BOARD OF OPEN SCHOOLING AND SKILL EDUCATION (BOSSE)

SIKKIM

Secondary

VOCATIONAL COURSES CURRICULUM

SKILLS FOR TODAY, OPPORTUNITIES FOR TOMORROW

BAKERY AND CONFECTIONERY

BIOGAS TECHNICIAN

CARPENTRY

DATA ENTRY OPERATIONS

DOMESTIC APPLIANCES

PAINTING AND DRAWING

LAUNDRY SERVICES

SOLAR ENERGY TECHNICIAN

WELDING TECHNOLOGY

LEARN Continuously | **SKILL** Practical Training | **GROW** For a Better Future | **SUCCEED** In Life

Empowering Learners • Building Skills • Creating Futures

Secondary

Vocational Courses Curriculum

BOARD OF OPEN SCHOOLING AND SKILL EDUCATION (BOSSE), Sikkim
(Established under Act No. 14 of 2020 of the Sikkim Legislative Assembly)
Amdo Golai NH-10, Near RBI Bank Gangtok, Sikkim (India) 737102

Contents

1. BAKERY AND CONFECTIONERY

By the end of the course, learners will be able to:

- Make bakery and confectionery products in a professional way
- Understand how ingredients work and how baking processes happen
- Follow proper hygiene, safety, and quality practices
- Run or start their own bakery or pastry shop

MODULE I: FOUNDATION OF BAKING AND CONFECTIONERY

1. Introduction to Bakery and Confectionery

- Evolution, scope, and industry significance of bakery and confectionery
- Classification of bakery and confectionery products
- Bakery kitchen layout: design, workflow, and essential equipment
- Functional role of key bakery ingredients

2. Basic Food Science and Nutrition

- Classification of food groups and their physiological functions
- Nutritional composition and value of bakery products
- Overview of food allergens and suitable dietary alternatives

3. Food Safety and Hygiene

- Principles of personal hygiene and sanitation practices in food handling
- Waste management systems in bakery operations
- Overview of Food Safety and Standards Authority of India (FSSAI) standards and relevant food safety regulations

Practical 1: Develop proficiency in identifying, understanding, and handling basic bakery tools, equipment, and ingredients.

Practical 2: Identify and analyze common allergens in bakery products, including gluten, dairy, eggs, and nuts.

Practical 3: Review the food safety standards prescribed by the Food Safety and Standards Authority of India (FSSAI) and prepare a concise report focusing on labeling requirements and hygiene compliance.

Practical 4: Demonstrate biscuit shaping techniques using different methods:

- Rolling and cutting for rolled biscuits
- Piping soft dough for piped biscuits

Practical 5: Prepare mini tarts using short crust pastry, filled with basic custard or fresh fruit.

PROJECTS

Project 1: Nutritional Bakery Product Development Develop a recipe for a healthy biscuit (e.g., gluten-free, high-fiber, or vegan), including ingredient substitution and nutrition labelling.

Project 2: Bakery Business Plan Create a small bakery setup plan with kitchen layout, equipment list, and compliance with FSSAI and hygiene standards.

MODULE II: CORE BAKERY & CONFECTIONERY TECHNIQUES

4. Baking Techniques and Dough Fermentation

- Understanding different types of leavening agents
- Learning various methods of dough fermentation
- Identifying common baking faults and their remedies

5. Introduction to Confectionery

- Study of **sugar boiling stages**
- Overview of **types of confectionery** such as fudges, toffees, and jellies

6. Preparation of Biscuits

- Classification and **varieties of biscuits**
- Understanding the **basic production process**
- Types include: salted biscuits, ice-box biscuits, piping biscuits, rolling biscuits, macaroons, and tarts

7. Preparation of Breads

- Classification of breads including **Danish pastry breads and bread rolls**
- Step-by-step **basic bread-making procedures**

Characteristics of good bread:

- External appearance
- Volume and symmetry
- Color, texture, and aroma
- Crumb clarity and elasticity
- Study of different **bread variations**

8. Preparation of Danish Pastries and Croissants

- Classification of laminated pastries
- Study of **raw materials used and its preparation**
- Effects of **over-fermentation and under-fermentation** on final products

PRACTICALS

Practical 1: To understand how different leavening agents and fermentation methods affect dough development and to identify common baking faults with corrective actions.

Practical 2: To learn the stages of sugar boiling and prepare basic confectionery products like fudge, toffee, and jelly using appropriate techniques.

Practical 3: To learn the classification and preparation of different types of breads, including Danish pastry and bread rolls, and to evaluate the characteristics of a well-baked bread.

Practical 4: To understand the classification, preparation method, and ingredient functionality in laminated dough products like Danish pastries and croissants, while observing the effects of fermentation

Practical 5: To develop effective communication, professional grooming, time management, and teamwork skills in a kitchen or bakery setting.

Project 1: Allergen-Free and Nutrient-Rich Bakery Product Development

PROJECTS

Project 1: To design a healthy, allergen-conscious bakery product using alternative ingredients and demonstrate awareness of nutrition and food safety.

Project 2: To create a blueprint for a small bakery with proper kitchen layout, equipment placement, workflow, and hygiene practices following FSSAI standards.

MODULE III: ADVANCED PASTRY, CAKES & CHOCOLATES

THEORY:

9. Advanced Cakes and Gateaux

- Classification.
- Cake mixing methods
- Types of fillings, frostings, and icing
- Baking faults in cakes - identification and rectification

10. Chocolate & Sugar Art

- Cocoa processing and tempering
- Working with couverture and compound chocolate
- Basic sugar pulling

11. Pastries

- Flaky and Puff Preparing various mixtures, types of pastes and mixtures.
- Items

  -Patties, Vol-au-vont

  -Khara Biscuits, Cheese straws
- Choux

  -Eclairs, Cream Rolls

  -Profit Rolls

12. Product Costing & Quality Control

- Ingredient cost calculation
- Portion control
- Quality checks and shelf life

PRACTICALS

Practical 1: Prepare a Swiss Roll using the whisking method. Fill it with whipped cream and fresh fruits.

Practical 2: Create a simple chocolate showpiece using basic chocolate techniques like melting, shaping, and decorating.

Practical 3: Prepare choux pastry, pipe it into shapes, bake properly, and make éclairs and profiteroles with filling and glazing.

Practical 4: Check the quality and shelf life of a prepared product using the following points:

- **Appearance:** Even shape and good color
- **Texture:** Soft and proper structure
- **Taste:** Balanced sweetness and fresh flavour
- **Aroma:** Pleasant and fresh smell
- **Size & Weight:** As per standard measurements

PROJECT

Project 1: Prepare a scrap book on Advanced Cakes and Gateaux. Consider the following points

a) Classification of Cakes

b) Cake Mixing Methods

c) Fillings, Frostings, and Icings

d) Baking Faults and Fixes

MODULE IV: INDUSTRY READINESS, ENTREPRENEURSHIP & INTERNSHIP

13. Entrepreneurship and Bakery Management

- Bakery business plan
- Kitchen setup and equipment layout
- Perishable, Semi-perishable and Nonperishable Items
- Menu planning and pricing

14. Marketing & Customer Handling

- Branding and packaging
- Storage

- Social media for bakers
- Visual Merchandising in Bakery Retail
- Dealing with customers and feedback

15. Accounting Procedures

- Purchasing and sales Maintaining accounts procedure in a unit
- Maintenance of accounts

  -journal, ledger

  -subsidiary books

  -final accounts etc.
- Calculation of

  -selling & cost price, calculating selling price, gross profit, net profit.

  -gross & net profit

  -taxes, debit notes preparing a simple

  -preparing invoices statement of account.

16. Career Skills & Industry Exposure

- Resume building
- Preparing for job interviews
- Bakery internship/project planning

17. Workplace Communication & Soft Skills in Kitchens

- Basic communication in kitchens
- Grooming and etiquette
- Time management and teamwork

PRACTICALS

Practical 1: To Develop a bakery product and calculate its cost and selling price.

Practical 2: To Plan and execute a mini marketing campaign for a product.

Practical 3: To Practice handling different types of customers in a bakery setting.

Practical 4: To Maintain financial records for a day of sales.

Practical 5: Kitchen Communication & Teamwork Simulation

PROJECTS

Project 1: "Start Your Own Bakery" – Business Plan

This project focuses on developing a complete business plan for starting a small bakery. It integrates key concepts of entrepreneurship, marketing, customer service, accounting, and workplace skills to give a practical understanding of running a bakery business.

Project 2: "A Day in a Bakery" – Live Simulation

This project involves conducting a live simulation of operating a bakery for a day or a few hours. It allows students to apply practical skills in product preparation, marketing, basic accounting, and communication in a real-time working environment.

2. BIOGAS TECHNICIAN

MODULE 1: IDEA OF BIOGAS ENERGY

Lesson 1: What is Biogas Energy

- Definition of biogas
- Composition of biogas (methane, carbon dioxide, etc.)
- Modern significance of biogas (renewable energy, waste management)
- Benefits of biogas (reducing greenhouse gases, energy production)

Lesson 2: Origin and Evolution of Biogas Energy

- Historical use of biogas (ancient China, India, etc.)
- Methane Discovery
- 1880s Development of Biogas Plants (World and India)
- 20th Century
- Modern application

MODULE 2: BIOGAS SYSTEMS

Lesson 3: Biogas Production Process

- Anaerobic digestion process
- Role of microorganisms in biogas production
- Factors affecting biogas production (temperature, pH, feedstock)

Lesson 4: Types of Biogas Systems

- Fixed-dome digesters
- Floating-drum digesters
- Plug-flow digesters
- Continuous vs. batch systems

Lesson 5: Components of a Biogas System

- Digester tank
- Gas storage and collection
- Gas utilization (burners, generators)
- Effluent management

Lesson 6: Safety Measures in Biogas Systems

- Preventing gas leaks and explosions
- Proper ventilation
- Maintenance and inspection

MODULE 3: BIOGAS FEEDSTOCK

Lesson 7: Suitable Feedstock for Biogas

- Types of organic materials (manure, food waste, crop residues)
- Nutrient content in feedstock

Lesson 8: Preparing Feedstock for Digestion

- Size reduction and mixing
- Importance of balanced feedstock

Lesson 9: Managing Feedstock Sources

- Sustainable feedstock management
- Farm waste collection and storage

Module 4: Bio Gas Microbiology

Lesson 10: Microorganisms in Biogas Production

- Introduction to microorganisms in biogas production
- Methanogens
- Hydrolytic and acidogenic bacteria
- Acetogens

Lesson 11: Factors Affecting Microbial Activity

- Temperature
- pH levels
- Nutrient availability
- Inhibitory substances

MODULE 5: BIOGAS APPLICATIONS

Lesson 12: Energy Generation from Biogas

- Introduction to biogas as a renewable energy source
- Biogas composition for energy generation

- Biogas utilization methods (e.g. biogas generators, gas turbines)
- Advantages of using biogas for electricity generation

Lesson 13: Cooking with Biogas

- Biogas as a clean and efficient cooking fuel
- Biogas stoves and burners
- Benefits of using biogas for cooking (reduced indoor air pollution, cost savings)
- Biogas as an alternative to traditional fuels (wood, LPG)

Lesson 14: Other Uses of Biogas

- Heating applications with biogas (e.g., space heating, water heating)
- Combined heat and power (CHP) systems
- Biogas as a fuel for vehicles (bio-CNG)
- Biogas as a source of thermal energy for industrial processes

MODULE 6: ENVIRONMENTAL AND SOCIAL BENEFITS OF BIOGAS

Lesson 15: Environmental Impact Reduction

- Overview of biogas as an eco-friendly energy source
- Importance of addressing environmental challenges
- The role of biogas in mitigating environmental impact
- Greenhouse gas emission reduction
- Air quality improvement*

Lesson 16: Biogas in Sustainable Agriculture and Rural Development

- Benefits for rural communities
- Enhancing soil and crop health
- Sustainable waste management

Lesson 17: Biogas and Sustainable Waste Management

- Closing the organic waste loop
- Waste-to-Energy and resource recovery
- Economic viability and job creation

3. CARPENTRY

INTRODUCTION:

Carpentry is one of the oldest and most essential skilled trades, forming the backbone of construction, furniture making, and interior design industries. It involves the art of shaping, joining, and finishing wood to create structures, fixtures, and decorative pieces. From building houses and furniture to repairing doors and installing cabinets, carpenters play a crucial role in both residential and commercial projects. In today's world, carpentry has evolved with modern tools, smart designs, and innovative materials, offering a blend of traditional craftsmanship and advanced technology. Learning carpentry not only develops technical expertise but also enhances problem-solving, creativity, accuracy, and discipline. This course equips learners with hands-on skills, safety awareness, and professional ethics required to build a successful career. Whether one aims to work independently, join a company, or start a business, carpentry offers endless opportunities for skilled individuals.

MODULE 1: FOUNDATION & SOFT SKILLS FOR CARPENTRY

Lesson 1: Introduction to Carpentry

1.1 What is Carpentry? – Definition & Scope

1.2 Types of Carpentry (Rough, Finish, Furniture, Modular, etc.)

1.3 Career Opportunities in Carpentry

1.4 Basic Workflow of a Carpenter

Lesson 2: Workshop Rules & Safety Practices

2.1 Personal Protective Equipment (PPE)

2.2 Safe Tool Handling Guidelines

2.3 Fire, Electrical & First Aid Basics

2.4 Cleanliness & Maintenance of Work Area

Lesson 3: Soft Skills for Carpenters

3.1 Importance of Discipline & Punctuality

3.2 Communication with Clients & Team Members

3.3 Workplace Etiquette & Professional Behavior

3.4 Problem-Solving & Decision Making

3.5 Safety Awareness & Responsibility

MODULE 2: TOOLS & MATERIALS IN CARPENTRY

Lesson 4: Carpentry Hand Tools

4.1 Measuring & Marking Tools

4.2 Cutting Tools (Saw, Chisel, Knife)

4.3 Holding & Striking Tools (Hammer, Clamp)

4.4 Care & Maintenance of Hand Tools

Lesson 5: Power Tools & Their Safety

5.1 Drilling Machine

5.2 Electric Saw & Sander

5.3 Router & Planer

5.4 Power Tool Safety Norms

Lesson 6: Wood & Other Construction Materials

6.1 Types of Wood (Hardwood vs Softwood)

6.2 Plywood, MDF, Particle Board

6.3 Nails, Screws, Adhesives & Fasteners

6.4 Selection of Material for Projects

MODULE 3: CARPENTRY JOINTS & CONSTRUCTION TECHNIQUES

Lesson 7: Measuring, Marking & Cutting Techniques

7.1 Accurate Measurement Methods

7.2 Layout & Templates

7.3 Manual vs Machine Cutting

Lesson 8: Wood Joints & Their Applications

8.1 Butt Joint, Lap Joint, Mortise & Tenon

8.2 Dovetail, Finger Joint

8.3 Modern Joinery (Screw & Bracket Fittings)

Lesson 9: Sanding, Finishing & Polishing

9.1 Types of Finishes (Paint, Varnish, Polish)

9.2 Surface Preparation

9.3 Eco-Friendly Finishing Solutions

MODULE 4: ENTREPRENEURSHIP

Lesson 10: Cost Estimation & Material Planning

10.1 Budgeting for Projects

10.2 Material Requirement Sheet

10.3 Time Management in Work Execution

Lesson 11: Labor Costing, Productivity, & Waste Management

11.1 Labor Costing and Productivity

- Skilled vs unskilled labor
- Daily wage calculation
- Output per day and productivity estimation

11.2 Waste Management and Cost Control

- Minimizing material wastage
- Reuse of offcuts and scrap
- Impact of wastage on project cost

Lesson 12: Freelancing & Business Opportunities

12.1 Starting a Small Carpentry Service

12.2 Customer Interaction & Negotiation

12.3 Online Promotion & Networking

4. DATA ENTRY OPERATIONS

INTRODUCTION

Data Entry Operations form the backbone of business processes in today's digital economy. From banking and healthcare to e-commerce, logistics, government services, and corporate enterprises, accurate and efficient data entry ensures the smooth functioning of operations. The growing need for digitization, record management, and real-time information has created a strong demand for skilled data entry operators. This course on Data Entry Operations is designed to equip learners with essential technical and soft skills such as computer fundamentals, keyboarding proficiency, accuracy in data handling, knowledge of spreadsheets, database management, and basic communication skills. It not only prepares individuals for clerical and back-office support roles but also develops their competence to adapt to evolving technologies such as automated data systems and cloud-based documentation.

SCOPE & MARKET VALUE OF DATA ENTRY OPERATIONS

Data Entry Operations offer strong employment opportunities across sectors like banking, healthcare, e-commerce, education, and government services. With increasing digitization, organizations require accurate data management for decision-making and compliance. The demand for skilled data entry professionals continues to grow, supported by outsourcing, freelance opportunities, and remote work, making it a stable and valuable career option.

MODULE 1: FOUNDATION & SOFT SKILLS FOR DATA ENTRY OPERATORS

Lesson 1: Introduction to Data Entry Operations

1.1 Role of a Data Entry Operator

1.2 Work Areas: Business, Education, Government, Health, etc.

1.3 Key Qualities: Speed, Accuracy, Confidentiality

1.4 Career Pathways in Data Entry

Lesson 2: Basics of Computer Systems

2.1 Hardware: Input, Output, Storage Devices

2.2 Software: System & Application Software

2.3 Operating System Basics

2.4 File & Folder Management

Lesson 3: Soft Skills for Data Entry Operations

3.1 Importance of Soft Skills

3.2 Communication Skills (Oral & Written)

3.3 Workplace Etiquette & Time Management

3.4 Teamwork & Professional Behavior

3.5 Problem-Solving & Adaptability

MODULE 2: WORD PROCESSING & TYPING SKILLS

Lesson 4: Introduction to Word Processing (MS Word)

4.1 Creating & Saving Documents

4.2 Editing & Formatting Text

4.3 Paragraph Alignment, Bullets & Numbering

4.4 Printing & Page Setup

Lesson 5: Advanced Word Processing

5.1 Tables, Columns & Page Borders

5.2 Inserting Pictures, Shapes & Symbols

5.3 Mail Merge Basics

5.4 Document Proofing Tools (Spell Check, Grammar Check)

Lesson 6: Typing Skills Development

6.1 Touch Typing Techniques

6.2 Use of Typing Tutor Software

6.3 Typing Speed & Accuracy Practice

6.4 Common Typing Errors & Corrections

MODULE 3: SPREADSHEETS & PRESENTATIONS

Lesson 7: Introduction to Spreadsheets (MS Excel)

7.1 Understanding Rows, Columns & Cells

7.2 Entering Data & Simple Calculations

7.3 Formatting Cells & Worksheets

7.4 Saving & Printing Worksheets

Lesson 8: Working with Formulas & Functions

8.1 Basic Arithmetic Functions (SUM, AVERAGE, MAX, MIN)

8.2 Relative & Absolute Cell References

8.3 Sorting & Filtering Data

8.4 Charts & Graphs Basics

Lesson 9: Presentation Tools (MS PowerPoint)

9.1 Creating Slides & Layouts

9.2 Adding Text, Images & SmartArt

9.3 Transitions & Animations

9.4 Delivering Presentations

MODULE 4: INTERNET, E-MAILS & DATA HANDLING

Lesson 10: Internet & Email for Office Work

10.1 Basics of Internet & Browsers

10.2 Creating & Using Email Accounts

10.3 Email Etiquette for Professionals

10.4 Downloading & Uploading Files

Lesson 11: Data Handling & Accuracy

11.1 Importance of Accuracy in Data Entry

11.2 Data Validation Techniques

11.3 Error Detection & Correction

11.4 Maintaining Confidentiality in Data

5. DOMESTIC APPLIANCES

MODULE 1: INTRODUCTION TO DOMESTIC APPLIANCES

Lesson 1: Domestic Appliances in Daily Life

- Meaning and importance
- Types of domestic appliances

Lesson 2: Classification & Responsible Use

- Kitchen, cleaning, comfort, personal care
- Responsible and safe usage

MODULE 2: ELECTRICAL BASICS & SAFETY

Lesson 3: Basics of Electricity

- Current, voltage, resistance
- AC supply

Lesson 4: Household Wiring & Safety Devices

- Plug, socket, fuse, MCB
- Earthing

Lesson 5: Electrical Symbols & Circuits

- Common symbols
- Simple appliance circuits
- **Electrical Safety Rules**
  - ❖ Do’ s and dont's
  - ❖ Preventing accidents

MODULE 3: KITCHEN APPLIANCES

Lesson 6: Cooking Gadgets

- Parts, working, care
- Rice Cooker, Kettle & Toaster

- ❖ Automatic heating principle

- **Microwave Oven**
  - ❖ Working principle
  - ❖ Safe use
- **Refrigerator – Parts & Working**
  - ❖ Cooling principle

Lesson 7: Care, Maintenance & Faults

- Cleaning, storage
- Common problems

MODULE 4: CLEANING & LAUNDRY APPLIANCES

Lesson 8: Washing Machine

- Types and working
- Vacuum Cleaner & Dishwasher
- Uses and operation

Lesson 9: Energy & Water Efficiency

- Efficient appliance use

MODULE 5: HEATING, COOLING & COMFORT APPLIANCES

Lesson 10: Fans, Heaters & Coolers

- Heating and cooling basics
- Air Conditioner & Geyser
- Safety and usage

Lesson 11: Energy Consumption Calculation & Safety

- Units, power, cost

Fire Hazards & Protection

- Emergency measures

MODULE 6: PERSONAL CARE, ENERGY CONSERVATION & E-WASTE

Lesson 12: Personal Care Appliances

- Hair dryer, shaver
- Safe Use & Maintenance
- Storage and care

Lesson 13: Energy Conservation & Star Ratings

- Energy labels
- E-Waste Management & Revision
- Reduce, reuse, recycle

PRACTICALS

Practical 1: Appliance Identification & Use

- Identify **6 domestic appliances**
- Write **one use** of each

Practical 2: Electrical Safety & Components

- Identify **plug, switch, fuse/MCB**
- State **one function** of each

Practical 3: Study of ONE Appliance

(Electric iron / mixer / refrigerator / washing machine – any one)

- Parts
- Working
- Two safety precautions

Practical 4: Energy Consumption

- Calculate **monthly electricity use** of one appliance

ASSIGNMENTS

Assignment 1: Classification Chart

- Kitchen
- Cleaning
- Comfort
- Personal care appliance

Assignment 2: Energy & Environment

- Two energy-saving tips
- One point on e-waste disposal

6. PAINTING AND DRAWING

Introduction

This course will help students develop their artistic abilities in both drawing and painting, focusing on improving their skills in various techniques, enhancing their creative thinking, and exploring different mediums. By the end of the course, students should have gained proficiency in basic to intermediate art techniques, and they will be able to express their creativity through visual art.

Objectives:

- To develop and improve drawing and painting skills.
- To understand and apply the principles and elements of design and composition.
- To experiment with various art materials, including graphite, charcoal, pencil colours, oil pastels, photo colours, black ink print, poster colour, watercolor, and acrylic paints.
- To gain an understanding of different art technique, styles and cultural art practices.
- To appreciate and critique the work of artists from different periods and cultures.

MODULE 1: FOUNDATION OF DRAWING AND PAINTING

Lesson 1: Basic Drawing Techniques with Tools and Materials

1. **Introduction to Drawing Tools**
    - Pencils (graphite HB to 6B and H to 9H):
    - Brushes
    - Charcoals – soft, medium, hard) :
    - Blending tools:
    - Erasers and Sharpener:
    - Paper types: (handmade paper, pastel sheets, neon sheets, cartridge sheets, chart papers, canvas sheets, oil sheets etc.
    - Colour Mixing Palette

- Drawing board:
- Easel:
- Basic tools and their use.

2. **Line Drawing and Shapes**
    - Simple geometric shapes (circles, squares, triangles).
    - Different Types of lines
    - Contour drawing (still life or natural objects).
3. **Shading and Textures**
    - Techniques for shading: hatching, cross-hatching, stippling, Scribbling, Stippling, Circling, Rendering.
    - Rendering textures (wood, fabric, metal, etc.).
4. **Proportions and Perspective**
    - Introduction to basic proportions in drawing.
    - One-point and two-point perspective drawing.

Projects:

- Still life drawing using basic shapes and shading with light effects.
- Drawing simple objects with focus on texture and light effects.

Lesson 2: Introduction to Painting

1. **Introduction to Watercolors and Acrylics**
    - Basics of watercolor painting techniques: wash, glazing, dry brush work, wet-on-wet, wet-on-dry.
    - Acrylic paint mixing, brush techniques, and layering, create rich colours like oil paints.
2. **Color Theory**
    - Primary colors : Red, Yellow and Blue are categorized under primary colours.

- Secondary colours: Combination of primary colours are secondary colours, Orange, Green and Violet / Purple
- Tertiary colors: Combination of primary and secondary colours , Red-Orange, Yellow-Orange, Yellow-Green, Blue-Green, Blue-Violet and Red-violet etc.
- Understanding warm and cool colors, complementary colors, and color mixing.

3. **Basic Brush Techniques**
   - Different types of brushes and their uses.
   - Techniques: dry brush, glazing, blending, and wash techniques.
4. **Composition in Painting**
   - Rule of thirds, focal points, and balance in artwork.
   - Creating a cohesive composition using color, form, and space.

Projects:

- Simple watercolor landscape with light effects.
- Abstract acrylic painting with emphasis on color theory and composition.

MODULE 2: ADVANCED DRAWING TECHNIQUES-I

Lesson 3: Still Life and Object Study

1. **Still Life Setup**
   - Techniques for observing and drawing still life (fruits, Glass, Jug, etc.).
   - Rendering realistic textures and using shading to show light and shadow.
   - Apply basic tones, shades the spaces between objects, Deeper the tones of objects.
2. **Creating Depth in Still Life**
   - Techniques like overlapping, perspective, and varied focus.
   - Painting objects using light and shadow.
   - Window light source with light tone and dark tone.

Projects:

- Still life drawing and painting (mix medium such as colored pencils and watercolors, poster color).
- Paint a realistic object with attention to details with texture.

Lesson 4: Portrait Drawing and Painting

1. **Proportions of the Human Face**
   - Basic facial proportions and structure.
   - Drawing the head in proportion: eyes, nose, mouth, and ears.
2. **Facial Features in Detail**
   - Draw a oval shape
   - Focusing on eyes, lips, nose, and ears.
   - Light and shadow on the face.
3. **Portrait Painting Techniques**
4. Watercolor and acrylic techniques for painting skin tones.
5. Use light tone first in water colour then after middle and dark tone.
6. Blending colors to achieve realistic textures with painting brushes.

Projects:

7. Pencil or charcoal portrait of a classmate or self-portrait.
8. Watercolor or acrylic portrait with focus on skin tones and facial features.

MODULE 3: ADVANCED DRAWING TECHNIQUES-II

Lesson 5: Landscape and Nature Painting

1. **Landscape Composition**
   - Elements of a landscape: foreground, middle ground, background.
   - Depicting natural elements such as trees, mountains, rivers, and skies.
2. **Techniques for Painting Natural Scenery**
   - Watercolor techniques for skies and water bodies.

- Water colour always used light to dark tone with lots of water and this is transparent technique.
- Acrylic techniques for creating depth and texture in landscapes.

3. **Light and Atmosphere**
   - Creating mood through light and atmospheric perspective.

Projects:

4. Acrylic or watercolor landscape painting.
5. A project focusing on nature (forests, beaches, mountains, etc.).

Lesson 6: Abstract Art and Creative Expression

1. **Introduction to Abstract Art**
   - Understanding abstraction and non-representational art.
   - Exploring emotions and concepts through abstract forms and colors.
2. **Techniques for Abstract Painting**
   - Working with acrylics, oil pastels, or mixed media to create abstract works.
   - Experimenting with texture, color, and form.

Projects:

3. Abstract painting inspired by personal emotions or concepts.
4. Create a piece of abstract art using mixed media.

MODULE 4: ART HISTORY AND CRITIQUE

Lesson 7: The Legacy of Bharatiya Art

(a) Paintings (Religious Art)

i) Hindu Art

ii) Buddhist Art

iii) Jain Art

(b) Sculpture

i) Stone and Bronze Sculptures

ii) Modern Sculptures

(c) Architecture

i) Temple

ii) Vastu Shastra

(d) Classical Bharatiya Art

i) Madhubani

ii) Warli

iii) Patta Chitra

iv) Tanjore

v) Indus valley civilization

(e) Folk Art

i) Kolam/Rangoli

ii) Phad Paintings

iii) Kalamkari

(g) Textiles and Crafts

i) Kashmir Shawls

ii) Sarees

iii) Woodwork and Metalcraft

Lesson 8: Art Appreciation and Critique

1. **Famous Artists and Art Movements in Bharat**
    - Famous Artists in Bharat
    - Major Art Movements in Bharat
    - Key Art Galleries & Museums in Bharat
    - Contemporary Art Scenario

2. **Famous Artists and Art Movements outside Bharat**
    - Overview of key art movements: Renaissance, Cubism, Impressionism, Expressionism, etc.
    - Study of notable artists like **Leonardo da Vinci, Van Gogh, Picasso**, and contemporary artists.
3. **Art Critique Techniques**
    - How to analyze and critique art: elements and principles of design.
    - Art discussion and feedback sessions.

Assessment Criteria:

Practical Work:

- Final portfolio submission (includes drawings, paintings, and projects completed throughout the year).
- Regular sketchbook submissions showcasing practice and experimentation.

Theory/Art Appreciation:

- Written tests on techniques, artists, and art movements.
- Art critique and reflective essays.

Additional Notes:

Materials Required:

- Drawing pencils (HB, 2B, 4B, 6B,8B,10B), charcoal, pastels, colored pencils.
- Watercolor paints and brushes, acrylic paints, canvases, and sketchbooks.

Field Trip (Projects):

- Visit an art gallery or museum for exposure to different art styles and techniques. Write a report.
- This syllabus offers a well-rounded approach to both drawing and painting, encouraging skill development alongside creativity and art appreciation.

7. LAUNDRY SERVICES

Introduction

Laundry Services for Secondary Students would provide a more in-depth understanding of laundry processes, techniques, and equipment. It would cover practical skills, as well as some basic business and environmental awareness related to the laundry industry. This course would not only teach how to do laundry but also how to manage it as a service, which could be helpful for students interested in starting a laundry business or learning about the industry in more detail.

MODULE 1: INTRODUCTION TO LAUNDRY SERVICES AND FABRIC CARE

Lesson 1: Introduction to Laundry Services

- The role and importance of laundry in daily life
- Basic history and evolution of laundry services
- Different types of laundry services (self-service, full-service, commercial, etc.)

Lesson 2: Understanding Fabrics and Textile Care

- Common fabrics: cotton, polyester, wool, silk, and their properties
- How different fabrics react to washing and drying
- Fabric care symbols (reading laundry labels)

Lesson 3: Sorting Laundry and Stain Identification

- How to sort laundry (color, fabric, and dirt level)
- Identifying common stains (oil, coffee, ink, food)
- Stain removal techniques (home remedies vs. commercial products)

Lesson 4: Understanding Detergents and Cleaning Products

- Types of detergents (liquid, powder, pods)
- Choosing the right detergent for different fabrics and loads
- The role of fabric softeners, bleaches, and disinfectants

Lesson 5: Hands-on Practice: Basic Laundry Techniques

- Sorting and preparing laundry
- Operating a washing machine: selecting cycles, temperatures, and detergents
- Folding and hanging clothes correctly

MODULE 2: ADVANCED LAUNDRY TECHNIQUES AND EQUIPMENT

Lesson 6: The Science of Laundry

- How washing machines work: agitation, rinsing, and spinning
- The role of water temperature in cleaning
- The chemistry of stain removal

Lesson 7: Drying Clothes and Ironing

- Air drying vs. tumble drying
- Setting proper drying temperatures for different fabrics
- Introduction to ironing: techniques and fabric-specific tips

Lesson 8: Special Laundry Needs (Delicates and Special Fabrics)

- Hand washing delicate (silk, wool, etc.)
- Dry cleaning process and its importance
- Caring for leather, suede, and fur items

Lesson 9: Laundry Equipment and Maintenance

- Types of washing machines: front-load vs. top-load
- Understanding commercial laundry equipment
- Basic maintenance and cleaning of washing machines and dryers

Lesson 10: Hands-on Practice: Advanced Laundry Techniques

- Operating the dryer and iron
- Caring for delicate fabrics
- Drying and folding towels, sheets, and specialty items

MODULE 3: CUSTOMER SERVICE AND BUSINESS MANAGEMENT IN LAUNDRY SERVICES

Lesson 11: Introduction to Laundry Business Management

- Overview of the laundry business industry
- Starting and operating a laundry business: basic steps
- Key components of a successful laundry service (location, pricing, marketing)

Lesson 12: Customer Service in Laundry Services

- Handling customer inquiries, complaints, and requests
- Providing high-quality service and building customer loyalty
- Communicating effectively with clients (in-person, phone, or online)

Lesson 13: Time Management and Organization

- Time management in laundry services: efficient workflow
- Organizing laundry operations (sorting, washing, drying, folding)
- Keeping track of orders and managing a laundry schedule

Lesson 14: Eco-Friendly Practices and Sustainability

- The environmental impact of laundry services
- Using eco-friendly detergents, reducing water and energy use
- Sustainable laundry practices for homes and businesses

Lesson 15: Safety and Hygiene in Laundry Services

- Safe handling of chemicals (detergents, bleaches)
- Proper use of laundry equipment (handling hot surfaces and machines)
- Hygiene protocols: washing hands, sanitizing laundry rooms

MODULE 4: PRACTICAL SKILLS AND BUSINESS SIMULATION

Lesson 16: Hands-on Practice: Customer Service and Laundry Business Operations

- Role-playing customer interactions (accepting laundry, complaints, delivery)
- Organizing and managing laundry tasks in a real-world scenario

- Mock pricing and service quoting for laundry services

Lesson 17: Advanced Stain Removal and Fabric Care

- Practice on stubborn stains (wine, grease, ink)
- Using specialized products for tough stains
- Repairing minor fabric damage (sewing buttons, small tears)

Lesson 18: Final Project: Running a Mini Laundry Service

- Students will simulate a small laundry business:
    - Take orders, sort, wash, dry, iron, fold, and deliver laundry
    - Manage customers, pricing, and time constraints
    - Record and organize laundry orders and payments
- Present their business plan: target customers, pricing strategy, marketing

Recommended Resources

- **Books**:
    - *Laundry Simplified: A Practical Guide to Efficient Laundry Techniques* by Heather Lindstrom
    - *The Art of Fabric Care* by Sarah Turner
- **Online Tutorials**:
    - YouTube channels like "Laundry University" for hands-on tips and techniques
    - Websites like Persil and Tide for educational materials on detergent and laundry care
- **Guest Speakers**:
    - Invite local laundry business owners to speak about running a laundry service.

This Course is designed to give students a comprehensive understanding of laundry as both a skill and a potential business. By the end of the year, students should be well-equipped to handle personal laundry tasks, understand the mechanics behind laundry equipment, and even start thinking about how they could run their own laundry service in the future.

8. SOLAR ENERGY TECHNICIAN

MODULE 1: INTRODUCTION TO SOLAR ENERGY

Lesson 1: Overview of Energy

- Definition and forms of energy
- Renewable vs. non-renewable energy sources with Indian examples

  Coal, petroleum vs. solar, wind, hydropower
- Energy's role in development
- Introduction to solar energy and India's solar potential

Lesson 2: Overview of Renewable Energy Sources

- Solar, wind, hydropower, biomass, geothermal, tidal, and wave energy
- Benefits and environmental impact of Renewable Energy
- Challenges in Renewable Energy Adoption
- Environmental impact and challenges in India

Lesson 3: Origin and Evolution of Solar Energy

- The Sun as a star: structure and parameters
- Early solar technologies and ancient applications
- Discovery of the photovoltaic effect
- Evolution of solar cells and space exploration
- Solar energy today: trends, challenges, and future scope
- Solar energy today in India: trends, challenges, and future scope

Lesson 4: Importance of Solar Energy

- Uses and applications in residential, commercial, and industrial sectors
- Environmental and economic benefits
- Energy independence, rural electrification, and grid stability
- Basics of energy conversion and solar radiation measurement

MODULE 2: SOLAR PHOTOVOLTAIC TECHNOLOGY

Lesson 5: Working of Solar Panels

- Photovoltaic effect and energy conversion process
- Structure and types of solar cells
- Electricity output and inverter technology
- Grid integration and net metering (Indian households' example)

Lesson 6: Types of Solar Panels

- Conventional Solar Panels: Monocrystalline, polycrystalline, and thin-film panels
- Advanced Solar panel technology: Bifacial, CPV, perovskite, and transparent solar panels
- Building-integrated photovoltaics (BIPV)

Lesson 7: Components of a Solar PV System

- Solar panels-The Energy Source,
- Inverters- The Brain of the System
- Batteries-Storing the Sunlight
- Charge controllers -Protecting the Batteries
- Mounting Structures- positioning for the sun
- Electrical wiring- The Nervous System
- Monitoring systems -Tracking Performance
- Grid connection -Linking with the power network
- Safety mechanisms- Protection First

Lesson 8: Sizing and Designing a Solar PV System

- The importance of proper sizing
- Load analysis – the first pillar
- Site assessment – capturing the sun right
- System efficiency – bridging theory and reality

- Battery selection – heart of off-grid systems
- Inverter selection – the brain of the system
- Grid-connected vs off-grid vs hybrid systems
- Step-by-step design case studies
- Economic & policy perspectives
- Environmental & social aspects
- Future trends

MODULE 3: SOLAR PANEL INSTALLATION

Lesson 9: Mounting and Securing Solar Panels

- Types of mounting structures: roof, ground, pole mounts
- Tilt, orientation, wind, and snow load considerations
- Securing panels in extreme weather

Lesson 10: Electrical Wiring and Connections

- Types of wiring and connection methods
- Bus bar systems
- Inverter and battery wiring
- Safety codes and regulations

Lesson 11: Tools and Equipment for Solar Installation

- Essential hand and power tools
- Safety gear and protective equipment
- Practical demonstration of installation tools

Lesson 12: Safety Protocols for Solar Installation

- Electrical, fall, and roof safety
    - ➢ Safety measures in India
- Hazard identification and emergency response
- Personal protective equipment (PPE)

MODULE 4: SOLAR SYSTEM MAINTENANCE

Lesson 13: Routine Inspection and Cleaning

- Visual inspection and system performance checks
- Cleaning solar panels and checking for shading
- Electrical connections and grounding verification

Lesson 14: Monitoring Energy Production

- Real-time data tracking and analysis
- Comparing expected vs. actual energy generation
- Fault detection and troubleshooting alerts
- Importance of monitoring

Lesson 15: Troubleshooting Common Issues

- Low energy production
- Inverter errors
- Electrical faults
- Weather impacts
- System aging
- Pest-related issues
- Professional inspection and record-keeping

Lesson 16: Preventive Maintenance for Solar Systems

- Importance of regular maintenance
- Weatherproofing, sealing, and mounting structure inspection
- Documentation and maintenance records

MODULE 5: SOLAR ENERGY STORAGE & POLICY

Lesson 17: Battery Technology and Energy Storage

- Types of batteries: lead-acid, lithium-ion, flow batteries
- Depth of discharge
- Cycle life of a Battery
- Charging efficiency
- Battery management systems and Thermal control& Management
- Thermal control
- Emerging trends in energy storage

Lesson 18: Solar Energy Policies and Regulations

- Net metering, permitting, and interconnection standards
- Government incentives, tax credits, and feed-in tariffs
- Environmental impact assessment and zoning laws

MODULE 6: ENERGY EFFICIENCY & CAREER DEVELOPMENT

Lesson 19: Energy Efficiency and Conservation

- Energy-efficient appliances
- Home energy audits
- Reducing energy consumption through insulation and LED lighting
- Solar-compatible appliances
- HVAC efficiency

Lesson 20: Career Opportunities and Soft Skills

- Resume building for solar industry jobs (Scope in India)
- Interview skills, teamwork, and communication
- Customer service and project management in solar energy

9. WELDING TECHNOLOGY

Introduction

Creating a syllabus for Welding Technology at the secondary level would typically focus on both theoretical knowledge and practical skills, aiming to provide students with a foundational understanding of welding processes, safety protocols, equipment, and materials used in the field. The syllabus can be structured as follows:

MODULE 1: INTRODUCTION TO WELDING TECHNOLOGY

This module provides the foundational knowledge needed for understanding welding as a trade and profession.

Lesson 1: Introduction to Welding

- Definition and importance of welding
- Types of welding processes: Manual, Automated, and Semi-automated
- Overview of welding in different industries (construction, automotive, aerospace etc.)
- Career opportunities in welding

Lesson 2: Safety Practices in Welding

- Importance of safety in welding
- Personal protective equipment (PPE) for welders (helmet, gloves, apron, boots, etc.)
- Safety rules for the welding workshop
- Hazards and risks: Burns, fumes, electric shock, etc.
- First aid in welding accidents

Lesson 3: Basic Welding Equipment

- Welding machines: Arc welders, MIG welders, TIG welders, etc.
- Types of electrodes and filler rods
- Welding torches and tips
- Accessories: Welding clamps, grounding cables, protective screens

MODULE 2: WELDING JOINTS AND POSITIONS

Lesson 4: Introduction to Welding Joints

- Types of welding joints: Butt joint, Corner joint, Tee joint, Edge joint, etc.
- Understanding the strength and application of each joint
- Basic welding positions: Flat, Horizontal, Vertical, Overhead

MODULE 3: WELDING PROCESSES AND TECHNIQUES

Lesson 5: Shielded Metal Arc Welding (SMAW)

- Basic principle of SMAW (stick welding)
- Selection of electrodes for different materials
- Practical skills: Creating welds in different positions
- Common defects in SMAW and their prevention

Lesson 6: Gas Metal Arc Welding (GMAW) – MIG Welding

- Principles and advantages of MIG welding
- Types of shielding gases
- Setup and operation of MIG welders
- Applications and techniques for MIG welding

Lesson 7: Gas Tungsten Arc Welding (GTAW) – TIG Welding

- Overview of TIG welding
- Components of the TIG welding system
- Filler rods and shielding gas selection
- Practical techniques for TIG welding

Lesson 8: Oxy-Acetylene Welding and Cutting

- Introduction to oxy-acetylene welding and cutting
- Setup of oxy-acetylene welding equipment
- Flame types and their applications
- Safety measures in oxy-acetylene welding

MODULE 4: WELDING INSPECTION, QUALITY CONTROL AND SAFETY PRACTICES

Lesson 9: Welding Defects and Quality Control

- Common welding defects: Porosity, cracks, spatter, undercut, etc.
- Methods for identifying and correcting defects
- Introduction to welding inspection techniques
- Non-destructive testing (NDT) basics (visual inspection, ultrasonic testing, etc.)

Lesson 10: Welding Symbols and Blueprint Reading

- Understanding welding symbols and their interpretation

Practical Sessions

- Hands-on practice in the welding workshop
- Practice with different welding processes: SMAW, MIG, TIG, and Oxy-acetylene
- Creating welding joints and performing welding tests
- Understanding and correcting welding defects through practice
- Reading welding blueprints and applying the correct welds

BOARD OF OPEN SCHOOLING AND SKILL EDUCATION (BOSSE), SIKKIM

(Established under Act No. 14 of 2020 of the Sikkim Legislative Assembly)

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