growth curve of micro-organisms.</p> <p>Food Preservation by Low temperature : Freezing and Refrigeration :Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, introduction to thawing, changes during thawing and its effect on food.</p> <p>Food Preservation by high temperature: Thermal Processing- Commercial heat preservation methods: Sterilization, commercial sterilization, Pasteurization, and blanching.</p> <p>Preservation using sugar, salt and acids: Sugar – Introduction, factors affecting osmotic pressure of sugar solution, foods preserved using sugar; salt: introduction, antimicrobial activity of salt, estimation of salt, food products preserved using salt; acid – Introduction, mechanism, common foods preserved using acids</p>
III	Principles of food preservation-II
	<p>Food Preservation by Moisture control</p> <p>Drying and Dehydration - Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry.</p>

	<p>Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.</p> <p>Food Preservation by Irradiation</p> <p>Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of action, uses of radiation processing in food industry, concept of cold sterilization.</p> <p>Preservation by use of chemicals: Introduction; objectives; factors affecting antimicrobial activity of preservatives; type of chemical preservatives; sulphur dioxide, benzoic acid, etc; use of other chemicals like acidulants, antioxidants, mold inhibitors, antibodies, etc.</p> <p>Preservatives :Defination, Characteristics of the ideal antimicrobial preservatives, Grouping of preservatives</p>
IV	Food contamination and public health:
	<p>Food Fermentations: Fermentation –definition and types</p> <ul style="list-style-type: none"> • Microorganisms used in food fermentations • Dairy Fermentations-starter cultures and their types , concept of probiotics, <p>Fermented Foods-types, methods of manufacture for vinegar, sauerkraut, tempeh, miso , soya sauce ,beer, wine and traditional indian foods.</p> <p>Classification of food based on pH, Food infection, food intoxication, definition of shelf life, perishable foods, semi perishable foods, shelf stable foods</p> <p>Food borne infections and food poisoning:</p> <p>i. Bacterial with examples of infective and toxic types- <i>Clostridium</i>, <i>Salmonella</i>, <i>Shigella</i>, <i>Staphylococci</i>, <i>Campilobacter</i>, <i>Escherichia</i>, etc..</p> <p>ii. Mycotoxins in food with reference to <i>Aspergillus species</i>. Protozoa.</p> <p>Prevention of food borne diseases.</p> <p>Food Poisoning, Chemical changes caused by microorganisms</p> <p>Indicator organisms, microbiological quality assurance systems in food industry, GMP, use of HACCP to ensure microbiological safety of food, food regulations and standards</p>

Reference Books:

- 1) Food Microbiology by M.R. Adams and M.O. Moss
- 2) Food Microbiology by W.C. Frazier
- 3) Dairy Microbiology by E .M. Foster.
- 4) Modern food Microbiology by James M. Jay.
- 5) Food borne bacterial pathogens by M.P. Doyle
- 6) Basic Food Microbiology by G.J. Banwart
- 7) Food microbiology by V. Ramesh, MJP publishing.
- 8) Food microbiology by W.C. Frazier, 1st Edition by McGraw Hill Pub. Co. New York.
- 9) Modern Food Microbiology, J.M. Jay. CBS publisher.
- 10) Preservation of fruits and vegetables by LallG. Siddhappa, G.V and Tandon, J. L
, Indian council of agricultural research, New Delhi.
- 11) Food storage and preservation by Vijayakhader
- 12) Fruit & vegetables preservation and practice by K. Sanjeev & Srivastava R.P
- 13) Fruit and vegetable preservation. Principles and practices by Srivastava, R.P. and Sanjeev kumar

List of Practical

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
II	PRACTICAL:-I (FOOD MICROBIOLOGY)	<p>Section: A</p> <ol style="list-style-type: none"> 1. An introduction to microbiology, aseptic technique and safety 2. Preparation of culture media. 3. To sterilize the media and equipment. 4. To prepare serial dilutions. 5. Plating techniques 6. Determination of acidity of the given sample of water. 7. Determination of alkalinity of the given sample of water. 8. Determination of the total hardness of Water. 9. Determination of pH of the given sample of Water. 10. Determination of Conductivity of the given sample of Water. 11. Determination of Total Solids of the given sample of Water. 12. Determination of Total Dissolved Solids of the given sample of Water. 13. Determination of Turbidity of the given sample of Water. Section: B Quality analysis of preserve food and impact of preservation Techniques 14. To determine the effect of salt concentration on growth of M/O present in food. 15. Determination of salt Content (NaCl) from the provided food sample 16. Qualitative and Quantitative determination of Benzoic acid in food sample 17. Qualitative and Quantitative determination of sulphur dioxide in food sample 18. Determination of Ascorbic acid (Vita. C) of provided food sample 19. To detect the presence of carbohydrate in the given food sample by Anthrone test. 20. Estimation of protein content of a provided food sample 21. Determination of Ash content of provided food sample 22. Estimate the fat content of a provided food sample by Soxhlet extraction method

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester II)
Paper – II
DAIRY TECHNOLOGY

NSQF : LEVEL - 5

JOB ROLE: DAIRY PRODUCT PROCESSOR

UNIT NO.	CONTENT
I	Dairy Chemistry and Microbiology
	<p>Present status of milk & milk products in India, Composition of milk and nutritive value and grading of milk. Factors influencing raw milk quality.</p> <p>Milk - Definition, sources, factors effecting composition of milk. physiochemical properties of milk: Color, taste, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, OR, electrical conductivity.</p> <p>Grading of milk-definition and types of grades, collection and Transportation of milk. Lactose: Lactose (alpha and beta forms). Significances of lactose in dairy industry.</p> <p>Milk fat: Composition and structure, and physical properties, crystallization, structure of fat granules, lipolysis, autoxidation, fat constants (saponification value, iodine value, RM value, Polenske value, peroxide value).</p> <p>Protein and Enzymes: General structure, amphoteric nature, difference between casein and serum protein,</p> <p>Different types of casein (acid and rennet), uses of casein, fractionation of protein.</p> <p>Enzymes- catalase, alkaline phosphatase, lipases and proteases Buying and collection of milk, transportation of milk, milk reception, Milk reception in dairies.</p> <p>Quality and Quantity tests at reception.</p>
II	Milk and dairy products
	<p>Unit operations in liquid milk processing: (pasteurization, sterilization, homogenization, drying, Colling and freezing, membrane separation process).</p> <p>Processing of market milk: Flowchart of milk processing, Market milk industry and milk products: Systems of collection of milk, Reception, Platform testing, Different types of cooling systems.</p> <p>Various stages of processing: Filtration, Clarification, Standardization -Pearson's square method ,Homogenization, Pasteurization -LTLT, HTST and UHT process-continuous pasteuriser, Sterilization, separation- centrifugal cream separator, bactofugation.</p> <p>Definition, composition and, manufacturing of butter, defects in butter and Ghee, Manufacturing of Whole and skimmed milk powder, defects in milk powder.</p> <p>Definition, composition, classification and manufacturing of Cheddar Cheese, Cheese defects and their control.</p> <p>Definition, composition, manufacturing of ice cream and defects in icecream.</p> <p>Manufacture of khoa, channa, paneer and toned milk,</p>
III	Fermented dairy products
	<p>Yogurt: Definition, composition and Nutritional value, manufacturing process</p> <p>Dahi/ Curd making and Misti Dahi: Definition, composition and Nutritional value, manufacturing process, types, packaging, storage</p> <p>Sour milk: Definition, composition and Nutritional value, manufacturing process, packaging, storage</p> <p>Shrikhand and Amrakhand: Definition, composition and Nutritional value, manufacturing process, packaging, storage</p>

	<p>Lassi: Definition, composition and Nutritional value, manufacturing process, packaging, storage.</p> <p>Contamination of milk and milk products:</p> <p>Preservation of Dairy Products. Spoilage of milk Products, Utilisation of dairy industry by-products.</p>
IV	Dairy Plant sanitation
	<p>Sanitation and the food industry: Sanitation, sanitation laws and regulations and guidelines, establishment of sanitary, potential risks of food borne bioterrorism, bioterrorism protection measures and role of pest management in bio-security</p> <p>In-Plant cleaning system: Introduction to Cleaning in- place (CIP) system - cleaning procedure, Cleaning efficiency, Methods of cleaning in food industry, cleaning solutions – Detergents. SIP system of dairy plant.</p> <p>Sanitizers, sanitizing methods, sanitation equipment, waste product handling, solid waste disposal and liquid waste disposal; Soil types and properties of cleaning agents.</p> <p>Personal hygiene and sanitary food handling: Role of HACCP in sanitation, quality assurance for sanitation cleaning compounds, handling and storage precautions.</p> <p>Pest control: Insect infestation, cockroaches, insect destruction, rodents, birds, use of pesticides and integrated pest management.</p> <p>FSS Regulations: Regulations on Licensing and Registration, Regulations on Contaminants, toxins and residues, FSS Regulations on Food product standards and food additives, FSS Regulations on Laboratory and sampling analysis; FSS Regulations on Packaging and Labelling; FSS Regulations on Prohibition and Restriction on sales.</p>

Reference Books

1. Aneja RP, Mathur BN, Chandhan RC & Banerjee AK. 2002. Technology of Indian Milk Products. Dairy India Publ., Delhi.
2. De S. 1980. Outlines of Dairy Technology. Oxford Univ. Press Publ., New Delhi.
3. Smit G. 2003. Dairy Processing – Improving Quality. CRC-Woodhead Publ.
4. Walstra P, Geurts TJ, Noomen A, Jellema A & Van Boekel MAJS. 1999. Dairy Technology – Principles of
5. Milk Properties and Processes. Marcel Dekker.
6. Joshi. V.K. (2015), "Indigenous Fermented Foods of South Asia", CRC Press.
7. Alan H. Varnam, (2012), "Milk and Milk Products: Technology, chemistry and microbiology", Springer Science & Business Media Publishers.
8. Robinson, R. K., (2012), "Modern Dairy Technology: Volume 2 Advances in Milk Products", Springer Science & Business Media Publishers.
9. Food Safety and Standards Act, 2006 by Commercial Law publications, New Delhi

List of Practical

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
II	PRACTICAL:-II (DAIRY TECHNOLOGY)	<ol style="list-style-type: none">1) Perform the sensory evaluation of milk (general appearance, consistency, flavor and aroma) on reception of milk at the plant.2) Perform SNF3) To estimate milk protein by Folin method4) To estimate milk fat by Gerber plate form test of milk (Acidity, MBRT, Specific gravity method)5) Simple test for detection of common adulterants: formaldehyde, starch, cane sugar, hydrogen peroxide, sodium bicarbonate in milk.6) Study of pasteurization of milk.7) Determination of efficiency of pasteurization of milk liquid by alkaline phosphates test8) Preparation of Butter, Cheese and indigenous milk product such as khoa, chhana, paneer, shrikhand, butter, milk etc.9) Product of dried milk by spray dryer.10) Determination of acidity of butter11) Determination of moisture content of butter12) Determination of salt content of Butter13) Determination of Fat content of Butter14) To estimate skim milk protein by titration method

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester III)
Paper – I

(BAKERY AND CONFECTIONERY)

NSQF : LEVEL - 6

JOB ROLE: QUALITY ASSURANCE MANAGER

UNIT NO.	CONTENT
I	Introduction of fast food
	<p>Status of bakery and confectionery industries in India.</p> <p>Raw materials used in Bakery and their function in bread making Bakery unit operations-- Mixing, Fermentation, Proofing and Baking. Equipment used in bakery and confectionary industry: Construction and working of various equipments like Mixers, proofing chambers, dough dividers, moulder and sheeter, baking ovens, cooling chamber, sealing and packaging machines, Rolling and cutting machines.</p> <p>Extrusion Cooking: definition, introduction to extruders, principles and types, Uses of extruders in the food industry, Types of Extruder. Ready to eat breakfast cereals by extrusion cooking</p>
II	Bakery products technology
	<p>Major baking ingredients and their functions, role of baking ingredients in improving the quality of bread. Characteristics of good flour used for making bread, biscuits and cakes.</p> <p>Bread</p> <ul style="list-style-type: none"> - Principle involved in bread production Different types of breads (Panatoni Bread, Focaccia Bread,) and their uses <p>Ingredients used for bread manufacture, methods of mixing the ingredients, dough development methods - straight dough, sponge dough, moulding, proofing, baking, packing, spoilage, bread staling, methods to reduce bread staling and spoilage.</p> <p>- Cake</p> <ul style="list-style-type: none"> - Principle involved in cake production - Different types of cakes and their uses (Black Forest Cake, Orange Chiffon Cake, Christmas Fruit Cake, Chocolate Butter Cake, Torta Di Apple Cake, Butter Cake) - Ingredients used in cake production Flow diagram <p>- Biscuits and Cookies</p> <ul style="list-style-type: none"> - Principle involved in biscuits and cookies production - Different types of biscuits and cookies and their uses <p>Ingredients used in biscuits and cookies production Flow diagram Spoilage in cakes and biscuits</p>
III	Technology of Confectionery products
	<p>Characteristics of confectionary products Types of confectionary products - Ingredients used in confectionary products</p>

	<p>Characteristics of confectionary products Types of confectionary products - Ingredients used in confectionary products</p> <p>Classification of confectionery</p> <p>Sugar boiled confectionery- crystalline and amorphous confectionery, rock candy, hard candy, lemon drop, china balls, soft candy, lollypop, marshmallows, fudge, cream, caramel, toffee, lozenges, gumdrops, honeycomb candy.</p> <p>Manufacturing of confectionary products:</p> <p>Flow diagram for manufacture of following</p> <p>Characteristics and processing of raw material; Technology of manufacturing of toffee, chocolate, hard boiled candies, bars, chewing gums, bubble gums and Characteristics of finished products.</p> <p>Quality control: Standards/ Regulations to be followed in the Bakery Industry and packaging requirements</p>
IV	Sensory Evaluation
	<p>Texture: classification, role of firmness, yielding quality, juiciness, chewiness, fibrousness, grittiness, mealiness, stickiness,, measurement of texture/ kinesthetic characteristics.- by compression, mechanical thumb, puncture tester, succulometer, shearing by tenderometer, texturometer, maturometer, fibro meter, moisture content, by barbender moisture tester, alcohol insoluble solids, color, consistency & sound measurement for kinesthetics.</p> <p>Flavour: Definition and its role in food quality, Taste, classification, taste qualities, relative intensity, reaction time, effect of disease, temperature, and taste medium on taste, basic tastes and interaction of tastes. Odour : definition, Classification, neutral - mechanisms, Olfactory abnormalities, odor testing, techniques, thresholds, odor intensities.</p> <p>Factors influencing the food qualities: Soil, field practices, harvesting practices, procedures, packaging, transportation, storage, conditions, processing conditions, packaging and storage conditions of finished products.</p>

Suggested Reading Books

SR. NO.	BOOK	YEAR	AUTHOR	PUBLICATION
1	Sensory Evaluation Techniques	2015	Civillie and Carr	CRC Press,
2	Snack Food Technology	1985	Matz S.A.	Springer, ISBN: 9780870554605
3	Chocolate, Cocoa and Confectionery: Science and Technology	1999	Bernard W. Minifie	Springer, ISBN: 9780834213012
4	Snack Food Processing	2001	Lusas EW and Rooney LW	CRC Press, ISBN: 9781420012545
5	Industrial Chocolate Manufactory and Use	, 2012	S. T. Beckett	Springer, ISBN: 9781461521112

**Revised Syllabus
From 2020-21 onwards**

6	The Complete Technology Book on Snack Foods	2013	Panda H	NIIR Project Consultancy Services, 2013 ISBN: 9789381039243
7	Snack Food	2012	Booth RG	Springer, 2012 ISBN: 9781461314776
8	Basic Baking. The Society of Indian Bakers	2002	Dubey SC.	New delhi
9	Wiley Encyclopedia of Food Science & Technology	2000	Francis FJ.	John Wiley
10	Technology of Biscuits, Crackers & Cookies	2000	Manley D.	2nd Ed. CRC Press.
11	A professional text to bakery and confectionary		John Kingslee	New Age International Publication.
12	NIIR Board: The complete technology book on bakery Products			
13	Science of Bakery Products		W.P. Edwards	
14	Chocolate science and Technology		EmmanuelObene	
15	“Bakery Products Science and Technology”	2014	Zhou. W, HuiY, H;	2 nd Edition, Wiley Blackwell Publishers
16	“Baking Science & Technology”	2009	Pylar, E. J. and	Fourth Edition, Sosland
	Vol.1		Gorton, L.A.	Publications
	“Baked Products: Science Technology and Practice”.	2008	Stanley P. Cauvain, Linda S. Young,	John Wiley & Sons Publishers

LIST OF PRACTICAL

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
III	PRACTICAL:-I (BAKERY AND CONFECTIONERY)	<p>SECTION: I</p> <p>PREPARATION OF BAKERY PRODUCTS</p> <ol style="list-style-type: none"> 1) To study composition and standards of wheat flour as well as significance of fictional test to predict the quality of flour 2) Preparation of Bread 3) Preparation of Biscuit 4) Preparation of Cakes <p>SECTION: II</p> <p>QUALITY TESTING OF WHEAT FLOUR FOR BAKERY PRODUCTS</p> <ol style="list-style-type: none"> 5) Quality testing of Wheat flour it's moisture content 6) Quality testing of Wheat flour it's Ash content 7) Quality testing of Wheat flour it's Gluten content 8) Quality testing of Wheat flour it's alcoholic acidity % as H₂SO₄ <p>SECTION: III</p> <p>QUALITY TESTING OF YEAST</p> <ol style="list-style-type: none"> 9) Testing for dough raising capacity of yeast <p>SECTION: III</p> <p>QUALITY TESTING OF BREAD</p> <ol style="list-style-type: none"> 10) Quality testing of Bread it's moisture content 11) Quality testing of Bread it's Ash content 12) Quality testing of Bread it's alcoholic acidity 13) Quality testing of Bread it's pH <p>SECTION: IV</p> <p>QUALITY TESTING OF BISCUIT</p> <ol style="list-style-type: none"> 14) Quality testing of Biscuit it's moisture content 15) Quality testing of Biscuit it's Ash content 16) Quality testing of Biscuit it's alcoholic acidity <p>SECTION: V</p> <p>QUALITY TESTING OF CAKE</p> <ol style="list-style-type: none"> 17) Quality testing of Cake it's moisture conten 18) Quality testing of cake it's Ash content 19) Quality testing of Cake it's alcoholic acidity t

**Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester III)
Paper – II**

(Emerging Technologies in Food Industry)

NSQF : LEVEL - 6

JOB ROLE: QUALITY ASSURANCE MANAGER

UNIT NO.	CONTENT
I	High pressure processing and microwave heating
	Microwave heating of foods- Mechanism of Heat Generation-Working of microwave oven, High Pressure processing: Concept-Equipment for HPP Treatment-Mechanism of Microbial Inactivation and its Application in Food , dielectric heating of foods. Irradiation and PEF and ohmic heating:- Pulsed electric field – equipment –mechanism of PEF-advantages, Ohmic heating of foods- mechanism- principle-advantages, applications. Irradiation- principle- types of irradiation-advantages-applications
II	Osmotic dehydration of foods and minimal processing:
	Principle – Mechanism of osmotic dehydration – Effect of process parameters on mass transfer – Methods to increase the rate of mass transfer – Applications – Limitations of osmotic dehydration – Management of osmotic solutions. Minimal processing-principle-methods- advantages. Ultrasonic processing: Properties of ultrasonic, types of equipment, effect of ultrasonic treatment on microbial inactivation, oil yield etc. Hurdle technology: Types of preservation techniques and their principles, concept of hurdle technology and its application. Applications of enzyme in food Processing, Milling and baking, Starch, starch syrups and dextrose, Fruit, fruit products and wine, Meat and Other Proteinaceous Foods, Candy, Cacao, Chocolate, Coffee, Flavors and other applications
III	Mechanical Operations in food processing
	Mixing: Filtration: Centrifugation. Distillation: Crystallization: Dehydration: Evaporation: Freezer types Principle, instrumentation, types, applications of following instruments in food analysis.: UV/Vis and atomic absorption spectrophotometers Electrophoresis Fluorimetry Refractometry Adsorption, column, partition, affinity, ion exchange, GCand HPL Chromatography

IV	Spray and drum drying
	<p>Theory of drying, estimation of drying rates and drying time, drying equipments, particle size calculation, design of spray and drum dryer, skim milk and whole milk powders manufacturing methods. Fluidized bed drying, Principles of fluidized bed method, Types of fluidized bed drier, Drying and cooling times in fluidized bed;</p> <p>Freeze drying:- Agglomeration, Problems of reconstitution, Methods of Agglomeration, The effect of drying on milk products. Recent advances in drying. Design data, performance and selection and design of dryer. Good Hygienic Practices (GHP), Good Manufacturing Practices (GMP), Food Safety Plan, Food Safety Management Risk Analysis. Traceability, food product recall. Food safety Management Systems: ISO 22000: Importance of implementing a HACCP system and how it can be applied to various products, develop a HACCP plan including a HACCP team, produce product workflow diagrams for a range of products and their verification processes etc. Audits: Introduction, objectives, documentation, responsibilities, management review, audit certification and its importance etc</p>

Suggested Readings:

SR. NO.	BOOK	YEAR	AUTHOR	PUBLICATION
1	Hurdle Technologies – Combination treatments for food stability safety and quality	2002	Leistner L. and Gould G.	Kluwer Academics / Plenum Publishers, New York
2	Novel Food Processing Technologies (Food Science and Technology Series)	2004,	Gustavo V. Barbosa- Canovas, Maria S. Tapia, M. Soledad Tapia, M. Pilar Cano	Publisher: CRC Press ISBN- 13: 9780824753337
3	Thermal Technologies in Food Processing	2001	P Richardson	Campden and Chorleywood Food Research Association, UK, Woodhead Publishing Limited
4	Food analysis: theory and Practice	200	Pomeranz, Y. and Meloan, C.E	CBS Publishers, New Delhi, India
5	Hand Book of Microwave Technology for Food Applications	1999	Dutta AK & Anantheswaran RC	
6	The Technology of Extrusion Cooking	200	Blackie. Gould GW	
7	Enzymes and Immobilized Cells in Biotechnology		Allen I. Laskin	The Benjamin/Cummings Publishing Company, INC., California.
8	Fermentation Microbiology and Biotechnology		Mansi El-Mansi & Charlie Bryce, Taylor & Francis	
9	Industrial Biotechnology		S. N. Jogdand	Himalaya Publishing House, Mumbai
10	Fundamentals of Enzymology		Nicholes C. Price and Lewis Stevens	Price and Lewis Stevens, Oxford Univ. Press.
11	Enzymes in Food Processing			Gerald Reed, academic press New York and London

LIST OF PRACTICAL

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
III	PRACTICAL:-II (EMERGING TECHNOLOGIES IN FOOD INDUSTRY)	Section: A Techniques of preservation <ol style="list-style-type: none">1) To Study Cold Storages Design, Construction and Working2) To Study sensory evaluation of products stored under RT and Refrigerated condition3) To study preservation of fruit and Vegetables blanching4) To study preservation of fruit and vegetables by mechanical dehydration5) To study preservation of fruit and vegetables by Canning6) To study preservation of grain, fruit and vegetables in cold storage unit. Section: B <ol style="list-style-type: none">7) Estimation of phosphorous acid from soft drink8) Determination of salt content of provided food sample9) To determine the Total Dissolved Solid of Waste water10) To determine the Suspended Solid of Waste water11) To determine the BOD of Sewage water12) To determine the COD of Sewage water13) To determine the DO of Sewage water.14) Estimate the fat content of provided food sample by Soxhlet Extraction method.

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester IV)
Paper – I

Fruits, Vegetables and Post Harvest Technology

NSQF : LEVEL - 6

JOB ROLE: QUALITY ASSURANCE MANAGER

UNIT NO.	CONTENT
1.	Microbiology of fruits and vegetables
	Introduction to fruit processing: Status and scope of Fruits and vegetables Production and processing industry in India, role of processed fruits, Chemical composition and nutritive value of fruits and vegetables, factors influencing composition and quality of fruits and vegetables. Contamination of fruits and vegetables, Spoilage of fruits and vegetables, Sensory evaluation methods for fruit and vegetables. Postharvest Technology, Post harvest management of fruits and vegetables-control of losses in harvesting, and handling operations, Post harvest field operations. , Pre and postharvest infection. Storage practices: Modified & Controlled atmospheric storage, hypobaric storage, cools storage
2.	Fruit juices and beverages
	Introduction, Fruit juice processing; Orange and tangerine, Lemon and lime juice, Apple juice, Grape juice, pulpy juices, tropical blends, Vegetable juices:- (selection, juice extraction, deaeration, straining, filtration and clarification), Various juice extraction methods, various handling and processing equipments for fruit juices, juice packaging materials and equipments. Preservation of fruits and vegetables:- Removal of micro organisms, Use of high temperature, Use of low temperature, drying, Use of preservatives and Irradiation preservation of fruit juices:- (pasteurization, chemically preserved with sugars, freezing, drying, tetra-packing, carbonation). Manufacture of non-fermented, fermented and carbonated beverages: -processing of squashes, cordials, nectars. Technology of Frozen Foods: Glass transitions in frozen foods and biomaterials, Microbiology of frozen foods, Thermophysical properties of frozen foods, Freezing loads and Freezing time, calculation, Innovations in freezing process, Freezing methods and equipment, Cold store design and maintenance, Transportation of frozen foods
3.	Fruit and vegetable products
	Technology of Jam and Jelly:- Introduction, Jam: Constituents, selection of fruits, processing & technology, Jelly: Essential constituents(Role of pectin, ratio), Theory of jelly formation, Processing & technology, defects in jelly. Marmalade : Types, processing & technology, defects Candied and Glazed fruits: -Preparation Pickles - Types of Pickles, Method of pickling, Problems/ spoilage in pickles. Dehydration of fruits and vegetables:- types (Sun drying & mechanical dehydration), process, machinery, operation, packing and storage, fruits juice powder, soup powder, nuggets, flakes, raisins preparation, Osmo dehydrated products. Problems related to storage of dehydrated products, Processing of potato chips, wafers,

	Freezing of fruits and vegetables: Criterion of selection for fruit and vegetables freezing, Various methods of freezing, frozen fruits, changes during freezing. Tomato products :-Selection of tomatoes, pulping& processing of tomato juice, tomato puree, paste, ketchup, sauce and soup Vinegar: Types, General methods of preparation
4.	Thermal processing of fruits & Vegetables and Packaging
	Thermal Processing:- Various types of techniques of thermal processing of fruits and vegetables, Types of cans and containers, their selection, preparation of syrups and brines. Canning: Introduction, can manufacture, canning process - selection of fruits and vegetables, grading, washing, peeling, cutting, blanching, cooling, filling, exhausting, sealing, processing, cooling and storage; types of canning- pressure canning and water bath canning, common causes of spoilage in canning of foods and Aseptic packaging. Minimally processed fruits and vegetables: Modified atmosphere packaging (MAP): Introduction, gases used in MAP, role of N ₂ , O ₂ & Co ₂ , Principles of MAP, Types of MAP-active packaging & passive packaging, factors affecting MAP, graphical representation, application of MAP, effect of MAP on shelf-life, future research needed, advantages and disadvantages. Controlled atmosphere packaging (CAP): Introduction, gases used in CAP, factors affecting CAP- Temperature control, humidity control and gas control, advantages and disadvantages

Suggested Readings:

SR. NO.	BOOK	YEAR	AUTHOR	PUBLICATION
1	Handbook of food additives Vol I and Vol II.	1980	Furia, T.E.	
2	Preservation of fruits and vegetables	1967	Lall G., Siddhappa,G.V and Tandon, J. L,	Indian council of agricultural research, New Delhi
3	Complete Technology Book on Processing, Dehydration Canning and Preservation of Fruit & vegetables , NIIR			
4	Fruit & vegetables preservation and practice		K. Sanjeev & Srivastava R.P	
5	Post harvest technology of fruits & vegetables (Vol I & II).	2000.	Verma, L.R and Joshi, V.K.	Indus publishing company, New Delhi.
6	Fruit and vegetable preservation. Principles and practices.	1994	Srivastava, R.P. and Sanjeev kumar.	International book Distributing Co., Lucknow.
7	Food Engineering Fundamentals	1983.	Batty, J.C. and Folkman, S.L.	John wiley and Sons, New York
8	Principles of Food Science: Part-II	1985	Fennema O.R.	
9	Hand book of Food Engineering		Aeldmam & Lunde	
10	Food Engineering Fundamentals	1983	Batty, J.C. and Folkman, S.L	John Wiley and Sons, New York
11	Hand book of food Engineering		R.P. Singh	

List of Practical

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
IV	<p>PRACTICAL:-I (FRUITS, VEGETABLES AND POST HARVEST TECHNOLOGY)</p>	<ol style="list-style-type: none"> 1. Determination of pH contain of fruit juice, Lemon Juice . 2. Determination of pH Contain of Jam, Jelly, Pickle, Sauce 3. Determination of Titrable Acidity of fruit juice, Jam, Jelly Pickle Sauce 4. Determination of Salt contain pickle and Sauce 5. Determination of Protein contain of fruit juice & Jam 6. Determination of Carbohydrate by folin ciocautue method of food sample 7. Determination of moisture contain of dehydrated food sample 8. Determination of Total soluble solids (TSS) of food sample 9. Estimation of Blanching from fruits and vegetable 10. Production of fruit juice 11. Production of jam 12 Production of Jelly 13. Production of Mango and Lemon Pickle 14. Production of Tomato Sauce 15. Determination of Ash contain from provided food sample

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester IV)

Paper – II BEVERAGES PROCESSING

NSQF : LEVEL - 6

JOB ROLE: QUALITY ASSURANCE MANAGER

UNIT No.	CONTENT
I	Introduction to beverages
	<p>Introduction of brewing, history of brewing; Raw materials: barley, hops, water, yeast; Adjuncts for beer production: Maize, rice, millet, wheat, sugar etc. Types of beverages and their importance, status of beverage industry in India, Manufacturing technology for juice-based beverages, synthetic beverages; technology of still, carbonated, low-calorie and dry beverages, isotonic and sports drinks; role of various ingredients of soft drinks, carbonation of soft drinks.</p> <p>Enzymes in beverage: Application of enzymes in tea and cocoa processing, Application of enzymes in alcoholic beverages as beer, whisky, wine and ciders., Role of the enzymes in fruit juice production, factors affecting the enzymatic activity.</p> <p>Enzymatic clarification of apple and guava juices, factors affecting the clarity of fruit juices.</p> <p>Processing of black and white varieties of grapes: Worth formation, Fermentation and packaging of wine, study over different type of wine like sherry, Port type of wine on basis of alcoholic content.</p>
II	Alcoholic Beverages
	<p>Malt production, role of enzymes for malting; Barley storage, steeping, germination, kilning, cooling, storage; Malt from other cereals, caramel malt, roasted malt, smoked malt, malt extract; Malt quality evaluation.</p> <p>Wort production, malt milling, Mashing, Mashing vessels; Wort boiling, clarification, cooling and aeration. Enzyme properties, starch degradation, b-glucan degradation; Conversion of fatty matter, Biological acidification.</p> <p>Introduction, types, role, manufacturing and types of wine, beer and distilled spirits and quality evaluation. Beer defects and Spoilage, Wine defects and spoilage.</p> <p>Manufacture and quality evaluation of distilled beverages including whisky, brandy, rum and gin, Vodka. Manufacturing process of beverages: Beverages based on tea, coffee, cocoa, spices, plant extracts, herbs, nuts, Dairy-based beverages.</p> <p>Brewing Equipments. Grain mill, kettles, siphons, carboys, fermentation equipment, wort chillers, pumps beer bottles, cans, labels, bottle caps, sanitation equipments</p>
III	Packaged drinking water and Food laws
	<p>Definition, types, manufacturing processes, quality evaluation and raw and processed water, methods of water treatment, BIS quality standards of bottled water; mineral water, natural spring water, flavoured water, carbonated water.</p> <p>Recycle technologies: Effluent treatment, Tertiary treatment, Advanced treatment, Biological treatment, (Clarification, Filtration, Adsorption, Membrane Bio-reactor, Ultra filtration, Nanofiltration (NF), Reverse osmosis, Photo Chemical Oxidation (PCO), Ion exchange process. Use of ozone in packaged drinking water disinfection and purification. The use of distillation technology in the bottled water industry.</p> <p>Food laws & Microbiological criteria for various food products: FAO, Codex Alimentarius, ISO, Indian food laws and standards, Prevention of Food adulteration (PFA)act, Fruit Products Order(FPO), Meat product order (MPO), Cold storage order (CSO),BIS, Agmark</p>
IV	Sugars Technology
	Introduction, Raw Sugar production process : Extraction of juice, Purification of juices,

	<p>Clarification stages, Treatment of clarified juice, Evaporation, Crystallization, Washing of sugar crystals and centrifugal separation/dewatering of sugar and other related processes, Sugar Refining, Sugar analysis. Production of liquid Sugar, Production of Glucose and fructose syrups. Sugar recovery. Sugar plant sanitation.</p> <p>By Products of cane sugar processing: Alcohol production, production of Animal feed, production of pulp & paper, production of agglomerated products.</p> <p>Water/effluent treatment plant in the food processing industries.</p>
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Suggested Readings

SR. NO.	BOOK	YEAR	AUTHOR	PUBLICATION
1	Technology of Bottled water	2011	Nicholas Dege	Blackwell publishing Ltd UK
2	Foods- Facts and Principles	2004	Manay, N.S, Shandaksharaswamy, M	New Age International Publishers, New Delhi
3	Chemistry & Technology of soft drinks & fruit juices	1998	Philip R Ashurst	Blackwell Publishers
4	Formulation and production of carbonated soft drinks	1997	Mitchel A J.	Blackwell Publishers
5	The soft drinks companions: A technical handbook for the beverage industry	2000	Shachman, M.	CRC Press Taylor & Francis Group, Boca Raton, Florida, USA
6	Beverages: technology, chemistry and Microbiology	1999	Varnam, H.A. and Sutherland, J.M.	CRC Press Taylor & Francis Group, Boca Raton, Florida, USA
7	Industrial Microbiology		Prescott & Dunn	
8	Industrial Microbiology		L. E. Casida	
9	Food Microbiology		W.C. Frazier and D.C. Westhoff	
10	Food analysis: theory and practice	2000	. Pomeranz, Y. and Meloan, C.E	CBS Publishers, New Delhi, India
11	Official methods of analysis of AOAC	2007	Association of Official Analytical Chemists, Arlington, USA.	
12	Sugar Processing and By-products of the Sugar Industry		By Antonio Valdes Delgado, Carlos de Armas Casanova	Food and Agriculture Organization of the United Nations
13	Technology Of Water And Packaged Drinking Water (Hand Book)		EIRI	

List of Practical

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
IV	PRACTICAL:-II (BEVERAGES PROCESSING)	<ol style="list-style-type: none">1. Determination of pH contain of Alcoholic Beverages.2. Determination of pH Contain of non Alcoholic Beverages.3. Determination of Volatile Acidity of Wine, Whiskey, Rum4. Determination of Terrible Acidity of Wine, Whiskey, Rum ,Beer5. Determination of Protein contain of fruit juice.6. Determination of Protein contain of Wine, Whiskey, Rum.7. Determination of Carbohydrate by folin ciocautue method of Beverages sample8. Determination of Sulpher dioxide from provided Beverages sample9. Determination of Calcium contain provided Beverages sample

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester V)
Paper – I (Technology of animal foods)

NSQF : LEVEL - 7

JOB ROLE: PRODUCTION MANAGER

UNIT No.	CONTENT
I	Compositional and Nutritional aspect of Animal foods
	<p>Livestock and poultry population in India, Development of meat and poultry industry in India and its need in nation's economy, Glossary of live market terms for animals and birds, Sources and developments of meat and poultry industries in India and importance in national economy.</p> <p>Fish - Classification of fish (fresh water and marine), composition, spoilage of fish - microbiological, physiological, biochemical.</p> <p>Meat - Definition of carcass, concept of red meat and white meat, composition of meat, marbling in meat, post mortem changes in meat - rigor mortis, tenderization of meat, ageing of meat.</p> <p>Egg:-composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality, preservation and safe handling of eggs.</p> <p>By-product utilisation: By-products and wastes from meat, fish and poultry industry</p>
II	Meat processing
	<p>Slaughtering of meat -- Scientific or Humane slaughter, Ritual slaughter, Dressing techniques for different animals, Meat cutting and packing, Grading of meat and packaging of meat, Meat tenderization. – principles and methods</p> <p>Meat products: Sausages - processing, RTE meat products Sausages - processing, RTE meat products.</p> <p>Preservation of meat -Refrigeration and freezing, thermal processing - canning of meat, dehydration, meat curing), Spoilage of meat.</p> <p>Meat quality: Effects of feed, breed and environment on production of meat animals and their quality Meat Quality-color, flavor, texture, Water-Holding Capacity(WHC),Emulsification capacity of meat.</p>
III	Fish Processing
	<p>Fishery products: Process, traditional and modern production lines, quality of products. Fish protein concentrates (FPC), fish protein extracts (FPE).</p> <p>Preservation of fish- High and low temperature, Preservatives , Irradiation and drying, salting - salting methods: brining, pickling, curing and canning of fish. Smoking - smoke production, smoke components, quality, safety and nutritive value of smoked fish, pre - smoking processes, smoking process control</p>
IV	Poultry and Egg processing
	<p>Handling, Transport and dressing of a poultry bird: Inspection of birds, poultry slaughter and dressing, factors affecting quality of poultry. Spoilage of poultry meat, Preservation of poultry meat.</p> <p>Egg and egg products: Structure and composition of eggs, changes in egg due to aging, abnormalities in egg, functions of egg in food system, inspection and grading for egg quality, coagulation of eggs, egg powder and egg based products, Factors affecting egg quality.</p>

	Egg products – Egg powder, egg foams , frozen egg pulp, designer eggs Preservation and maintenance of eggs:-Removal of microorganisms, Use of heat , Chilling , Preservatives , Irradiation, and drying, Refrigeration and freezing, thermal processing, dehydration, coating. Microbial spoilage of eggs
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SUGGESTED READINGS:

SR. NO.	BOOK	YEAR	AUTHOR	PUBLICATION
1	Fish Processing Technology	2012	George M. Hall	Springer Science & Business Media Publication.
2	Handbook of Meat Processing	2010	Fidel Toldra	John Wiley & Sons Publication.
3	Fundamentals of food Engineering	2010	Rao D.G	PHI Learning Pvt. Ltd
4	Handbook of Poultry Science and Technology, Secondary Processing	2010	Isabel Guerrero-Legarreta	John Wiley and Sons Publication
5	Poultry Meat Processing	2010	Casey M. Owens	Second Edition, CRC Press
6	Advanced Technologies For Meat Processing	2006	Leo M.L. Nollet and Fidel Toldra	CRC Press.
7	Essentials of food science. 2nd edition	2003	Vaclavik V.A. and Christian E.W	Springer International
8	" Meat Science. 6th edition	1998	Laurie R.A Lawrie	Woodhead Publishing Ltd
9	Egg science and technology	2001	Stadelman W.J. and Cotterill O.J.	CBS Publishers
10	A Text Book of Fish and Fisheries Technology		K P Biswas	
11	Meat Processing		Joseph Kerry, John Kerry and David Ledwood	Wood head Publishing Limited (CRC Press 2002)
12	Post Harvest Technology of Fish and Fish Products	2001	Balachandran, K.K	Daya Publishing House, New Delh
13	Poultry Meat and Egg Production	1997	Parkhurst & Mountney	CBS Publication, New Delhi
14	Egg Science and Technology 4th Ed	2002	Stadelman WJ, Owen J Cotterill	CBS Publication New Delhi
15	Poultry Products Processing	2005	Shai Barbut	CRC Press

LIST OF PRACTICAL

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
V	PRACTICAL:-I (TECHNOLOGY OF ANIMAL FOODS)	<p>Gradation of Meat Based on Physicochemical Quality Total protein of meat (kejedahal method) Physicochemical quality of meat and meat product Determination of Extract Release Volume Determination of Meat Swelling Capacity. Determination of Picric Acid Turbidity (PAT)</p> <p>Determination of Nutritive Value & Composition of Provided fish flesh</p> <p>Determination of Moisture from Fish. Determination of Sodium Chloride from Fish. Determination of Ash insoluble in dilute Hydrochloric acid from Fish Determination of Acidity of Brine from Fish Determination of Ascorbic acid from Fish Determination of Polyphosphates from Fish</p> <p>Study of Microbial Spoilage of Meat Determination of dye reduction capacity Determination of Microbial load in meat and meat products</p> <p>Determination of Egg Quality Based on Physicochemical Analysis Estimation of protein by Folin Lowery method from Egg Estimation of protein by Biuret method from Egg Detection of Carbohydrate from egg by Anthrone method Estimation of fat by Soxhlet Extraction method from Egg. Estimation of moisture content of meat</p> <p>Cutout analysis of canned meats/retort pouches Estimation of protein content of meat Analysis of frozen meat/meat emulsion products</p> <p>To study shelf-life of eggs by different methods of preservation Evaluation of eggs for quality parameters(market eggs,branded eggs) To perform freezing of yolk/albumen Meat/Egg product formulation</p>

Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester V)
Paper – II

(Cereals, Pulses, Oilseed Technology and Food Business)

NSQF : LEVEL - 7

JOB ROLE: PRODUCTION MANAGER

UNIT NO.	CONTENT
I	Rice and Wheat Milling
	<p>General introduction to cereals , Major Pulses grown in the country and their application, Engineering properties of food grains.</p> <p>Rice Milling: Defination, composition and nutritional value, Modern rice milling process - Cleaning, Dehusking, rubber roll Shellers ,Husk separation, Paddy separation, Polishers - Cone polishers, glazing and Grading operations and their related equipments, Extraction of rice bran oil and uses of rice bran in food industry. Parboiling and Processed products from rice: Defination, Application, Disadvantage, composition and nutritional value, Methods of parboiling of paddy, Ageing of Rice, Enriched Rice, Rice Fortification, Milling of Wheat, Dhal milling process.</p>
II	Oil seed processing
	<p>Introduction, raw material preparation, Oil extraction methods- hydraulic press- screw press, ram press, oil extraction- principle and working, solvent.</p> <p>Process of refining:- Clarification, degumming, neutralization, bleaching, deodorization techniques/process, blending of oils. Hydrogenation, Fractionation, Winterization.</p> <p>Processing of Ground nut oil, soyabean, Rapseed and mustered, sunflower, Linseed</p>
III	Food packaging technology
	<p>Definition of Package, Packaging, Packing. , Levels of Packaging. Functions of packaging. Packaging Materials and their properties, Rigid containers- Glass, Wooden boxes, metal cans- Aluminium and tin plate, containers, Semi rigid containers- paperboard cartons, Flexible packaging- paper, plastic pouches- Low density polyethylene, High density polyethylene and Polypropylene. Packaging materials for dairy products, bakery and confectionary, granular products, fruits and vegetables Types of packages, package design and. Special Packaging: Aseptic packaging, Active packaging, Intelligent packaging, Modified atmospheric packaging and controlled atmospheric packaging, Shrink packaging, stretch packaging, Biodegradable packaging, Edible packaging, Tetrapacks, Machineries used in Food Packaging , Package testing-Thickness – Paper density - Basis weight – Grammage - Tensile Strength - Gas Transmission Rate (GTR) - Water Vapour Transmission Rate (WVTR).</p>
IV	Entrepreneurship and Marketing Management
	<p>Meaning, definition and concepts, characteristics, functions, role of entrepreneur in economic development, factors affecting entrepreneurial growth.</p> <p>Types of entrepreneurs – Intrapreneurship, Classification of small, medium and large scale manufacturing industries.</p>

**Revised Syllabus
From 2020-21 onwards**

	<p>Entrepreneurial skills: Preparing, planning, establishing, managing, operating and evaluating relevant resources in small business.</p> <p>Role of institutions/schemes in entrepreneurial development: SIDCO, SIDBI, NIESBUD, EDII, SISI, DIC, PMEGP, CMEGP, Rozgar Yojana Schemes.</p> <p>Types of Market. Difference between Selling and Marketing Price: Concept of Pricing. Promotion and Advertising.</p> <p>Basic concepts of economics: Utility, Income, Wealth, Saving, Investment and Value.</p> <p>Demand and supply Factors of production: Land, Labour, Capital, Organization.</p>
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SUGGESTED READINGS:

SR. NO.	BOOK	AUTHOR	YEAR	PUBLICATION
1	Post Harvest Technology of Fish and Fish Products.	Balachandran, K.K.	2001.	Daya Publishing House, New Delhi
2	Egg Science and Technology, 4th Ed.	Stadelman WJ, Owen J Cotterill	2002	CBS Publication New Delhi
3	<i>Food Packaging Materials..</i>	Mahadeviah M & Gowramma RV	1996	Tata McGraw Hill
4	Entrepreneurial Development	Sarwate		Everest Publication
5	Agricultural Marketing in India –,	Sivarama Prasad. A	1985.	Mittal Publications, New Delhi
6	Oilseeds Processing Technology	Dr. Banshi D Shukia, Dr. Prabhat K Srivastava, Er. Ram K Gupta	1992	The book is published under the Technology Mission on Oilseeds by the Central Institute of Agricultural Engineering, Nabi Bagh
7	Chemistry and Technology of Oils and Fats	Chakrabarty M M	2003	
8	Cereal and Cereal Products	Dendy DAV & Dobraszczyk BJ	2001	Aspen
9	Principles of Cereal Science and Technology, Hosney RS	Hosney RS	1994	
10	Unit Operations of Agricultural Processing	K.M. Sahay & K.K. Singh		Vikas Publishing

LIST OF PRACTICAL

SEMESTER	PRACTICAL BASED ON SKILL COMPONENT PAPER	NAME OF PRACTICAL
V	<p>PRACTICAL:-II (CEREALS, PULSES, OILSEED TECHNOLOGY AND FOOD BUSINESS)</p>	<p>Study of quality control of Cereals and Pulses Determination of Physical property of Paddy and Rice Determination of size and L/B ratio of Paddy and Rice Determination of Angle of Repose and porosity of grain Determination of Bulk and True density of grain Determination of physical property of Pulses Determination of Size of Pulses. Determination of Bulk and True density of grain Determination of Bulk and True density of grain Determination of Sphericity of grain sample (Pulses) Determination of moisture content of cereals and Pulses grain Determination of percent of Ash content of provided food sample Determination of Ash insoluble in dil. Hcl Determination of hydrocyanic acid in beans Determination of calcium carbonate in Fortified Atta Determination of Talc in Rice and Pulses Determination of Kesari dal powder (Lathyrus Sativas) in besan Determination of Gluten content in Wheat flour Determination of wheat flour its Alcoholic acidity % as H₂SO₄ Determination of Total protein in protein Rich Atta by Kjeldahl Digestion method To detect presence of protein in terms of peptide bond in the given sample of wheat flour by Biuret test To determine the particle size analysis of flour by vibratory sieve shaker method.</p>

**Bachelor of Vocation (B. Voc)
Skill Development Component
Food Processing & Engineering
(Semester VI)**

NSQF : LEVEL - 7

JOB ROLE: PRODUCTION MANAGER

Industry Training Based Project

- **Project Work**
- **Project Seminar**

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

Detail Syllabus for
Bachelor of Vocation
(B.Voc)
Skill Development Component
Retail Management

(Faculty of Commerce & Management)

(WITH EFFECT FROM 2020-2021 ONWARDS)

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- I)
Paper – I
Management and Accounting

NSQF: LEVEL - 4

JOB ROLE : SALES ASSOCIATE

UNIT–I Introduction to Management, Planning: Importance of Planning, nature, types of plans, steps in planning process, factors determining effective plan, **Organizing:** process, formal and informal organizations, organization chart, principles of organization, span of control.

UNIT–II Staffing: Staffing, factors affecting staffing, Departmentation, job design, selection and recruitment process, social responsibilities of organization. **Controlling:** Importance and function of control, control process, types of control, controlling techniques and methods.

UNIT–III Authority: Definition of Authority, responsibility and accountability, delegation, delegation process, decentralization versus centralization, determinants of effective delegation. **Decision Making:** Introduction, types of decisions, steps for sound decision making process.

UNIT–IV Financial Accounting: Definition, Concepts and conventions, Scope, Importance, Rules and Principles of Accounting, Classification of Accounts, Objectives of Accounting, Journal Entries, Ledger Posting, Trial Balance, Trading Account, Profit & Loss Account, Balance Sheet.

References:

1. Essentials of Management, Koontz & Weirich, Tata McGrawHill 2
2. Principles of Management- R N Tripathi.
3. P. C. Tripathi, P. N. Reddy: Principles of Management (Tata McGraw Hill, New Delhi)
4. J. S. Chandan : Management Theory & Practice (Vikas Publishing House, New Delhi)
5. Drucker Peter F: Management Challenges for the 21st Century, B. H. Oxford From 2014-2015
6. S.N.Maheshwari : Financial Accounting Theory and Problems- S.Chand
7. Shukla and Grewal : Advanced Accounts (S.Chand& Ltd. New Delhi)

LIST OF PRACTICAL

1. Giving an Overview of Retail Industry,
2. Practical telling the students about types of Retail Formats
3. Store Processes Supporting the Team in Working Effectively.
4. Communication Etiquette, Role, Authority and Responsibility of Employees in Handling
5. Security Risks,
6. Explaining Product Features and Benefits to Customers to Promote Sales and Goodwill,
7. Demonstration of Specialist Products,
8. Identifying and Reporting Promotional Opportunities,
9. Promoting of Products,
10. Recording and Evaluating Promotion Results
11. Book keeping records- journal, ledger etc.

All the students will submit their Reports (in duplicate) within a period of in the department for the practical; this period shall be counted for training. The internal and external examiner will be evaluating the reports and university practical paper.

Each student will be attached with one internal regular faculty guide, with whom they shall be in continuous touch during the training period. The internal faculty guide will be required to evaluate on the basis of the assessment report where the Training has been completed and his/her own assessment about the work done by the student.

The evaluation of the shall be made by external examiner appointed by the university who shall evaluate the report on the basis of presentation and the assessment university practical paper which is solved by the student. The paper of university shall consist of atleast one practical from the list of practicals and will evaluated by the examiner appointed by university.

LEARNING OUTCOMES

1. Introduction to Retail, Retail industry and Retail Store operations in India and International.
2. Understanding the Process credit applications for purchases.
3. Team and Organisation al Dynamics, Demonstrate products to customers.
4. Explaining the Features and Benefits of Products during a Product Demonstration.
5. Helping customers choose right products, Performing Safe and Valuable Product Demonstration

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- I)
Paper – II
Retailing

NSQF: LEVEL - 4

JOB ROLE : SALES ASSOCIATE

UNIT–I Introduction to retailing- Overview of Retailing, Retailing Environment, Retail management, growth of retailing in India. Classification of retail sector, Evolution and challenges of organized Retailing.

UNIT–II Retail Formats-Evolution of retail formats, functions of retailer, Store based retailing, Non-store retailing, Departmental stores, super markets, specialty stores, discount stores, Hypermarket, Malls, Direct and online marketing(Home shopping) Franchising/ types, franchising in India.

UNIT–III Retail life cycle:- Concept of product life cycle, sales, revenue and profit behavior of a product on life cycle, introductory, growth and maturity and decline stages of product life cycle, product mix, product line, length and width, management of product mix on the retail store level.

UNIT–IV Concept of branding, history of branding, product life cycle versus brand life cycle, brand identity, brand positioning and brand image, branding challenges and opportunities, strategic brand management process, brand equity and brand valuation technique. Ethical and legal issues in retailing Focus on customer dealing with ethical issues.

REFERENCES

1. Yoginder Singh, Dictionary of Retailing, Cyber Tech Publications, 2007
2. A Sivakumar, Retail Marketing, Excel Books, New Delhi.
3. Gilbert, Retail Marketing Management,
4. 2nd Edition, Pearson Education,
5. Gibson G Vedamani, Retail Management: Functional Principles and Practice, Jaico Publishing House, Second edition. 2004

List of Practical's

1. Establishing Organizational Image,
2. Appropriate Customer Handling, Collecting,
3. Analysing and Presenting Customer Feedback,
4. Prepare Products for Display,
5. Interpret Visual Design Briefs for Retail Displays,
6. Retail markets - Competition and Best Practices,
7. Informing Staff about Dressing Techniques and Role of Lighting,
8. Plan Work to Make Optimum Use of Resources,
9. Providing Information to Customers,
10. Role of Product Demonstration in Driving Sales,
11. Reassuring and Negotiating with Customers

All the students will submit their Reports (in duplicate) within a period of in the department for the practical; this period shall be counted for training. The internal and external examiner will be evaluating the reports and university practical paper.

Each student will be attached with one internal regular faculty guide, with whom they shall be in continuous touch during the training period. The internal faculty guide will be required to evaluate on the basis of the assessment report where the Training has been completed and his/her own assessment about the work done by the student.

The evaluation of the shall be made by external examiner appointed by the university who shall evaluate the report on the basis of presentation and the assessment university practical paper which is solved by the student. The paper of university shall consist of at least one practical from the list of practical's and will evaluated by the examiner appointed by university.

LEARNING OUTCOMES

1. Introduction to Retail, Retail industry and Retail Store operations in India and International.
2. Understanding the Process credit applications for purchases.
3. Understanding the importance of Team, how to develop a team and understanding the Organizational Dynamics,
4. Helping the student in Demonstrate products to customers.
5. Explaining the Features and Benefits of Products during a Product Demonstration.
6. Helping customers choose right products, Performing Safe and Valuable Product Demonstration

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- II)
Paper – I
Retail Marketing-I

NSQF: LEVEL - 5

JOB ROLE : TEAM LEADER

UNIT–I Introduction to Retail Marketing: Meaning & Definition of Retail Marketing,– Marketing, Definition of marketing management – marketing concepts – evolution of marketing – marketing mix, Retail marketing. Micro Environment: The company – suppliers – intermediaries – customers – competitors, public. Macro Environment: Demographic, economic, natural government intervention in natural resource management – political environment – cultural environment.

UNIT–II Shopper/Shopping Behavior: The Grocery Shopper, timing, Reutilized buying behavior, Impulse buying behavior Variety seeking, early purchase, consumer inventory, A Buyer behavior perspective – characteristics affecting consumer behavior – consumer buying roles – types of buying decision behavior –the buyer decision process for new products.

UNIT–III Segmenting & Targeting: Levels of segmentation – patterns of segmentation – procedures for marketing segmentation –Retail Product Decisions: Product classifications– product – mix decisions – product –line decisions. Developing new products: New product development processes, Product life-cycle . Foundations of Research, Problem Identification & Formulation – Research Question, Research Design, types of data collection, types of sampling and data analysis,

UNIT–IV Distribution and channel decision : Nature of distribution channels – channel design and modification decisions –physical distribution and distribution cost analysis, types of retailing – telemarketing, retailing – the supplier market – the multichannel system – the supermarket – mail– order – transportation – warehousing – inventory management.

References:

1. Yoginder Singh, Dictionary of Retailing, Cyber Tech Publications, 2007
2. A Sivakumar, Retail Marketing, Excel Books, New Delhi.
3. Gilbert, Retail Marketing Management, 2nd Edition, Pearson Education,
4. Gibson G Vedamani, Retail Management: Functional Principles and Practice, Jaico Publishing House, Second edition. 2004
5. SwapnaPradhan, Retailing Management: Text and Cases, Tata McGraw Hill Publishing Company Ltd., 2004
6. Bert Rosenbloom, Marketing Channels: A Management View, Thomson, New Delhi 2007.

List of Practical's

1. New product development processes, Product life-cycle Foundations of Research. Characteristics of scientific method –Variable. Research Process
2. Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance
3. Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables

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LEARNING OUTCOMES

1. Create a positive image of self and organization in the customers minds, Promote continuous improvement in service.
2. Monitoring Changes and Analysing the Impact of Successfully Resolved Customer Service Problems,
3. Implementing Changes in Customer Service Standards.
4. To organize the delivery of reliable service.
5. Helping the student in Demonstrate products to customers.
6. Explaining the Features and Benefits of Products during a Product Demonstration.
7. Helping customers choose right products, Performing Safe and Valuable Product Demonstration

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- II)
Paper – II

Retailing & Information Technology's use in Retail Operations

NSQF: LEVEL - 5

JOB ROLE: TEAM LEADER

UNIT–I Channel Management: Structure of marketing channels of commodity products - Multi-channel Retailing – Major channel management decision - Product management in retail sector - Brand management and retailing.

UNIT–II Retail Buying: Concepts of Retail Buying - Factors related to Retail buying – Comparative study on Retail buying behavior. Issues in Multichannel Retailing: Channel Conflict – Resolution of channel conflict – Territory Management –Technology issues – compatibility – Rural exposure – Integrated Shopping Experience.

UNIT–III Introduction to the Retail Industry: - Forecasted Trends that will impact Retailing for the next decade - Global and Local Retail Industry - Creating Customer Value through Information Technology - Computerization in Retail. Customer Relationship in Retail: Choosing the right CRM solution, Retention strategies E-retailing: Basic Overview of E-commerce - Traditional Retailing and E-Retailing - Benefits of E-retailing ,

UNIT–IV Tracking Innovations: Introduction to Radio Frequency Identification (RFID) - Background and definitions - RFID - BAR Code Comparison - Implementing RFID for Positive ROI - Evaluating RFID opportunities and ROI. Technological Solutions in the Retail Business: Point of Sale Solutions - Online Shopping Carts - Mobile Commerce - Online Procurement - Online Payments - E Customer Relationship Management – E-Business Security

REFERENCES

1. Retail management , Bajaj, Chetan& others, Oxford
2. Multi-Channel Retailing, Lynda GamansPoloian, Fairchild Books & Visuals
3. Retail marketing management , Gilbert, David, Pearso
4. e- Retailing Principles and Practice, Prof D P Sharma, Himalaya
5. E- Retailing, Charles Dennis, TinoFenech and Bill Merrilees, Routledge
6. e- Merchant: Retail Strategies for e- Commerce, Joanne Neidorf and Robin Neidorf, Addison Wesley Longman
7. e- Business & e- Commerce for Managers, Harvey M Deitel, Paul J Deitel and Kate Steinbuhler, Prentice Hall

LIST OF PRACTICAL'S

1. Inventory and merchandise management,
2. How to design the Effective Visual Display,
3. Practical on Radio Frequency Identification (RFID) - Background and definitions - RFID - BAR Code Comparison
4. Online Shopping Carts - Mobile Commerce - Online Procurement - Online Payments.
5. E Customer Relationship Management – E-Business Security
6. Practical on Brand management

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LEARNING OUTCOMES

1. Create a positive image of self and organization in the customers minds, Promote continuous improvement in service.
2. Monitoring Changes and Analysing the Impact of Successfully Resolved Customer Service Problems,
3. Implementing Changes in Customer Service Standards.
4. To organize the delivery of reliable service.
5. Helping the student in Demonstrate products to customers.
6. Explaining the Features and Benefits of Products during a Product Demonstration.
7. Helping customers choose right products, Performing Safe and Valuable Product Demonstration

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- III)
Paper – I
Entrepreneurship Development

NSQF: LEVEL - 6

JOB ROLE: DEPARTMENTAL MANAGER

UNIT–I Entrepreneur & Entrepreneurship: Evolution of the concept of Entrepreneur, Characteristics of an Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneur, Concept of Intrapreneurs, Role of Entrepreneurship in Economic Development, Growth of Entrepreneurship in India.

UNIT–II Entrepreneurial Growth: Factors – Economic factors, non – Economic factors, Government actions, Entrepreneurial competencies – meaning, major competencies, developing competencies, Entrepreneurship Development Programs (EDPs), Need, Objectives.

UNIT–III Small Enterprises: An Introductory framework: Definition, Characteristics, relationship between small and large units, objectives, scope, opportunities for Entrepreneurial carrier, problems of SSI, Project identification, Project selection, Contents of project reports.

UNIT–IV Institutional and financial support to Entrepreneurs: Various institutions supporting Entrepreneurship in India – MIDC, MSME, MCED, DIC, SSIB, MSSIDC. Financial support to Entrepreneurs: Commercial banks, IDBI, IFCI, SIDBI, SFCs, venture capital.

References

- 1) Entrepreneurship 6th Edition – Robert D Hisrich, Tata McGraw – Hill
- 2) Small – Scale Industries and Entrepreneurship. Desai, Vasant (2003). Himalaya Publishing House, Delhi.
- 3) S.S.Khanka - Entrepreneurial Development (S. Chand & Co)
- 4) Exploring Entrepreneurship, Blundel & Lockett, Oxford University Press
- 5) Entrepreneurship, Roy, Oxford University Press

LIST OF PRACTICAL

Information about various institutions supporting Entrepreneurship in India

1. MIDC,
2. MSME,
3. MCED,
4. DIC,
5. SSIB,
6. MSSIDC.
7. Financial support to Entrepreneurs: Commercial banks, IDBI, IFCI, SIDBI, SFCs,
8. Understanding the venture capital
9. Handling of Merchandise in Marketing and Promotional Campaigns
10. Following Company Policies to Develop Business Relations

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LEARNING OUTCOME

1. Monitor and solve service concerns,
2. Improve customer relationship,
3. Provide personalised sales & post- sales service support,
4. To organize the delivery of reliable service,
5. Organize the display of products at the store,
6. Maintain the availability of goods for sale to customer,
7. Organization & Team Dynamics
8. Evolution of the concept of Entrepreneur,
9. Characteristics of an Entrepreneur,
10. Functions of an Entrepreneur

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- III)
Paper – II
Retail Store Operations

NSQF: LEVEL - 6

JOB ROLE- DEPARTMENTAL MANAGER

UNIT–I Introduction to Retail Store Operations, store operation resources, daily procedures, refunds and returns, retailing tips, shoplifting and emergency planning. Key components of retail operations, store administration and management of the premises, managing inventory and supply, managing receipts, managing promotions, events, alliances and partnerships in retail operations management. Store space management, fundamentals of atmospherics

UNIT–II Customer Service in Retailing: Customer Service: Strategic Advantage through Customer Service, CS strategies, Gap Model of Improving Customer Service, Managing the Retail Store: Managing the Retail Store: Store Manager" s Responsibilities: Staffing, Selection, Socializing and Performance Management, Cost Control, Shrinkage Control. (Case study on rostering for a large format store)

UNIT–III Store operations and profitability analysis, Customer service and activity based costing, budgeting and planning, personnel recruitment and selection, communication inside the store: internal communication and external communication, legal compliance in store management, Attitude and Personality, Working Conditions, Career Advancement. Store Ambience: Store Layout, Design and Visual Merchandising, Exterior, Interior, Objectives of Store Design, Types of layouts (their relevance to Various Formats).

UNIT–IV Managing overall environment, Supplier Relations, Competition Relations, Employee Relations, Organizational Environment, supply chain management, customer relationship management, use of information technology in cash management and billing and management information system.

References

1. Yoginder Singh, Dictionary of Retailing, Cyber Tech Publications, 2007.
2. R Gopal, Pradip Manjrekar, Retail Management , Excel Books, New Delhi.
3. A Sivakumar, Retail Marketing, Excel Books, New Delhi.
4. Swapna Pradhan, Retailing Management : Text and Cases, Tata McGraw hill, New Delhi 2nd edition, 2006
5. M.Chael Hevy and Barton.AWeitz, Retail Management, Irwin Mcgraw Hill International edition, U.S, 1998. From 2014-2015

LIST OF PRACTICAL'S

1. Identifying Customers' Needs,
2. Customer's Buying Decision,
3. Maintenance of Store and Personal Hygiene
4. supply chain management,
5. Store Ambience: Store Layout,
6. Design and Visual Merchandising, Exterior, Interior, Objectives of Store Design, Types of layouts (their relevance to Various Formats).

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LEARNING OUTCOME

1. Monitor and solve service concerns,
2. Improve customer relationship,
3. Provide personalised sales & post- sales service support,
4. To organize the delivery of reliable service,
5. Organize the display of products at the store,
6. Maintain the availability of goods for sale to customer,
7. Organization & Team Dynamics
8. Evolution of the concept of Entrepreneur,
9. Characteristics of an Entrepreneur,
10. Functions of an Entrepreneur

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- IV)
Paper – I
Modern Retail Practices

NSQF: LEVEL - 6

JOB ROLE- DEPARTMENTAL MANAGER

UNIT–I Introduction to Retailing: Meaning of retailing, The Retailer within the Distribution Channel, The Vertical Marketing system, the relationship between the retailer and the consumer in terms of the distribution of goods, A Retailer's Position in Society, Retail Industry Structure and Trends, The Diversity of Retailing.

UNIT–II Retail Organizations and Formats: Introduction, Retail Ownership, The Independent Retailer, The multiple retailers, Voluntary retail group, the retail conglomerate, Franchises in retailing, Co-operative retailers, Retail Formats, Store based Formats, Variety stores, Specialist stores, Category killers, Convenience stores (Cstores), Supermarkets, superstores and hypermarkets, Warehouse clubs, Catalogue shops, Discount stores, Factory outlets, Charity shops, Non-Store Formats, Direct selling,

UNIT–III Retailing and the Competitive Environment: Measures of Retail Competition, Types of Competition, A Framework for Analyzing Competition, The Threat of New Entrants, The Changing Consumer Demographics, consumer buying behavior, Needs recognition, Retail Outlet Choice, Retail Segmentation. Franchising in Retailing-introduction, , types of franchise agreements

UNIT–IV Introduction to International Retailing: Understanding International retailing, alternative conceptions of International retailing, Global Retail Structures. Trends in International Retailing: Introduction, Trends in International Retailing, Evolution of International Retailing, the Motivations for International Expansion.

REFERENCES

1. Yoginder Singh, Dictionary of Retailing, Cyber Tech Publications, 2007
2. M. Chelvey and Barton. A Weitz, Retail Management, McGraw Hill International edition, U.S, 1798.
3. Judith. W. Kincaid, Customer Relationship Management: Getting it right, Pearson Education, New Delhi, 2003.
4. James. A. Fitzsimms and Mina. J. Fitzsimms, Service Management: Operations, Strategy, Information Technology, Tata McGrawhill, 2006 New Delhi.
5. Christopher Louchock and Jochen Wirtz, Service Marketing: People Technology, Strategy, Pearson Education, New Delhi, 2004.
6. K. Ramamohan Rao, Services Marketing, Pearson Education, New Delhi, 2005.
7. Stephen Spinnelli Jr, Robert .M. Rosenberg, and five billing, franchising; partnering to wealth creation, Pearson Education, UBS Publication, New Delhi, 2004 From 2014-2015

LIST OF PRACTICAL

1. Allocating Work within the Team,
2. Regular Monitoring of Work and Encouraging Improvements in the Quality of Work,
3. Following Personal Hygiene and Report
4. Franchising in India,
5. key factors in franchising
6. Retail Operations- introduction, store operating parameters using the strategic resource model in retailing, designing a performance program. Indian Retail Market Benefits of Organized Retail

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LEARNING OUTCOME

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2. Improve customer relationship,
3. Provide personalised sales & post- sales service support,
4. To organize the delivery of reliable service,
5. Organize the display of products at the store,
6. Maintain the availability of goods for sale to customer,
7. Organization & Team Dynamics
8. Evolution of the conceptof Entrepreneur,
9. Characteristics of an Entrepreneur,
10. Functions of an Entrepreneur

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- IV)
Paper – II
Store Planning, Layout and Designing.

NSQF: LEVEL - 6

JOB ROLE- DEPARTMENTAL MANAGER

UNIT–I Overview of Planning in Retailing: Functions of Retailing, Retailing Formats and the parameters for Strategy Mix Decision. Non Store Retailing, Wheel of Retailing, Dialectic Process. Retail Selling , Role of Selling, Retail Selling Process, Up-selling and Cross-Selling. Managing Retail Store: Store Manager’s Responsibilities: Staffing, Selection, , Cost Control, Shrinkage Control.

UNIT–II Planning Retail Management: Site Selection Process, Understanding and Review of Commercial Lease, Tenant Mix, Logistics and Information Systems, Improved Product Availability, Improved Assortment, Improved ROI, Strategies, Store Layout, Design and Visual Merchandising: Objectives of Store Design, Types of layouts (their relevance to Various Formats), Merchandise Presentation Techniques Retail Communication Mix, Location Strategy, Shopping Entertainment,

UNIT–III Strategic Issues in Store Planning: Store planning: Operation blue print. Personal utilization, Store maintenance, energy management and renovations, Inventory management, Store security & Insurance, Outsourcing, Security and Loss Control Techniques. New product schedule. Brand alternatives, types of brands- national brands and private labels,

UNIT–IV Meeting with vendors, negotiation with vendors, bargaining versus negotiation, principles of negotiation, negotiation strategies, tips for effective negotiation, negotiation tactics, best alternative to negotiated agreements, legal and ethical issues involved in negotiation. Strategic relationships, defining strategic relationships

References

1. David Gilbert, Retail Marketing Management, 2nd edition, Pearson Education
2. Levy IM. And Weitz B.A (2004), Retailing Management, 5th ed., Tata McGraw Hill
3. Berman B. Evans J. R. (2004), Retail Management, 9th Edition, Pearson Education
4. SwapnaPradhan, Retailing Management Text & Cases The McGraw-Hill
5. Barry Berman, Joel R. Evans, Tom Mahaffey(2005), Retail Management: A Strategic Approach, Pearson Education From 2014-2015

LIST OF PRACTICAL'S

1. Achieving Organisational Goals through Teamwork
2. Staffing, Selection process
3. Socializing and Performance Management,
4. How to Cost Control, Shrinkage Control.
5. Brand alternatives,
6. Types of brands- national brands and private labels,

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3. Provide personalised sales & post- sales service support,
4. To organize the delivery of reliable service,
5. Organize the display of products at the store,
6. Maintain the availability of goods for sale to customer,
7. Organization & Team Dynamics
8. Evolution of the conceptof Entrepreneur,
9. Characteristics of an Entrepreneur,
10. Functions of an Entrepreneur

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- V)
Paper – I
Merchandizing & Supply Chain Management

NSQF: LEVEL – 7

JOB ROLE: STORE MANAGER

UNIT–I : Merchandise management process overview, the buying organization, merchandise category- the planning unit, evaluating merchandise management performance- GMROI, managing inventory turnover, merchandise management process, , category of life cycles, Sales forecasting.

UNIT–II :Product assortment, product mix, product assortment plan, steps in developing an assortment plan, category variety and assortments, determining variety and assortment, setting inventory and product availability levels, product availability. Merchandising with background, approach.

UNIT–III : **Retail Merchandising**-merchandise planning, merchandise hierarchy, retail merchandise planning systems, staple merchandise management systems, the inventory management report, fashion merchandise management system, monthly sales percentage distribution to seasons Monthly sales,

UNIT-IV : Introduction to SCM: Supply Chain Inventory Management: Economic Order Quantity Models, Reorder Point Models, Multiechelon Inventory Systems, Cost associated with inventory decisions, selective control, economic order quantity, safety stock, probabilistic models Internet Technologies and Electronic Commerce in SCM. Relation to ERP, E-procurement, E-Logistics, E-markets, Electronic business process optimization, Business objects in SCM Recent Trends in SCM, JIT

References

1. David Gilbert, Retail Marketing Management, 2nd edition, Pearson Education
2. Levy IM. And Weitz B.A (2004), Retailing Management, 5th ed., Tata McGraw Hill
3. Berman B. Evans J. R. (2004), Retail Management, 9th Edition, Pearson Education
4. SwapnaPradhan, Retailing Management Text & Cases The McGraw-Hill
5. Barry Berman, Joel R. Evans, Tom Mahaffey(2005), Retail Management: A Strategic Approach, Pearson Education
6. Chopra, “Supply Chain Management”, Pearson Education Asia, New Delhi
7. Christopher, “Logistics and Supply Chain Management”, Pearson Education Asia, New Delhi
8. Taylor and Brunt, “Manufacturing Operations and Supply Chain Management (The Lean Approach)”, Business Press Thomson Learning, NY. From 2014-2015

LIST OF PRACTICAL

1. Management of Retail Store Operations, Define stock levels as per market trends and consumption,
2. Keeping records of Monitor receipt and dispatch of goods,
3. Maintaining stock records Ensure display of goods and merchandise to maximize store profitability and cost optimization
4. Economic Order Quantity Models, Reorder Point Models,
5. Models on Inventory Systems, Cost associated with inventory decisions, selective control, economic order quantity, safety stock and service level, probabilistic models Internet Technologies and
6. Electronic Commerce in SCM: Relation to ERP, E-procurement process, E-Logistics process, Internet Auctions, E-markets, Electronic business process optimization, Business objects in SCM Recent Trends in SCM

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LEARNING OUTCOME

1. Leadership and Effective Communication,
2. Understanding the Human Resource Management,
3. Optimize inventory to ensure maximum availability of stocks and minimized losses,
4. Execute visual merchandising displays as per standards and guidelines,
5. Implement promotions and special events at the stores,
6. Adhere to standard operating procedures, processes and policies at the store while ensuring timely and accurate
7. Reporting,
8. Business Ethics and Corporate Responsibility,
9. Project Management, Manage Sales and Service Delivery to increase store profitability

Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- V)
Paper – II
Mall Management

NSQF: LEVEL – 7

JOB ROLE STORE MANAGER (SEM – V)

UNIT-I Introduction to Mall Management:

Global Overview of Retail and Mall Management - Introduction to Malls – Site Selection Process - Understanding and Review of Commercial Lease - Tenant Mix - Marketing Planning and Branding of Malls - Factors influencing Malls establishments.

UNIT-II Operational Issues in Mall Management:

Maintenance Management - Shopping Entertainment - Shopping Centers –Mall Design process - HRM planning and Organization Structure - Aspects in Finance - Aspects in security /accounting - Aspects in Quality management - Statistical methods used in measuring mall performance.

UNIT-III Mall Management System:

Mall management – Tenants and Brands – Leasing Management – Cheque Collection –Invoice Management – Facility Management - Report Management, Shop floor Sales Management. Customer Life Time Value, Identification of customer needs and satisfaction gaps, Tactics to get new customers. New Concept of Customer Care: Ways to achieve customer delight. Difference between customer delight and wow factors.

UNIT-IV Retail Customer Service :Retail Customers Profile. Customer Service: Strategic Advantage through CustomerService, CS strategies, Gap Model of Improving Customer Service. Buzz factor in Service Delivery: Customers Role, Employee Role. Customer Expectations The Gaps, Dimensions of service quality, Measurement of Service Quality. Handling Customer Complaints

References:

1. Mall Management, Arif I Sheikh &DrKaneez Fatima, Himalaya
2. Mall Management with Case Studies, Abhijit Das, Eastern Book Company
3. Consumer-Centric Category Management : How to Increase Profits by Managing Categories based on Consumer Needs by ACNielsen, Wiley, 2005
4. Barry Bermans and Joel Evans, "Retail Management – A Strategic Approach", 8th edition, PHI private limited, New Delhi, 2002.

LIST OF PRACTICAL

1. How to have HRM planning and Organization Structure - Aspects in Finance,
2. Ensure application of store policies and procedures with respect to visual merchandising
3. Role of Electronic & Other Channels.
4. Customer Expectations & Perceptions of Service Retail Service Quality The Gaps,
5. Dimensions of service quality, Measurement of Service Quality, service quality issues in retail industry.
6. Handling Customer Complaints: Types of difficult customers. Ways to handle Complaints

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LEARNING OUTCOME

1. Leadership and Effective Communication,
2. Understanding the Human Resource Management,
3. Optimize inventory to ensure maximum availability of stocks and minimized losses,
4. Execute visual merchandising displays as per standards and guidelines,
5. Implement promotions and special events at the stores,
6. Adhere to standard operating procedures, processes and policies at the store while ensuring timely and accurate
7. Reporting,
8. Business Ethics and Corporate Responsibility,
9. Project Management, Manage Sales and Service Delivery to increase store profitability

**Bachelor of Vocation (B.Voc.)
Skill Development Component
Retail Management
(Semester- VI)**

NSQF: LEVEL – 7

JOB ROLE: STORE MANAGER

FORMAT OF PROJECT WORK

- Writing the Summer Project Report
- Student's Declaration
- Certificate from the Company
- Certificate from the Guide
- Acknowledgements
- Executive Summary
- List of Tables
- List of Charts
- List of Graphs
- Table of Contents

Chapter 1 - Introduction to the topic

About the company/topic (include details like product mix, marketing mix, HR policies, etc) according to the need of the project

Chapter 2 - Methodology Research Design (Exploratory, Analytical etc.) Data Collection
Primary and Secondary data Instruments for Data Collection (Questionnaire, Inventories, Interview etc.) Method for Data Collection (Shopping Mall Intercept, Telephone, E-mail etc.)
Chapter

3 Findings & Analysis Chapter

4 Conclusions Chapter

5 Recommendations / Suggestions Chapter

6 Limitations of the Study

Bibliography

Annexure 1.Questionnaire (If Applicable) 2.Miscellaneous :

PROJECT SEMINAR

LEARNING OUTCOMES

1. Leadership and Effective Communication,
2. Understanding the Human Resource Management,
3. Optimize inventory to ensure maximum availability of stocks and minimized losses,
4. Execute visual merchandising displays as per standards and guidelines,
5. Implement promotions and special events at the stores,
6. Adhere to standard operating procedures, processes and policies at the store while ensuring timely and accurate
7. Reporting,
8. Business Ethics and Corporate Responsibility,
9. Project Management, Manage Sales and Service Delivery to increase store profitability

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

Detail Syllabus for
Bachelor of Vocation
(B.Voc)
Skill Development Component
Acting

(Faculty of Humanities)

(WITH EFFECT FROM 2020-2021 ONWARDS)

DETAIL OF JOB ROLE					
B.VOC (BACHELOR OF VOCATION)					
Sr. No.	Programmed	Semester	NSQF Level	Job Role	Learning Outcomes
1.	Certificate	I ST	4th	Theatre Actor	<ol style="list-style-type: none"> 1. Perform Acting in Amateur and professional Theatre Productions 2. Perform Acting in religious programmes 3. Perform in Various theme Parks 4. Create portfolio to promote themselves 5. Perform as an actor in various traditional Theatres
2.	Diploma	II ND	5	Theatre Actor	<ol style="list-style-type: none"> 1. Perform Acting in Amateur and professional Theatre Productions 2. Perform Acting in religious programmes 3. Perform in Various theme Parks 4. Create portfolio to promote themselves 5. Perform as an actor in various traditional Theatres
3	Advance Diploma	III RD	6	Theatre Actor Television Actor Voice- Over Artist Anchor	<ol style="list-style-type: none"> 1. Perform Acting in Professional Theatre Productions 2. Perform Acting in Short Films 3. Perform in Various Advertisements produced at local level 4. Create portfolio to promote themselves 5. Perform as an anchor in Documentaries
4	B.Voc Degree	V TH	7	Television Actor Voice- Over Artist Anchor Film Actor Model	<ol style="list-style-type: none"> 1. Perform Acting in Professional Theatre Productions 2. Perform Acting in Films 3. Perform in Various Advertisements 4. Create portfolio to promote themselves 5. Perform as an anchor in Documentaries 6. Perform as a Voice over artists in Films/Plays/Mahanatya
		IV TH			
		VI TH			

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester - I
Paper – I
(Acting as Observed Art)

Unit – I :

Acting as Observed Art

Various Definitions of drama

Basics of Acting :

Imagination in Acting,
Observation in Acting,
Concentration in Acting

Unit – II :

Acting Theory

Motivation
Improvisation
Knowing the purpose of observation,
Aesthetic contemplation

Unit – III :

Response of Spectators

Emotional Response,
Art of Make Believe,
Nature of objects observed,
Types of observations

Unit – IV :

Experience of Actor
Attitude of the observer actor
Experience of the observer actor
Concept of Empathy

Recommended Books

1. Acting the First Six Lessons Richard Boleslavski, Echo Points Books and Media, U.S.A.
2. Indian Method in Acting, Prasanna, National School of Drama, New Delhi
3. Natya Prasang, Dr. Satish Pawde, Aakar Publication Mahal Nagpur
4. Bharat Muninche Natya Shastra : Ek Rasaswad, Parag Ghonge, Vijay Prakashan Nagpur

List of Practical's:

UNIT I :

Enacting an imaginary situation
Makeup: Historical Perspective
Study of Mythological, Historical, Traditional & Modern
Costume Techniques of Makeup with special reference to Technique and Style

UNIT II :

Improving a Scene
Makeup: Techniques - Types of Faces, Basic Makeup, Background, Highlight & Shadow, Stylized Makeup Mythological & Traditional Makeup Techniques

UNIT III:

Rehearsing Monologues from famous plays, Acting in an One Act Play

UNIT IV:

Stage Acting Performance by a Candidate in Practical Examination
Acting in 1 One Act Play, One Monologue Presentation

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester - I
Paper – II
(Acting as Created Art)

Unit – I : Acting as Created Art

Rasas as per Natyashastra Shringar Rasa, Veer Rasa, Raudra Rasa, Bibhats Rasa, Hasya Rasa, Adbhut Rasa, Karun Rasa.

Unit – II : Types of Acting as per Natyashastra

Introduction to Types of Acting by Bharat Muni -Angik Abhinay, Wachik Abhinay, Aharya Abhinay, Satvik Abhinay

Unit – III : Understanding the Process of Creation

Creation- Knowing the component parts of creation, knowing the technique of creation, knowing the problem during Creation, Knowing the problem of the beginner.

Unit – IV : Methods of Creation

Analysing the Role for Creation, Knowing the Methods for Creation, Motivation for Creation, Discovering the symbols for creation

Recommended Books :

1. Introduction to Bharta's Natyashastra, Adya Rangacharya, Munshilal Manoharlal Publishers Pvt Ltd, New Delhi
2. Sanskrit Play Production in Ancient India, Tarla Mehtaa, Motilal Banarasidas Publishers Pvt Ltd, New Delhi
3. The Theatre According to Natyashastra of Bharta, Kanishka Publishers & Distributors, New Delhi
4. Creating a Role, Constantin Stanislavski, Print Perfect, New Delhi

List Of Practical's

UNIT I :

Rehearsing Dramatic scenes of different Rasas
Costume: Historical Perspective
Study of Mythological, Historical, Traditional & Modern Costumes
Costume Techniques of Makeup with special reference to Technique and Style

UNIT II:

Creating a Role from the play in the syllabus
Costume Production Process

UNIT III:

Makeup Rehearsals /Costume Design Rehearsals

UNIT IV:

Actual Performance by the candidate in Practical Examination – 2 One Act Plays
Main Role in One Play and Minor Role in other

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester - II
Paper – I
(Acting and its Basic Elements)

Unit – I : Acting and its basic elements I

Naturalness in acting,
Life-likenesses in acting,
Freshness in Acting,
Unity in Acting

Unit – II : Acting and its basic elements II

Consistency in Acting,
Harmony in Acting,
Emphasis in Acting,
Balance in Acting

Unit – III : Acting and its basic elements III

Proportion in Acting,
Sincerity in Acting,
Rhythm in Acting,
Grace in Acting

Unit – IV : Types of Acting in details

Angik Abhinay,
Waachik Abhinay ,
Aaharya Abhinay ,
Saatvik Abhinay ,
Stage Movements

Recommended Books

1. Abhinay Kala, Dr. Vinod Indurkar, Visa Books, Dhantoli, Nagpur
2. Rangmanch, Prayog aur Parampara, Yogendra Choubey, Megha Books, Delhi
3. Natya Darshan, Dr. Parag Ghonge, Vijay Prakashan, Nagpur

List of Practical's

UNIT – I

Costume: Historical Perspective

Study of Mythological, Historical, Traditional, Modern with special reference to technique & Style

Costume Rehearsals

UNIT – II

Costume Design Process

Distinguishing costumes between Major & Minor Characters

Rehearsing Plays as Major and Minor Roles with specific reference to costumes

UNIT – III

Costume Rehearsals

UNIT – IV

Actual Performance by the candidate in Practical Examination, considering the costumes and makeup as per the character of the play in at least two plays

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester - II
Paper – II

Acting and Improvisation

Unit – I : Acting and Improvisation

1. What is Improvisation?
2. Improvisation through Theatre Games
3. Features of Improvisation
4. Commandments of Improvisation

Unit – II : Mime Acting

1. Mime and its type (Pantomime)
2. Information of Mime Institutions in India
3. Study of famous mime artists
4. Mime Scene Work Analysis

Unit – III : Improvisation

1. Scene improvisation
2. Improvisation & Mime
3. Interpretation of the improvisation
4. Improvisation and Suggestion

Unit – IV : Improvisation & Interpretation

1. Narrative Improvisation
2. Comedia del arte
3. Theatre of Viola Spolin
4. Theatre of Augusto Boal

Recommended Books

1. Improvisation for Theatre, Viola Spolin, Northwestern University Press, USA
2. Creating Pantomime, Joyce Branagh & Keith Orton
3. The Improv Handbook, The Ultimate Guide to improvising in comedy Theatre and Beyond, Tom Salinski & Debora Francis White
4. Truth in comedy : The Manual of Improvisation, Kim Johnson, Charna Helparn, Del Close

List of Practical's

UNIT – I

Types of Costume Designers

UNIT – II

Distinguishing between Major & Minor Characters with reference to costumes by an actor student

UNIT – III

Changing an Actors Appearance according to Character Suggesting changes in Character Development & age

UNIT – IV

Actual Performance by the candidate in Practical Examination, considering the costumes and makeup as per the character of the play in Two Plays

Course Outcomes

By the end of the first year which qualifies the student to acquire a Diploma in Acting, students shall be able to –

1. Understands the basic technique of stage acting
2. Learn how to play a role and make it believable
3. Learn how to analyse a script and the situations therein
4. Learn the importance of creation in the art of acting
5. Learn the use of costumes for character building

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester - III
Paper – I
Types of Acting

Unit – I : Types of Acting I

- Vachik Abhinaya
- Voice,
- Speech
- Tone

Unit – II : Types of Acting II

- Aangik Abhinaya
- Anga
- Upanga
- Pratyanga

Unit – III : Types of Acting III

- Aaharya Abhinaya
- Music
- Costume
- Make-up, Set, Props

Unit – IV : Styles of Play Production

- Satvik Abhinaya- Bhav, Vibhav
- Anubhav Realistic and Non realistic acting styles
- Play Analysis of the play Andhayug

Recommended Books

1. Barata's Natyashastra, Adya Rangacharya, Munshilal Manoharlal Publisher's Pvt. Ltd., New Delhi
2. Natya Darshan, Dr. Parag Ghonge, Vijay Prakashan, Nagpur
3. Bharat Muninche Natyashatra Ek Rasaswad , Dr. Parag Ghonge, Vijay Prakashan, Nagpur
4. Andha Yug, Dharmaveer Bharatee

List of Practical's

Unit I :

Set : Historical prospective
Introduction of scale model, measurements of levels, wings etc.
Actual scale model of the productions.

Unit II :

Set design techniques
Actual implementation of the scale model done. Hand property making by students.

Unit III :

Setting Rehearsals - Actors are inspired to use set for enhancing the effectiveness in their acting

Unit IV :

Stage Acting performance- Actual performance by the candidate in Practical Examination making use of the set and Hand Property in two different plays.

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester - III
Paper – II
(Actor And His Body)

Unit – I : Actor and his body

- Knowing the Anatomy by Actor
- Purpose of knowing the Anatomy by an actor
- Understanding the Significance of Relaxation,
- Physical Action and its Necessity in Acting

Unit – II : Body Language I

- Body-Mind and Rhythm
- Actor's Mental Attitude
- Actor's Emotional World
- Character's Emotional World

Unit – III : Body Language II

- Postures-Gestures
- Body Movements
- Body Language
- Voice Culture and Speech.

Unit – IV: Quality Standards

- Detailed Analysis of the Play
- Andha Yug By Dharmveer Bhartee

Recommended Books

1. Actor and his Body (Performance Book), Litz Pisk
2. Andha Yug, Dharmaveer Bhartee
3. The Lucid Body, A guide for the Physical Actor, Fay Simpson
4. Movement Directors in contemporary theatre, Ayse Tashkiran

List of Practical's

Unit I : Computer Aided Set Design.

Unit II : Conceptual Visualization

Unit III: Technical Drafting Woodwork

Unit IV: Actual performance by the candidate in Semester End Practical Examination
in at least two plays and two monologues

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester – IV
Paper – I
Acting Techniques

Unit – I: Acting Techniques I

- Addition Technique of Acting
- How and where Addition Technique is used by an actor
- Elimination Technique of Acting
- How and where Elimination Technique is used by an actor

Unit – II: Acting Techniques II

- Alienation Technique of Acting
- How and where Alienation Technique is used by an actor
- Purgation Technique
- What is catharsis?

Unit – III: Analysing a Role

- Method of Physical Action
- Spontaneity and Analysis
- Understanding Actor Audience Relationship
- Method or Madness

Unit – IV: Play Analysis

- Play analysis – A Doll's House by Henrik Ibsen

Recommended Books

1. Towards Poor Theatre, Jerzy Grotovaski, Methuen Drama, London
2. Brecht on Theatre, Bertolt Brecht, Hall And Wang, New York
3. Stanislavski for Beginners, David Allen, Orient Blackswan Pvt. Ltd. Chennai
4. A Doll's House, Henrik Ibsen

List of Practical's

Unit I

Stage lighting historical perspective
Introduction to lights.
Types of lights and it's various functions.
How to use Stage Lights by an actor

Unit II

Light design techniques
Introduction to que sheet.
Diagram by students explaining the various parts of lights.

Unit III

Light Rehersals for actors

Unit IV

Actual performances by Students in Practical Examinations keeping in view the use of mood lighting on the stage in tow plays and 2 emotional scenes of any two plays which need mood lighting.

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester – IV
Paper – II
Role Interpretation and Role Playing

Unit – I: Role Interpretation and Role Playing

- Understanding the Role
- Building the Character
- Identity Crisis,
- Character and Illusion of Reality

Unit – II: Character Study

- Actor-Character Emotional World,
- Understanding the Graph of the Character,
- Understanding the terms Reaction
- Understanding the term Response.

Unit – III: Satvik Abhinay

- What do you understand by Satvik Abhinaya
- Why Satvik Abhinay is difficult
- Which emotions are expressed through Satvik Abhinaya
- What is the relation between Rasa And Abhinaya

Unit-IV: Play Analysis

- Detailed analysis of the play- Ghashiram Kotwal by Vijay Tendulkar

Recommended Books

1. Roles in Interpretation, Judy Yordan
2. Interpretation Role Play, Abdelha Lomri & Dr. Emad Hamza
3. Ghashiram Kotwal, Vijay Tendulkar
4. Building a Character, Constantin Stanislavski

List of Practical's

Unit I

Study Mythological, Historical, Traditional & Modern Light Design

Unit II

Evolution of Stage Lighting

Unit III Light Rehearsals

Unit IV

Film Acting Performance - Actual performances by Students in Practical Examinations in a short film of 5 minutes duration, concept and direction should also be from students

Course Outcomes

By the end of the Second year which qualifies the student to acquire a Advanced Diploma in Acting, students shall be able to –

1. Understands the technique of creating a Role on Stage
2. Learn how to effectively create an illusion of reality on stage
3. Learn how to act in Films
4. Understand the technique of camera acting
5. Understand a difference between documentary and Film

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester – V
Paper – I
Acting in Drama

Unit- I: Acting in Drama

- Acting in Drama
- Knowing Drama as Performing Art
- Importance of Space and Time
- Analysing the Created Atmosphere of the Stage

Unit – II: Character Building

- Establishing Rhythm with other Characters
- Understanding the Concept of Holy Actor
- Mood And Atmosphere
- Given Circumstances

Unit – III: Character Building

- Method Acting
- Magic if and Emotional Memory
- Character Interpretation
- Character Building

Unit-IV : Art of Make Believe

- Why Drama is called an art of make believe
- Principle of Liveliness
- Empathy & Illusion
- Knowing own potentials

Recommended Books

1. Audition, Michael Shurtleff, Bantom Books, Newyork
2. Sanford Meinsner on Acting, A Vintage Original, U.S.A.
3. Actor's Art & Craft, William Esper, Demon Dimarco, Anchor Books, New York

List of practical's

Unit I : Stage acting performances

Unit II : Performance of Five Soliloquies

Unit III : Production of Two One Act Plays

Unit IV : Production of The cherry orchid by Anton Chekhov, playing an important role in any classic play

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester – V
Paper – II
Acting in Films

Unit –I: Acting in Films I

1. Understanding Film as Mass Media
2. Language of Film as different from Drama
3. Script Writing
4. Screenplay Writing

Unit –II: Acting in Films II

1. Loud Acting
2. Subdued Acting
3. Drama Production
4. Film Production

Unit – III: Technique of Film Acting

1. Understanding the Language of Camera
2. Various types of Camera Shots
3. Various types of Camera Movements
4. Basics of Stage Acting

Unit- IV : Use of technical manuals

1. Differentiating Drama Production and Film Production
2. Practicing the Basics of Stage Acting and Film Acting
3. Understanding the Technique of Film Acting
4. Differentiating Drama and Film Acting

Recommended Books

1. Jansanwad Siddhant aani Vyawahar, Rama Golwalkar Potdukhe, Shri Mangesh Prakashan, Nagpur
2. Prasar Madhyame aani Prayogkala, Vishram Dhole, Lalit Kala Kendra, Pune
3. Secrets of Screen Acting, Patrick Tucker
4. Acting in Film, Michael Cain
5. Acting for Film, Catthy Hase

List of Practical

Unit I

- TV Acting Performance
- Participation as an Actor
- As Anchor Person

Unit II

- TV Acting Performance
- Participation as an Actor
- As News Reader

Unit III

- Performance as an Actor in Add Films

Unit IV

- Performance as an Actor in Documentary

Bachelor of Vocation (B.Voc)
Skill Development Component
Acting
Semester – VI

Project Work

1. T.V. Acting Performance
Participation as Actor in the following
 - A. As Anchor Person
 - B. As News Reader
 - C. As Announcer

2. Acting Performance
Performance as actor in the following
 - A. 1 Add Film
 - B. 1 Short Film Or Documentary Or AV Song

Project Seminar

- Presentation by the student on the above Project work

Course Outcomes

By the end of the Third year which qualifies the student to acquire a Degree in Acting, students shall be able to –

1. Understands the technique of Acting on Stage and Acting in Films
2. Learn how to make a documentary
3. Understand the technique of TV Acting
4. Understand Film as a Mass Media
5. Can act in any commercial venture of the entertainment industry

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

Detail Syllabus for
Bachelor of Vocation
(B.Voc)
Skill Development Component
Theatre & Stagecraft
(Faculty of Humanities)
(WITH EFFECT FROM 2020-2021 ONWARDS)

DETAIL OF JOB ROLE					
B.VOC (BACHELOR OF VOCATION)					
Sr. No.	Programmed	Semester	NSQF Level	Job Role	Learning Outcomes
1.	Certificate	I ST	4th	Makeup Artist for Theatre Hair Dresser for Theatre	1. Work as a Makeup Artists in Amateur and professional Theatre Productions 2. Work as Makeup Artists in religious programmes 3. Work As Costume Designer in Amateur and Professional Theatre Productions 4. Create portfolio to promote themselves 5. Can work as costume creator for Theatre
2.	Diploma	II ND	5	Makeup Artist for Theatre Hair Dresser for Theatre	1. Work as a Makeup Artists in Amateur and professional Theatre Productions 2. Work as Makeup Artists in religious programmes 3. Work As Costume Designer in Amateur and Professional Theatre Productions 4. Create portfolio to promote themselves 5. Can work as costume creator for Theatre
3	Advance Diploma	III RD	6	Set Designer for Theatre	1. Work as set & Light Designer for Theatre Productions 2. Work as Art Director for Short Films 3. Work as Light Designer for Short Films 4. Work as Light Designer for Short Films 5. Work as Art Director for TV Advertisements 6. Create portfolio to promote themselves 7. Work as Art Director in Documentaries 8. Work as light designer for Documentaries
		IV TH		Light Designer For Theatre	
4	B.Voc Degree	V TH	7	Sound Recordist Films	1. Work as set & Light Designer for Theatre Productions 2. Work as Art Director for Short Films 3. Work as Light Designer for Short Films 4. Work as Light Designer for Short Films 5. Work as Art Director for TV Advertisements 6. Create portfolio to promote themselves 7. Work as Art Director in Documentaries 8. Work as light designer for Documentaries 9. Work as Sound Recordist in Professional Sound Recording companies 10. Work as Sound Recordist in Professional Projects of Entertainment Industry
		VI TH		Art Director for Films	

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester - I
Paper – I
(Drama Theatre Concepts & Forms)

Unit – I :

Drama & Theatre concepts

Various definitions of Drama

Drama methods -

Stanislavsky's Method

Grotovaski's Method

Brecht's Method

Unit – II :

Dramaturgy

Drama games

Dramaturgy.

Stage division/ Stage geography

Bharatmuni's Natyamandapa

Unit – III :

Drama Forms I

Tragedy

Comedy

Farce

Melodrama

Unit – IV :

Drama Forms II

Tragicomedy

Problem Plays

Aristotle's views on Dramatic Plot

Aristotle's views on Dramatic Character

Recommended Books

1. The Theatre According to Natyashastra Of Bharata, R.P. Kulkarni, Kanishka Publishers and Distributors, New Delhi
2. Key Concepts in Theatre, Drama Education, Editor Shifra Shonman
3. Key Concepts in Drama and Performances, Kneneth Picking
4. Improvisation for the Theatre, Viola Spolin, Northwestern University Press, U.S.A.
5. Dramaturgy in making, A users guide for Theatre Practitioners, Katalin Trencenyi

List of Practical's:

UNIT I : Makeup Historical Perspective

Study of Mythological, Historical, Traditional And Modern Makeup with special reference to Technique & Style

UNIT II : Makeup Techniques I

Types of Faces, Basic Makeup, Highlight & Shadow

UNIT III: Makeup Techniques II

Straight Makeup, Character Makeup

UNIT IV: Makeup Practical

Actual Straight & Character Makeup by the candidate in Semester Practical Examination

**Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester - I
Paper – II
(Indian Folk Theatre)**

Unit – I :

Indian Folk Theatre

Historical perspective of Indian Theatre
Traditional Indian Theatre
Different forms of Folk Theatre
Comparison of Modern Theatre with Folk Theatre

Unit – II :

Regional Folk Theatre I

Regional Folk Theatre
Salient features of Folk Theatre
Commonalities in various Folk Theatre Forms
Play analysis- One act play by Ratnakar Matkari

Unit – III :

Regional Folk Theatre II

Yakshagana
Raslila
Jatra
Bhavai

Unit – IV : Regional Folk Theatre III

Swang
Dashavtar
Koodiyattam
Therukutthu

Recommended Books :

1. The Oxford Companion to Indian Theatre, Ananda Lal, Oxford University Press , New Delhi
2. History of Indian Theatre, M.L.Varadpande
3. Dance Theatre Of India, Katia Legeret Manochhaya
4. Improvisation for the Theatre, Viola Spolin, Northwestern University Press, U.S.A.

List Of Practical's

UNIT I : Study of Mythological, Historical, Traditional & Modern Makeup with reference to technique and style

UNIT II: Study of Makeup with reference to Lighting

UNIT III: Study of Stylized Makeup

UNIT IV: Actual Stylized Makeup by the candidate in Semester Practical Examination

**Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester - II
Paper – I
(Indian Traditional Theatre)**

Unit – I :

Indian Traditional Theatre

Historical perspective of Traditional Indian Theatre
Regional Traditional Theatres
Traditional Theatre forms
Salient features of Traditional Theatre forms

Unit – II :

Regional Folk Theatre I

How Folk Theatre is composite form which includes Dance, Drama & Music
Tamasha
Kirtan
Nautanki

Unit – III :

Play Analysis

Play analysis- Adhe Adhure by Mohan Rakesh
Theme, Plot, Characterization, Relationships of Characters, Historical Importance

Unit – IV :

History of Marathi Theatre
History of Bengali Theatre
History of Hindi Theatre
History of Gujrathi Theatre

Recommended Books

1. The Oxford Companion to Indian Theatre, Ananda Lal, Oxford University Press , New Delhi
2. History of Indian Theatre, Lok Rng Panorama of Indian Folk Theatre
3. History of Indian Theatre, M.L.Varadpande
4. Natya Darshan, Dr. Parag Ghonge, Vijay Prakashan, Nagpur

List of Practical's

UNIT – I : Costume Historical Perspective, Study of Mythological, Historical, Traditional & Modern Costumes

UNIT – II : Basic Sewing Process, Color, Line, Texture, Types of Costume Designers

UNIT – III : Suggesting Relationship between Characters with reference to Costume

UNIT – IV : Actual making and designing of costumes as per above input by the candidate in Semester Practical Examination

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester - II
Paper – II
Modern Indian Theatre

Unit – I : Modern Indian Theatre

Modern Indian Theatre
Evolution of Modern Indian Theatre

Unit – II : Study of Post Independent Indian plays and its playwrights I

Khamosh! Adalat jaari hai by Vijay Tendulkar

Unit – III : Study of Post Independent Indian plays and its playwrights II

Virasat by Mahesh Elkunchwar

Unit – IV : Study the works of Modern Indian Playwrights

Mohan Rakesh
Vijay Tendulkar
Badal Sarkar
Girish Karnad

Recommended Books

1. The Oxford Companion to Indian Theatre, Ananda Lal, Oxford University Press , New Delhi
2. Natya Prasang, Dr. Satish Pawde, Aakar Publication Mahal Nagpur
3. Modern Indian Theatre, Nandi Bhatia, Oxford University Press, New Delhi
4. Aadhe Adhure, Mohan Rakesh, Radhakrishna Publication, New Delhi
5. Khamosh Adalat Jaree Hai, Vijay Tendulkar, Translation Vasant Deo, Uttkarsh Prakashan
6. Virasat, Mahesh Elkunchwar

List of Practical's

UNIT – I : Costume Historical Perspective, Study of Mythological, Historical, and Traditional & Modern Costumes with reference to Style

UNIT – II : Types of Costume Designers, Reinforcing Mood & Style of the Production , Distinguishing between Major & Minor Characters with reference to Costume

UNIT – III : Changing an Actor's Appearance, Suggesting Changes in Character Development and Age through use of costumes

UNIT – IV : Actual making and designing of costumes as per above input by the candidate in Semester Practical Examination

Course Outcomes

By the end of the first year which qualifies the student to acquire a Diploma in Theatre & Stagecraft, students shall be able to –

1. Understands Basic concepts of Makeup like, Background, Highlight, Shadow
2. Learn how do stylized Makeup for traditional plays
3. Learn how to design Traditional & Modern Costumes
4. Learns how to establish relationships amongst the characters through costume design

**Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester - III
Paper – I
(Greek Theatre)**

Unit – I :

Greek Theatre Origin

- Etymology & Origin of Greek Theatre
- Architecture of Greek Theatre
- Greek Tragedies
- Three Unities of Drama

Unit – II : Greek Theatre Features I

- Greek Drama Plots
- Greek Drama Characters
- Salient Features of Greek Drama
- Chorus in Greek Drama

Unit – III : Greek Theatre Features II

Masks used in Ancient Greek Theatre

Use of Language in Ancient Greek Theatre

Unit – IV : Playwrights of Ancient Greek Theatre

- Aeschylus
- Sophocles
- Euripides
- Aristophanes

Recommended Books

1. Guide to Greek Theatre And Drama, Kenneth Maclish
2. Natya Darshan, Dr. Parag Ghonge, Vijay Prakashan, Nagpur
3. Paschatyya Rangbhumihee Watchal, Kru. Ra. Sawant, Majestic Prakashan, Mumbai
4. Greek Tragedy in Action , Oliwar Taplin

List of Practical's

Unit I : Set: Historical prospective, Study of Mythological Historical, Traditional and Modern Set Designs

Unit II : Set design techniques

Actual implementation of the scale model done. Hand property making by students.

Unit III : Script Breakdown as per set Design

Unit IV : Actual making and designing of sets as per above input by the candidate in Semester Practical Examination

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester - III
Paper – II
(Elizabethan Theatre)

Unit – I : Origin of Elizabethan Theatre

- Etymology & Origin of Elizabethan Theatre
- Architecture of Elizabethan Theatre
- Discovery Space
- Costumes of Elizabethan Theatre

Unit – II : Elizabethan Theatre Features I

- Sets and costumes of Elizabethan Theatre
- Various Drama companies of Elizabethan Theatre
- Types of Plays during Elizabethan Period
- Themes of Plays during Elizabethan Period

Unit – III : Elizabethan Theatre Features I

- Technique of Play Production during Elizabethan Period
- Salient Features of Elizabethan Theatre
- Playwrights of Elizabethan Period
- William Shakespeare

Unit – IV: Play analysis – Andha Yug

- Plot, Theme, Characters, Relationships between Characters and historical importance of Indian Play – Andha Yug by Dharmaveer Bhartee

Recommended Books

1. Natya Darshan, Dr. Parag Ghonge, Vijay Prakashan, Nagpur
2. Paschatyaa Rangbhuchichee Watchal, Kru. Ra. Sawant, Majestic Prakashan, Mumbai
3. Andha Yug, Dharmaveer Bhartee
4. The Elizabethan Stage, E. K. Chambers
5. Elizabethan Popular Theatre : Plays in Performance

List of Practical's

Unit I : Introduction of scale model, measurements of levels, wings etc. Actual scale model of the productions.

Unit II : Set design techniques-

Computer Aided Set Design,

Conceptual Visualization of Set

Unit III : Technical Drafting Woodwork

Unit IV : Actual making and designing of sets as per above input by the candidate in Semester Practical Examination

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester – IV
Paper – I
Modern Western Theatre

Unit – I: Modern Theatre I

Features of Twentieth Century Theatre

Realism

Naturalism

Expressionism

Surrealism

Unit – II : Modern Theatre II

Theatre of Cruelty

Theatre of the Absurd

Epic Theatre

Postmodernism in Theatre

Unit – III: Modern Theatre III

Play Analysis of Naturalism

The Cherry Orchard

Unit – IV: Modern Theatre IV

Play Analysis – A Doll’s House by Henrik Ibsen

Recommended Books

1. Makers of Modern Theatre, An Introduction, Leach Robert
2. Modern Theatre : A Collection of Successful Modern Plays, as Acted at the Theatres Royal, London, Mrs. Inchbald
3. Cambridge Studies in Modern Theatre, Cambridge University Press
4. A Theory of Modern Stage: An Introduction to Modern Theatre & Drama, Eric Bentley

List of Practical's

Unit I

Stage lighting historical perspective

Study of Mythological, Historical, Traditional, Modern Light Designs

Unit II

Introduction to que sheet.

Diagram by students explaining the various parts of lights.

Unit III

Qualities of Lights, Intensity, Brightness

Unit IV

Actual designing & Operation of Lights as per above input by the candidate in Semester Practical Examination

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester – IV
Paper – II
Styles of Play Production

Unit – I: Indian Tradition of Play Production

- Sanskrit Play Production
- Themes of Sanskrit Plays
- Costumes of Sanskrit Plays
- Sets and Hand properties used in Sanskrit Plays

Unit – II: Greek Tradition of Play Production

- Architecture of Greek Theatre
- Salient Features of Greek Drama
- Chorus in Greek Drama
- Masks used in Greek Dramas

Unit – III: Elizabethan Tradition of Play Production

- Architecture of Elizabethan Theatre
- Costumes of Elizabethan Theatre
- Technique of Play Production during Elizabethan Period
- Salient Features of Elizabethan Theatre

Unit-IV: Modern Tradition of Play Production

- Set in Modern Drama
- Lighting in Modern Drama
- Music in Modern Drama
- Special technical Effects in Modern Drama

Recommended Books

1. Natya Darshan, Dr. Parag Ghonge, Vijay Prakashan, Nagpur
2. Paschatyaya Rangbhumichee Watchal, Kru. Ra. Sawant, Majestic Prakashan, Mumbai
3. Theatre Craft, A Director's Practical Companion from A To Z, John Caird, Faber & Faber Ltd, London
4. Fundamentals of Directing, Ric Nowels
5. Directing Post Modern Theatre, Shaping Signification in Performance, John Whitmore

List of Practical's

Unit I

Types of lights and it's various functions

Unit II

Lighting Design, Evolution of Stage Lighting, Objectives of Stage Lighting

Unit III Direction and Movement, The Language of Light

Unit IV

Actual designing & Operation of Lights as per above input by the candidate in Semester Practical Examination

Course Outcomes

By the end of the Second year which qualifies the student to acquire a Advanced Diploma in theatre and stage craft , students shall be able to –

1. Understands the technique Set Design
2. Learn how to prepare a computer aided design for the set of a Drama
3. Learn how to make Models of Set for the Drama
4. Understand woodwork for preparation of Drama Sets
5. Understand the technique of Traditional and Modern Light Design
6. Understands Qualities of Lights, intensity, brightness, colour chroma, Language of Light

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester – V
Paper – I
Experimental Theatre

Unit- I: Relationships to Audience

- What is experimentation in Theatre?
- Passive Audience of Traditional Theatre
- Participatory Audience of Experimental Theatre
- Use of Theatrical Space in Experimental Theatre

Unit – II: Social Context

- Social Themes handled by Experimental Theatre
- Experimental Theatre against Exploitation
- Experimental Theatre challenges social hierarchy
- Experimental theatre and social change

Unit – III: Methods and Creation

- Shift from Writer centric Theatre to Director centric Theatre
- Liberty to Performers
- Interdisciplinary Approach
- Believing the capacities of the Audience

Unit-IV : Physical Effects

- Alters Traditional conventions of Space
- Different Themes welcomed
- Experimentation in Language
- Experimentation in conflict situations

Recommended Books

1. Experimental Theatre from Stanislvasi to Peter Brook, James Ewas
2. The Scenes we Made,
3. A Formalist Theatre, Maical Kirbi
4. Experimental Theatre Creating and staging Text, Judi Yordan
5. How to run a Theatre : Creating, Leading and Managing Professional Theatre

List of practical's

Unit I :

Introduction to Stage Management
Duties and Responsibilities of Stage Manager

Unit II :

Stage Electric and Lighting design
Use of Background Sound

Unit III :

Stagecraft Organization
Technical Drawings – Set, Lights, Music

Unit IV :

Actual Stagecraft Management as per above input by the candidate in Semester
Practical Examination

Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester – V
Paper – II
(Professional Theatre)

Unit –I:

Professional Theatre

Distinction between Amateur and Professional Theatre

- Salient Features of Amateur Theatre
- Definition and features of Professional Theatre
- Comparison between Amateur & Professional Theatre
- Aim and purpose of Professional Theatre

Unit –II:

Production Technique, Economics of Professional Theatre

- Production technique of Professional Theatre
- Economics of Professional Theatre
- Remunerations in Professional Theatre
- Audience Attitude in Professional Theatre

Unit – III:

Publicity and Management

- Publicity of Professional Theatre
- Role of Advertisement in professional Theatre
- Role of Stars in professional Theatre
- Role and duties of stage Manager in Professional Theatre

Unit- IV :

Professional Relationships and Attitude Development towards Professional Theatre

- Stage Management
- Scenic Construction
- Costume Design
- Light Design

Recommended Books

1. How to run a Theatre : Creating, Leading and Managing Professional Theatre
2. Stage Money, The Business of Professional Theatre, Tim Donahue
3. Theatre in Europe, A Documentary History, English Professional Theatre , Glynne Wicham
4. Theatre Management, Producing and Managing Performing Arts, David M Konte And Stephan Langle

List of Practical's

Unit I

- Scenic Construction, Property Making and Procurement Costume Set Design

Unit II

- Production Management on Macro & Micro Level

Unit III

- Safety in workplace including First Aid

Unit IV

- Actual Stagecraft Management as per above input by the candidate in Semester Practical Examination

**Bachelor of Vocation (B.Voc)
Skill Development Component
Theatre & Stagecraft
Semester – VI**

Project Work

1. Participation in Sound Recording & Editing
(T.V. Show)
2. Participation in Sound Recording & Editing
(Short Film Or Documentary Or AV Song)

Project Seminar

- Presentation by the student on the above Project work

Course Outcomes

By the end of the Third year which qualifies the student to acquire a Advanced Diploma in theatre and stage craft , students shall be able to –

1. Understands the duties and responsibilities of Stage Manager
2. Learn how to prepare a Stage Lighting Design
3. Learn how construct a scenic Design
4. Understand Production Management of a Drama
5. Learns how to create a background score for Dramas, Documentaries And Films
6. Understand the technique background Music Score
7. Learns Modern Sound Recording Techniques
8. Understands Acoustics, Audio Signal Processing
9. Learn Audio Engineering
10. Learns Computer Audio Systems

Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur

Detail Syllabus for
Bachelor of Vocation
(B.Voc)
Skill Development Component
Automotive

(Faculty of Science & Technology)

(WITH EFFECT FROM 2020-2021 ONWARDS)

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - I
Paper I
Road Transport System

NSQF Level : 4

Job role : Driving Assistant

Knowledge Description One who drive and assist to commute and delivers. Individuals at this job need to safely and quickly deliver the goods to the intended customers using appropriate mode of transport.

Unit - I : Road Transportation

History of road transportation, modes of road transport, evolution of roads, transportation vehicles and types, road and its categories, revolution in road transport.

Unit - II : Transportation System

Transport system, Public and private transport, features and utility, norms, fleet organisation, vehicle types, capacity, fleet crew, training

Unit - III : Taxation and charges

Taxation, fleet charges, vehicle assessment, sales and purchase, vehicle economics, fleet cost, permit.

Unit - IV : Spare parts management

Spare parts management, inventory control procedure, material handling, repair and maintenance, salvage and disposal, service facilities, procurement.

Recommended Books :

1. Industrial Engg & Management, Dr. O.P. Khanna Dhanpal Rai & sons New Delhi
2. Business Administration & Management, Dr. S.C. Saksena Sahitya Bhavan Agra
3. The process of Management, E. Kirby Warren W.H. Newman, A.R. McGill Prentice-Hall
4. Industrial Management Rustom S. Davar Khanna Publication

List of Practical

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper I.

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - I
Paper II
Motor Driving

NSQF Level : 4

Job role : Automotive Driving Crew

Knowledge Description : Able to learn and understand vehicle driving and aware of traffic rule and regulations

Unit - I : Vehicle Driving

Principles of driving, driving essentials, safety and precautions, eligibility driving conditions, driving types, technical training, responsibilities and duties. Driving condition; Hilly fog, terrain heavy traffic.

Unit - II : Driving Crew

Assistance to driving, role of conductor and helper, responsibilities, behavior, alertness, duties, routine inspection and maintenance, training, technical knowhow, tooling.

Unit - III : License

Qualification and eligibility, medical and physical fitness, forms and formats, documents, issuing authority, license types, test, online/offline, fees and penalties.

Unit - IV : Traffic rules

Road and traffic rules, knowledge of road signs and signals, traffic rules, prohibitions, permissions, penalties for rule violation.

Recommended Books :

1. Transport Management Vol. III & IV by Central Institute of Road Transport Pune.
2. Motor Vehicle Act of India (with Latest Amendment).
3. Motor Vehicle Act with Rules by B.S.Kohli
4. Motor Transportation: Principles and Practices Constantin, Ronald Press Company, New York by WJ Hudson and James'.
5. Transport in Modern India by KP Bhatnagar, Satish Bahadur, DN Aggarwal and SC Gupta. State Motor Vehicle Rules

List of Practical

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper II .

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - II
Paper I
Motor Vehicle

NSQF Level : 5

Job role : Automotive Specialist

Knowledge Description : One should be aware of the various section of Vehicle Act and knowledge of various vehicle fitness criteria and insurance.

Unit - I : Motor Vehicle Act

Provision and salient features of motor vehicle act, Guidelines in the act for public and private transport, safety norms, vehicle registration for New/Old vehicle, transfer of vehicle, rule violation, penalties, road traffic.

Unit - II : Vehicle Fitness

Guidelines as per vehicle act, routine inspection, inspection for fitness, fitness norms, recommendations for restoring fitness, fitness test, fitness certificate issuance, renewal, BS norms, modification provisions.

Unit - III : Insurance

Need and importance of vehicle insurance, types of insurance, criteria for insurance, renewal, policy General insurance, scope of insurance, premium, compensation and bonus.

Unit - IV : Loss Compensation

Reasons and demand for compensation for damages due to accidents, eligibility, claim notification, claim settlement parties, role of surveyor, procedure for loss assessment, claim preparation , documents, procedure for claim settlement and bargain, tribunal, role of insurer and surveyor in claim settlement.

Recommended Books :

1. Transport Management Vol. III & IV by Central Institute of Road Transport Pune.
2. Motor Vehicle Act of India (with Latest Amendment).
3. Motor Vehicle Act with Rules by B.S.Kohli
4. Transport in Modern India by KP Bhatnagar, S Bahadur, D Agarwal and SCGupta.

List of Practical

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper I.

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - II
Paper II
Estimating Cost

NSQF Level : 5

Job role : Account Manager

Knowledge Description : Responsible for the proper estimation of cost

Unit - I : Cost Estimation

Introduction and importance of estimates, estimation of cost, comparison between estimation and cost, methods and procedure, realistic estimates, factors affecting estimates, estimate preparation.

Unit - II : Costing

Definition of cost, cost components, costing methods, cost types, direct cost viz. material and labour cost, cost of repair and maintenance, fixed and variable cost total cost, hired equipment cost, cost allocation.

Unit - III : Cost Estimation

Total cost estimation, indirect cost overhead cost apportionment, overhead cost component, depreciation, office expenses, rent, service cost elements, job cost.

Unit - IV : Time and inventory cost Estimation

Set up and handling time, cycle time, operation time, inspection time, computation of operator charges, supervisor charges, inventory cost auxiliary operation time and its allied cost.

Recommended Books :

1. Industrial Engg & Management, Dr. O.P. Khanna Dhanpal Rai & sons New Delhi
2. Business Administration & Management, Dr. S.C. Saksena Sahitya Bhavan Agra
3. The process of Management, E. Kirby Warren W.H. Newman, A.R. McGill Prentice-Hall
4. Industrial Management Rustom S. Davar Khanna Publication

List of Practical

- It is essential to carry out and perform at least **Five Practical** based on the content of the syllabus of Paper II.

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - III
Paper I
Automotive Body

NSQF Level : 5

Job role : Automotive Service Technician

Knowledge Description : Possess knowledge of automotive body and its parts and various materials used in body parts.

Unit - I: Auto Body

Introduction, Main features and function of body Body requirements, Classification , Types, shapes - car, jeep medium and heavy truck, half body, articulated Design principles, Frame construction - tabular, interlaced, channel section, car frame, truck frame, ladder, body underfloor structure, front and rear end structure, crash worthiness, mountings.

Unit - II: Body Structure

Chassis, frame, features, components, types, Frameless construction, Integral construction, Semi unitary or Endo - Skeleton Unitary with sub-frame,, component location, paneling, passenger and luggage requirements, floors, roof, special purpose bodies. all metal bodies, coach built bodies, cowl assembly, front end assembly, roof assembly, doors and door fittings.

Unit - III: Body Material

Requirements of body materials,factors, selection criteria, safety consideration Types of materials and their specifications, Timber-plywood, fibre, boards, Steel- section, angle, channel, strips, Aluminium alloys - sheets, strips, channels, Glass - coloured, toughened, fibre reinforced, use of plastics.

Unit - IV: Auto body Accessories

General accessories and parts like door handles, hinges, latches, locks-working, types, requirements, Autolocks, sensors, displays wipers.

Recommended Books :

1. Automobile Engineering Vol. 1 by Dr. Kirpal Singh, Standard Publishers,Delhi
2. Automotive Chassis and Body by WH Crouse; McGraw Hill Book Company, New Delhi
3. Automobile Engineering by Anil Chikara, Satya Prakashan Publications, New Delhi

List of Practical's

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper I .

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - III
Paper II
Safety & Repairs

NSQF Level : 5

Job role : Repair and Maintenance Specialist

Knowledge Description : Possess knowledge of automotive body parts, safety accessories, vehicle maintenance and repairs

Unit - I: Seating and Upholstery

Importance/need of seats, Types of seats Seat designs/contours Rigidity and comfort, seat and seat adjusting mechanisms, Seat making, Seat materials, durability, types - cushion, rubber, foam, jute, mats/springs, Seat clothes - cotton, rexin, leather, ergonomic consideration

Unit - II: Safety Accesories

Safety provisions, Safety standards regarding Anchorage Instruments/controls, Window shields, glass, wipers Doors, windows, roofs, Head rests, Safety belts, Anti braking system Modern safety systems, viewing mirrors, air bags, sensors.

Unit - III: Body Maintenance and Accident Repairs

Definition, types, criteria and requirements, general repairs, routine and Periodic maintenance, service condition, for nuts/bolts/latches and moveable parts, replacement of panels and damaged portions, gauges, oil changing. Part replacement, lightings, indicators, fault occurrence and fault finding.

Unit-IV: Defect Determination and Rectification

Repair of auto body, defects and defect determination, denting, ironing of dents, finishing and patching, welding, soldering, systematic preparatory work, dent removal process, wheel alignment, wheel replacement, jacks, air pump, compressor. General and special tools and equipment for repair work.

Recommended Books :

1. Automobile Engineering Vol. 1 by Dr. Kirpal Singh, Standard Publishers, Delhi
2. Automotive Chassis and Body by WH Crouse; McGraw Hill Book Company, NewDelhi
3. Automobile Engineering by Anil Chikara, SatyaPrakashan Publications, NewDelhi

List of Practical's

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper II

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - IV
Paper I
Air Conditioning Systems

NSQF Level : 6

Job role : Automotive Service Technician

Knowledge Description : Responsible for installing, servicing and repairing an air conditioning system of a vehicle

Unit- I: Ventilation and Heating System

Understand the AC specifications related to the various components/ aggregates in the air conditioning system, Automotive ventilation system, layout of heating system, heating system components - their construction and working

Unit - II: Air-Conditioning System

Layout of a car air- conditioning system. Main constituents viz. refrigeration, air circulation and controls, their functions and working. types of compressor, condenser, evaporator, expansion devices, defrosting. Refrigeration controls.

Unit - III: Refrigeration System

install, connect, and adjust thermostats, humidistats timers, and other components of the air conditioning system using hand tool, various components - types, construction and working of compressor, thermostatic expansion

Unit-IV : AC Maintenance

Electromagnetic clutch, condenser, receiver - dryer, valve, and evaporator, the methods for adjustment refrigerant leak detection performance testing refrigerant regassing and de-gassing system evacuation mechanical removal and replacement of components system and component testing dismantling and reassemble cleaning components

Recommended Books :

1. Automotive Air Conditioning by Boyce H. Dwiggin; Delmar Thomson Publishers
2. Automotive Air Conditioning by Crouse and Donald Anglin; McGraw Hill company
3. Automotive Principles and Service by Theissen and DN Dales; PrenticeHall

List of Practical's

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper I

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - IV
Paper II
Inspection and Trouble Shooting

NSQF Level : 6

Job Role : Quality Controller:

Knowledge Description : Responsible for proper monitoring, testing and inspecting all systems and processes

Unit -I: Control System

Air distribution and circulation system, blend-air, electronic and thermostatic, methods of temperature control safety considerations, crash worthiness. electronic power steering, Active suspension, collision avoidance, intelligent lighting, navigational aids and electronic brake distribution system.

Unit- II : Clutch and Gear box

Necessity and requirement of clutch, Types of Clutches, centrifugal, single & multi plate clutch, Gear Box, transmission principle, types of transmission, transfer gear box, gear selector mechanism, lubrication and control, semiautomatic & automatic transmission.

Unit -III: Inspection and Testing

Visual inspection and monitoring, methods, inspection of lubricant level, testing equipment and methods of leak testing, testing equipments, gauges, Electrical systems, Battery maintenance, testing and charging, lighting circuit, horn, indicators, wiper and panel board instruments, electronic ignition systems.

Unit - IV: Trouble Shooting

Understanding of faults, faults determination, type of faults, impact of faults, Diagnosing major faults in automotive air conditioning system. fault records, preventive measures.

Recommended Books :

Automotive Air Conditioning by Boyce H. Dwiggin; Delmar Thomson Publishers
Automotive Air Conditioning by Crouse and Donald Anglin; McGraw Hill Book company
Automotive Principles and Service by Theissen and DN Dales; PrenticeHall

List of Practical's

It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper II

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - V
Paper I
Planning & Control

NSQF Level : 6

Job role : Automotive Service Manager

Knowledge Description : Knowledge of planning and control of process.

Unit - I : Production Planning & Control

Need, relevance and function, objective, production types its characteristics and features

Unit - II : Planning

Production planning, definition, steps, planning of resources and capability, capacity planning, routing, loading & Scheduling, priority rules, planning process, process sheet, resource planning, make or buy.

Unit - III : Production Control

Objective, factors, procedure, steps in production control, dispatching, follow up, estimating, evaluation.

Unit - IV :Pre-Planning

Forecasting, need, types, methods, break even analysis, man hour and machine hour rate estimation, vendor development, purchase procedure, stores function.

Recommended Books :

1. Production Estimating and Costing by M. Adithan and B. Pabla, Konark Publishers, Delhi
2. Industrial Engineering and Management by T.R Banga, and S.C. Sharma, Khanna Publishers, Delhi
3. Work Study by ILO

List of Practical's

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper I

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - V
Paper II
Quality Systems

NSQF Level : 6

Job role : Quality Controller

Knowledge Description : Responsible to assure quality service to customers

Unit - I : Quality

Quality - Definition, objective, planning, quality in manufacturing, vendor quality, inspection types, online/offline inspection, inspection procedure.

Unit - II : Quality Assurance

Quality assurance, principles, quality Planning, Quality audit, Vendor quality rating, SQC, causes of variation, control charts for variables and attributes.

Unit - III : Acceptance Sampling

Acceptance sampling concept, objectives, procedure, 100% vs Random sampling inspection, sampling techniques, risk in sampling, OC curve.

Unit - IV : Quality Standards

Introduction to Quality Standards, concept, definition, Total Quality Management, QMS, ISO 9000, ISO 14000, Quality circle, KAIZEN, KANBAN, Just in Time, Zero defect, 5'S.

Recommended Books :

1. Production Estimating and Costing by M. Adithan and B. Pabla, Konark Publishers,
2. Industrial Engineering and Management by T.R Banga, and S.C. Sharma, Khanna Publishers, Delhi
3. Work Study by ILO
4. Statistical control by Mahajan

List of Practical's

- It is essential to carryout and perform at least **Five Practical** based on the content of the syllabus of Paper II

Bachelor of Vocation (B.Voc)
Skill Development Component
Automotive
Semester - VI

Project Work

- **Industry Based Project**
 - Project Work
 - Project Seminar

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Nagpur University, Nagpur

Detail Syllabus for
Bachelor of Vocation
(B.Voc)

Skill Development Component
Building Technology

(Faculty of Engineering)

(WITH EFFECT FROM 2020-2021 ONWARDS)

Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
(Semester I)
Paper – I
Bar, Bender and Fixer I

UNIT - I: Health, Safety and Environment

- a) Role of Bar Bender and Fixer while working at work place
- b) Do's & Don'ts Notification at work place, safety measures.
- c) Health, safety and accident reporting procedures
- d) Safety rules, safety materials, remedies to avoid any accidents
- e) Procedures for evacuation of workers during emergency
- f) Identification and use of basic dressing materials and first aid.
- g) Environmental aspects
- h) Personal Protective Equipment PPEs : their selection, operation, use

UNIT - II: Material Handling & Storing

- a) Permissible Stacking heights according to size and length of bars.
- b) Sizing, sorting and identification
- c) Material Handling : (Mechanical and Manual) Definition, difference, policies, precautions while handling, handling equipment's.
- d) Storing: Definition, material storing at site, shifting of materials.
- e) Housekeeping standards procedures required in the workplace.

UNIT - III: Erect and dismantle 3.6 meter temporary Scaffold

- a) Temporary Scaffold: Definition, components, materials, types.
- b) Safety measure followed while working at height
- c) Tools and equipments required.
- d) Process of erecting and dismantling
- e) Process of accessibility & site tidiness.
- f) Scaffolding techniques, scaffolding safety, how to build temporary wooden scaffolding

UNIT - IV: Bar Bending Schedule and drawing

- a) Bar Bending Schedule : Definition, Location, Marks, Type, Size, Length and Number
- b) Bar Binding details in Reinforcement drawing
- c) Knowledge of scale used in drawing
- d) Elevation, plan and sectional drawing
- e) Reinforcement specifications for main bars and distribution bars.
- f) Provision of cover, definition and difference between the type of cover
- g) Type of reinforcement bars
- h) Precautions while bending bars.
- i) Bar bending schedule for reinforced concrete beam.

Reference Books

Author	Title	Place Of Publication & Publisher
Mackay	Building Construction Vol. 1 to 4	VaynStrand
Mitchell	Elementary Building Construction	B. T. Batsford, London
Molnar	Building Construction Drafting and Design	CBS Publications. Delhi
Sushil Kumar	Building Construction	Delhi : Standard Publishers, 1999, 18th Ed.
Arora S. P. & Bindra	Building Construction	Jaipur : Dhanapat rai & Sons
Rangwala S. C.	Building Construction	Anand : Charotar & Publishing House
Gurcharan Singh	Building construction & Materials	Standard Publishers & Distributers Delhi -
Vargbese P.C.	Building construction	Prentice Hall of India Pvt. Ltd., New Delhi
Bhavikalti S.S.	Building construction	Vikas Publishing house pvt. Ltd, Noida
Sane. Y.S.	Building construction	Pune Vidyarthi Griha Prakashan1786, Pune-411030

Bachelor of Vocation (B. Voc)

Skill Development Component Building Technology (Semester I) Paper – II Bar Bender & Fixer -II

UNIT- I: Stirrups and Crank / Shear Bars

- a) Definition of stirrups, types of stirrups, size and cover provision, function of stirrups, end anchorages of stirrups.
- b) Crank/ Shear bars: definition, use, functions, types of shear/ crank bars
- c) Relevant cutting and bending tools , their Specifications
- d) Rings, Links and Hooks : Definition, function, types, detailing
- e) Calculation of cutting length of rectangular and circular stirrups
- f) Hook formula in stirrups, hook in reinforcement, hook length as IS456, stirrups hook angles.

UNIT- II :Fabricate reinforcement in lintel, slab and projections

- a) Fabrication of reinforcement :function, use, types
- b) Main and distribution of reinforcement bar in lintel, slab and projections
- c) Indian Standard Specification for slab and lintel
- d) Rebar hook length formula
- e) Detailing of reinforcement in concrete structure
- f) Use of tie bars
- g) Tolerance limit for dimensional checking

UNIT- III: Fabricate beam reinforcement with & without Shear bar

- a) Load distribution of beam members
- b) Beam reinforcement with & without Shear bar
- c) IS Specification for beam reinforcement
- d) Prefabricated cage for beams
- e) Cutting length of stirrups in beams and columns
- f) RCC Beam details with plan and section
- g) Spacing of bars, deduction opening, cutting of bars.
- h) Precaution while bending/ cutting bars

UNIT- IV: Fabricate reinforcement cage for column and RCC footing

- a) IS 2502 (1963) : Code of practice for bending and fixing of bars for concrete
- b) Fabrication of reinforcement cage for column, their type use and precautions
- c) IS specification for RCC column and pedestal
- d) RCC footing: definition, classification, use, standard footing size
- e) Use of Dowel bars, stirrups, hooks and bars in RCC footings
- f) Type of acting load

Reference Books

Author	Title	Place Of Publication & Publisher
Mackay	Building Construction Vol. 1 to 4	VaynStrand
Mitchell	Elementary Building Construction	B. T. Batsford, London
Molnar	Building Construction Drafting and Design	CBS Publications. Delhi
Sushil Kumar	Building Construction	Delhi : Standard Publishers, 1999, 18th Ed.
Arora S. P. & Bindra	Building Construction	Jaipur : Dhanapat rai & Sons
Rangwala S. C.	Building Construction	Anand : Charotar & Publishing House
Gurcharan Singh	Building construction & Materials	Standard Publishers & Distributers Delhi -
Vargbese P.C.	Building construction	Prentice Hall of India Pvt. Ltd., New Delhi
Bhavikalti S.S.	Building construction	Vikas Publishing house pvt. Ltd, Noida
Sane. Y.S.	Building construction	Pune Vidyarthi Griha Prakashan1786, Pune-411030

Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
(Semester II)
Paper –I
Shuttering Carpenter-I

UNIT- I: Health, Safety & Environment

- a) Shuttering Carpenter : Definition use, function and Types
- b) Use and importance of health, safety and accident reporting procedures
- c) First Aid Knowledge with identification and use of basic dressing materials
- d) Sound knowledge of safety norms and safety rules.
- e) Environment for shuttering carpenter at work place.
- f) Safety measure, Safety budes, Safety booklets

Unit- II: Material Handling & Storing

- a) Norms followed to stack material at specified height
- b) Sequence followed for stacking Shuttering materials
- c) Shuttering material Handling : Types, difference, procedure and policies
- d) Storing: Definition, function, positioning
- e) Shuttering materials, Deshuttering.
- f) Difference and definition of shuttering and centering

UNIT- III : Shutter for Formwork

- a) Difference between Formwork and Shuttering
- b) Drawing / Sketch relevant to task
- c) Carpentry tools: Uses, Types, Sketches of different tools
- d) Fastenings : definition. Usual fastening with sketches and uses
- e) Purpose of Angle fillet, studs, support clits etc.

UNIT- IV: Shuttering Joints

- a) Wooden joints- General principles, classification of joints application of joints
- b) Sheathing materials that can be utilized at optimum
- c) Mivan shuttering
- d) Difference between sheathing and sheeting, most common sheathing for residential construction, sheathing for walls, exterior sheathing
- e) Insulation and Sheathing materials.

Reference Books

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
(SEMESTER-II)
Paper – II
Shuttering Carpenter-II

Unit - I: SAFETY HEALTH AND ENVIRONMENT

- 1) Safety involved in shuttering at height
- 2) Cause of accidents, Remedies to avoid accidents
- 3) Sound knowledge of primary treatment, first aid kit and facilities
- 4) Safety in maintenance of shuttering , safety rules for material handling equipment
- 5) Best Environment for shuttering carpenter

UNIT - II: SCAFFOLDING

- 1) Definition, Different parts, Shuttering Carpenter
- 2) Tools and Equipment used for task
- 3) Materials used for task
- 4) Scaffolding safety , Scaffolding Standards
- 5) Erection and dismantling of different types of scaffolding
- 6) Precaution prior to dismantling
- 7) Precautions during dismantling

UNIT - III: Conventional Formwork for Foundation, Column, Wall and Tie Beam

- 1) Different types and purpose of conventional framework
- 2) Different type of knots
- 3) Erection of conventional framework for foundations, columns, walls and tie beam
- 4) Application and comparison of different framework
- 5) Column framework procedure, steel framework
- 6) Dismantling sequence, dismantling walls, dismantling floors

UNIT - IV: Shoring, Underpinning and framework

- 1) Shoring : Definition, types
- 2) Underpinning; definition, methods
- 3) Framework for footing, column, and tie beam
- 4) Type of couplers, properties of woods, bellies and pipes
- 5) Cause of failures of framework , slip framework, moving from and jump forms
- 6) Requirement of a good framework

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
(SEMESTER-III)
Paper – I
Mason -I

Unit I: Health, Safety & Environment

- a) Procedures, guidelines and aim relevant to safety, health and environment parameters
- b) Organizations expectations and Safety procedures at sites
- c) Selection and visual checking of PPEs and knowledge of indent and return procedures.
- d) Various health and safety hazards at the workplace
- e) Reporting procedures on safety violations.
- f) First aid, safety measure, safety rules, masonry health and safety issues

Unit II: Mason

- a) What does a mason do in construction, definition, requirements
- b) Mason work tools and equipments such as masonry hammer,
- c) Safety procedures and safety information's, safety equipment
- d) Precautions in brick masonry work, masonry job analysis, masonry safety manual
- e) career as a mason, Mason vs masonry, block mason, mason ring.

Unit III: Material Handling & Storing

- a) Loading and unloading practices of materials.
- b) Handling materials according to its physical properties
- c) Handling and stacking of hazard/inflammable materials.
- d) Stacking of materials by its size, shape and height.
- e) Selection of shortest possible route for shifting material while adhering
- f) Housekeeping procedures relevant to the task.

Unit IV: Erection and dismantling of 3.6 meter temporary Scaffold

- a) Safety measures followed while working at height
- b) Tools and equipments used for erecting and dismantling 3.6 meter temporary scaffold
- c) Process of erecting and dismantling
- d) Process of accessibility & site tidiness
- e) Type of Materials used for the task
- f) Risk assessment for erection and dismantling of scaffolding
- g) Safe erection and dismantling of scaffolding
- h) Sequential erection method for erecting a mobile scaffold

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
Semester III
Paper – II
Mason –II

UNIT - I : Bricks, Brick Masonry, Wall

- a) Bricks: Definition, Quality, Soaking of bricks, ingredient of good brick earth, size of brick, moulding of bricks, characteristics of good brick, tooting, Racking back, face appearance.
- b) Brick masonry : Definition, type of bonds and closers, plans of two consecutive courses.4
- c) Tools used in brickwork, defects in brick masonry
- d) Various types of walls retaining walls
- e) Mortar : Definition, classification , mix proportions , strength

UNIT - II : Fixing door & window frames in room / cubical

- a) Doors and windows: Size , numbers, location
- b) Types of doors and windows
- c) Fixtures and fastenings for doors and windows
- d) Set out levels relevant to task

UNIT - III : Plastering, pointing

- a) Plastering : definition, objects,, selection of type, types, defects ,remedial measures
- b) Tools of plastering , material used for plastering
- c) Pointing: definition, methods, types, advantages.
- d) Difference between plastering and pointing, Stucco plastering, Waterproof plastering.

UNIT IV: Flooring and Roofs

- a) Flooring : Definition , objective types, factors affecting
- b) Method of construction , selection of flooring materials
- c) Classification of roof
- d) Roof covering materials

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
Semester IV
Paper- I
Painter & Decorator-I

Unit-I: Health, Safety & Environment

- a) Procedures on evacuation of workers during emergency
- b) Pointer and Decorator : Objective, function, career
- c) PPEs : Selection, Operation and Process
- d) Health, safety and accident reporting procedures
- e) Safety tools, Safety badges, Safety norms, safety signs
- f) First Aid with identification and use of basic dressing materials

Unit- II: Prepare, Handle & Store paints & related Materials

- a) Stacking of materials and the standard norms followed
- b) System of Sizing and sorting followed
- c) Points : Object, Characteristics of ideal points, constituents, Types of base, types of points
- d) Hazards related to paint materials
- g) Defects in painting, Rectification of the patch work.

Unit- III: Preparation of all type of basic surface for painting works

- a) Type of materials and ingredients required
- b) The ratio and mix proportions
- c) Method of surface preparation of placing and mixing of ingredients
- d) Process and type of knotting
- e) Putty preparation techniques, wall paper
- f) Different type of sealing compounds

Unit- IV: Material for Decoration

- a) Materials used for decoration and decorative surface
- b) Process of Mural painting
- c) Other decorative works on exterior portion
- d) Interior decorative work for ceilings, columns, walls

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
Semester IV
Paper – II
Painter & Decorator-II

Unit I: Painting and Decorating External Surface of structure

- a) Safety precaution while painting and decorating external surface of structure
- b) Tools and equipment required
- c) Safety aspects involved while working at height
- d) Ease of working and accessibility
- e) Site Tidiness
- f) Building painting equipments, Housing Rope

Unit II: Application of Paints as per required surface and finish

- a) Type of materials and other ingredients required for painting application.
- b) Standard methods for preparation of platform, placing and mixing of ingredients
- c) Painting Brush
- d) Method of application
- e) Upgraded techniques required for external painting and decoration

Unit III: Polishing & Finishing

- a) Polishing: Definition, types , Method
- b) Furniture Polish, Wax Polish, Thiner
- c) Stains, lacquers, Primming, Stopping
- d) Repainting Old wood work/ Structure
- e) Colouring pigments for paints

Unit IV: Distempering & Varnishing,

- a) Distempering : definition, process, properties
- b) Varnishing : Definition, process
- c) Different types of scaling compounds
- d) Painting and finishing tools
- e) White washing and colouring washing

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Bachelor of Vocation (B. Voc)
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Building Technology
Semester V
Paper – I
Scaffolder -I

Unit - I: Scaffolding, Shoring, Underpinning

- a) Scaffolding , Parts of a scaffolding, types, points to be kept in view in scaffolding
- b) Shoring, Types
- c) Underpinning, Methods of underpinning

Unit- II: Health, Safety & Environment

- a) Health working conditions, facilities, provisions
- b) Safety equipments, General Safe practices, preventive measures, safety Hazards, causes of accidents, safety rules, Do's and Don't
- c) First aid knowledge with identification and use of basic dressing materials, safety signs
- d) Sound knowledge of safety norms.

Unit -III: Erection & Dismantle the towers/ scaffolding

- a) Precaution prior to dismantling / erection
- b) Precautions during and after erection/ dismantling
- c) Requirements of tools and devices for erection and dismantling towers/ scaffolding
- d) The checking of scaffolder tools prior to use
- e) Dismantling / erection sequence

Unit- IV: Formworks

- a) General, requirements of a good form work
- b) Loads on formwork, guiding points in the design of form work
- c) Properties of timber used in formwork
- d) Formwork for sequence column, RCC column footing, RCC Beam, RCC T-beam
- e) Types of form work.

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
(SEMESTER-V)
Paper – II
Scaffolder -II

UNIT - I : Erect & Dismantle the staircase and lift tower.

- a) Location of stair case, Requirements of a good stairs, classification, technical terms.
- b) Tools used to erect/ dismantle of stair case and lift tower
- c) Precaution while erection/ dismantle of stair case and lift tower
- d) Advanced materials/ equipments require to dismantle/erection of the tower and stair case

UNIT - II : Site safety while erection/dismantle

- a) **Accidents during erection/dismantle**
- b) **Safe access of site**
- c) Working at height
- d) Ladder safety, crane safety
- e) Goods Hoist, Scaffold safety procedure

UNIT - III : Equipments for Erection & Dismantling lift towers and stair case

- a) Various lifting cranes for erection/dismantling lift towers
- b) Advanced method to erect/ dismantle life towers/ stair case
- c) Prefabricated steel modular scaffolding

UNIT - IV : General

- a) Control measure for working platforms
- b) Opportunities in carpentry, Mason
- c) Opportunities in scaffolding, Bar Bender and fixing
- d) Mini project related with Scaffolding

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Bachelor of Vocation (B. Voc)
Skill Development Component
Building Technology
SEMESTER-VI

Industry Based Project

❖ Project Work

❖ Project Seminar
