

**VOCATIONAL HIGHER SECONDARY  
TEXTILE DYEING AND  
PRINTING**

**TEACHER'S SOURCEBOOK**

**CLASS XII**



**GOVERNMENT OF KERALA  
Department of Education**

**SCERT - 2006**

**STATE COUNCIL OF EDUCATIONAL RESEARCH & TRAINING (SCERT)  
VIDYABHAVAN, POOJAPPURA, THIRUVANANTHAPURAM -12  
KERALA**

## **SOURCEBOOK**

Vocational Higher Secondary Course  
**TEXTILE DYEING AND  
PRINTING**

Class XII

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# Preface

*Dear Teacher,*

*The children promoted to the second year course of study are having a basis idea regarding Textile Dyeing and Printing. They were evaluated continuously during the first year class in a learner centred and process oriented pedagogy.*

*The paradigm applied to those children in their secondary classes is to be continued in Higher Secondary level also, but we know that most of the present higher secondary teachers are not familiar with this paradigm. Hence for the first time we are introducing Sourcebooks for all the subjects included in the Higher Secondary curriculum.*

*The sourcebook for “Textile Dyeing and Printing” will be helpful to prepare yourself to be competent in the activity oriented pedagogy. It is complementary to the training you have undergone in the beginning of the academic year.*

*The sourcebook has three parts. Part I gives you the general approach to the teaching learning process of “Textile Dyeing and Printing”. It also covers the curricular objectives and syllabus of the subject. The term-wise distribution and time schedule of the syllabus will be helpful for proper planning to complete the syllabus in a time bound, but efficient and effective manner. Towards the end of this part, the learning activities that can be applied and narrated and some of them are taken for continuous evaluation as per the directions of Higher Secondary curriculum committee. Evaluation indicators and guidelines for setting questions for written examination are also indicated in this part.*

*Part II of this book deals with the activities that can be carried out to attain the curricular objectives and are described chapter-wise. The activities specified are tried out and found apt and time bound. Being the teachers in different school situations, you have the freedom to choose alternate activities, but should ensure the feasibility, students involvement and time limit while selecting activities or strategies. Part III contains the activities to be performed, sample questions, list of equipments/apparatus/machinery/required and the list of books.*

*Suggestions are invited to improve the quality of the book as well as the teaching learning process to attain the objectives of the new pedagogy.*

*With regards,*

**Dr. E. Valsala Kumar**

*Director*

*SCERT, Kerala*

**Thiruvananthapuram**

**June - 2006**

# TEXTILE DYEING AND PRINTING

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# General Approach

## Introduction

The ultimate aim of education is human refinement. Education should enable the learner to formulate a positive outlook towards life and to accept a stand which suits the well being of the society and the individual as well.

The attitude and potential to 'to work' has determined the destiny, progress and cultural development of the human race. As we all are aware, the objective of education to form a society and individuals having a positive work culture. The educational process expected in and outside our formal schools should concentrate upon inculcating concepts, abilities, attitudes and values in tune with these 'work culture.' Hence vocationalised education cannot be isolated from the main stream of education. In another sense, every educational process should be vocationalised. However, due to our inability to utilise the resources wisely, scarcity of job

Opportunities is a service issue of the present society. For overcoming this deep crisis, emergent techniques have to be sorted out and appropriate researches have to be seriously carried out. It is in the sense that the content and methodology of Vocational Higher Secondary Education have been approached.

The Vocational Higher Secondary course was envisaged as a part of the National Policy on Education with the noble idea of securing a job along with education. The relevance of vocational education is very great in this age of unemployment. This education system, which ensures a job along with higher education, stands aloof from other systems of education.

A learning environment which ensures vocational aptitude, vocational training, basic life skills, competencies related to different subjects, appropriate values and attitudes and existential readiness has to be provided here.

The curriculum should be one which recognises the specific personality of the learner and should develop it in a desirable way. It should provide opportunity to imbibe novel ideas to follow a critical approach and for learning through experiences.

The competency to transform one's own resources for the betterment of the society and the individual is to be ensured in each individual. Training in the sense of equality, democratic sense, environmental consciousness and devotion to the constitution is an inseparable factor of the curriculum.

The need of a systematic curriculum is prevailing in vocational subjects. A scientifically structured curriculum incorporating the unique features peculiarity of Kerala ensuring the possibility of higher education and utilising the national and international possibilities of employment is required.

The new curriculum should be capable of assimilating the life skills, scientific temper, attitude of co-existence, leadership qualities and mental health to face the challenges of life. It should be capable of strengthening the competencies imbibed by the learners up to the tenth class.

oriented, need based vocational curriculum

### **What is learning?**

- Learning is construction of knowledge and so it is a live and continuous mental process.
- Learning is a process of advancement through adding and correcting in the light of comparing the new issue with the previously learned concepts.
- Learning takes place as a part of the effort to solve problems.
- Learning takes place by assimilating bits of knowledge into one's own cognitive structure.
- Learning is not a linear process. It is a spiral process growing deeper and wider.
- Learning is an intellectual process rather than the mere memorisation of facts. Learning is a conglomeration of a variety of activities like problem analysis, elucidation, critical thinking, rational thinking, finding out co-relations, prediction, arriving at conclusions, applications, grouping for other possibilities and extracting the crux. When opportunities are provided for intellectual processes learning will become effective and intellectual ability will get strengthened.

### **Theoretical foundations of learning**

Education is the best device that can be

adopted for creation of a new society. It should be democratic in content and process and should acknowledge the rights of the learner. It should also provide opportunity for better citizenship training. The concept of equality at all areas should get recognition in theory and practice.

There should be conscious programme of action to develop nationality, humanness and love and against the encroachment of the sectarianism of caste and religion.

The learner should be able to take firm steps and deferred against the social crisis like privatisation, liberalisation, globalisation etc and against all kinds of dominations.

They should develop a discrimination to use the acquired learning as a liberative weapon.

They should get opportunity to recognise that co-operation is better than competition and that co-operation is the key to social life and culture

A basic awareness of all the subjects needed for life essential for all students.

The remnants of perspectives formed in us during the colonial period still influence our educational philosophy. The solution to the present day perplexities of the society which approaches education on the basis of competitions and marketisation is only a comprehensive view of life.

It is high time that education was recognised on the basis of the philosophy of human education. The human approach to education has to reflect in its content, learning process and outlook. The perspective of 'learning to be' and learning to live together as expressed by the UNESCO and the concepts of existentialist intelligence intrapersonal and interpersonal intelligence.

The basis of new approaches on curriculum, teaching-learning process are derived from the developments place in the east and west of the world.

When we begin to see the learner at the centre of the learning process, the teaching process has to be changed timely. It is the result of the rapid growth and development of Science and Technology and Pedagogy. If we want to undergo the changing process, we have to imbibe the modern hypothesis regarding learner, they have;

- Great curiosity
- Good Imagination
- Numerous other qualities and interest
- Independent individuality
- Interest in free thinking and working in a fearless atmosphere.
- Have interest in enquiring and questioning
- Ability to reach conclusions after logical thinking.

- ability for manifest and establish freely the conclusions arrived at.
- Interest for recognition in the society.
- Determination to face the interference of society and make components which is a part of social life.

When we consider the learning system, the domains to be stressed in education according to the modern development becomes relevant.

The *knowledge* domain consists

- Facts
- Ideas
- Laws
- The temporary conclusions and principles used presently by scientists.

The learning is a process. The continuous procedures we undergo to reach a particular goal is process. The skills which are parts of the process to analyse the collected ideas and proofs and come to a conclusion is called *process skills*. Some important *process skills* are,

The skills;

- To observe
- To collect data and record

- To classify
- To measure and prepare charts
- To experiment
- To predict
- To recognize and control the variables
- To raise questions
- To generalize
- To form a hypothesis and check.
- To conclude
- To communicate
- To predict and infer
- To use tools
- *Observation is the process of acquiring knowledge through the senses. It is purely objective oriented. Learning experiences which provide the opportunity to use all the senses may be used.*

*The process of grouping is known as classifying. Starting from simple groupings of data, it can extend to the level of classification into minute subgroups.*

In addition to this, consider the skills related to *creative domain* also, they are skills:

- To visualize

To connect facts and ideas in new ways



- To find out new and uncommon uses of objects
- To fantasize
- To dream
- To develop creative isolated thoughts

**Creativity** is involved in finding out problems, formation of hypothesis, finding 'solutions' to problems etc. Through activity oriented learning experiences, opportunities to express again, the following factors consisting in the *Attitudinal domain*

- Self confidence
- Love for scientific knowledge
- Attitude to know and value history
- Respect human emotions
- Decide with reasonable present problems
- Take logical decisions regarding personal values

'Hypothesis' is a temporary conclusion drawn using insight. Based on knowledge and experiences relating to the problems the causes and solutions can be guessed

As regards the application domain the important factors are the ability to :

- Observe in daily life examples of ideas acquired

- Take the help of scientific process to solve the problems of daily life
- Choose a scientific life style
- Connect the ideas acquired with other subjects
- Integrate the subjects with other subjects

Some basic stands have to be taken on the new scientific knowledge about intelligence learning and teaching. When such basic concepts are accepted changes are required in the following factors

- The vision, approach, structure and content of the curriculum.
- The vision, approach, structure and content of the textbooks.
- Role of the teacher and the learner
- Learner atmosphere, learning materials and learning techniques.

Some scientific perspectives accepted by modern world in educational psychology are given below.

**Constructivism** This approach puts forward the concept that the learner constructs knowledge. New knowledge is constructed when ideas are examined and practiced in new situations relating them with the previously acquired knowledge and experience. That is assimilated into the cognitive structure of one's knowledge. This method which

gives priority to critical thinking and problem solving provides opportunity for self-motivated learning.

### **Social Constructivism**

Social constructivism is a sub-section of constructivism. Knowledge is formed, spread and imbibed and it becomes relevant in a social environment. Interactive learning, group learning, co-operative participatory learning, all these are concepts put forward by social constructivism.

The main propounders of constructivism are Piaget, Vygotsky and Bruner.

Discovery learning and interactive learning have prime importance. Learning takes place as a part of the attempt for problem solving. The activities of a learner who confronts cognitive disequilibrium in a learning situation when he tries to overcome it leads to the renewal of cognitive structure. It is through this process construction of new knowledge and the assimilation of them that learning takes place. Observation and enquiry are unavoidable factors.

The learner advances towards new areas of acquisition of knowledge where he tries to compare his new findings with the existing conceptions.

Learning is a live mental process. Rather than the ability for memorisation of facts cognitive process has to be given emphasis. The process of problem analysis, elucidation, critical thinking, rational thinking, finding out co-relation, prediction, hypothesis formation, application,

probing for other possibilities, extracting the crux and other processes are of critical importance in learning.

Constructivism gives greater predominance to co-operative learning. Social and cultural factors influence learning. Sharing of knowledge and experience among learners, collective enquiry, assessment and improvement, group activity and collaborative learning, by sharing responsibilities with the objective of public activity, provide opportunity for effective learning.

In learning internal motivation is more important than external motivation. The learner should have interest and initiative in learning. Learning situation should be capable of forming a sense of ownership in of the learner regarding the learning process.

Learning is not a linear process. It progresses in a spiralled way advancing deeper and wider.

### **Learner-his nature and features**

The learners in standard XI have undergone a learner-centered and process-oriented learning experience up to X standard. He is adequately competent to select vocational subjects according to his aptitude and interest and to acquire higher education and profession as he wishes. The aspirations about future life are framed in this particular age foreseeing national and international job opportunities. Some of the peculiarities of the learner at this stage are:

- Physical, intellectual and emotional planes are intensive changes during this age and their reflections can be observed.
- Ability to enquire, discover and establish cause-effect relationship between phenomena.
- Readiness to undertake challenges.
- Capacity to shoulder leadership roles.
- Attempt to interpret oneself.
- Susceptibility to different pressures.
- Doubts, anxieties and eagerness about sex.
- Longing for social recognition

### **Needs of the learner**

- To make acquaintance with a job through vocational education
- To acquire more knowledge in the concerned area through higher education
- To recognize and encourage the peculiar personality of the later adolescent period.
- To enable him to defend against the unfavourable circumstances without any help.
- Role of the learner
- Active participation in the learning process.
- Acts as a researcher

- Sharer of information.
- Share of responsibilities
- Collects information
- Takes leadership
- Involves in group work.
- Acts as co-participant
- Observes his environment
- Experiments and realises
- Makes interpretations and draws inferences.

### **Role of the Teacher**

The teacher should :

- Consider the 'Stress and Strain' of the teenagers
- Understand the socio-economic and cultural background of the students.
- Promote and motivate the students to construct knowledge.
- Arrange proper situation to interact in an outside of the classroom
- Guide the students by explanations, demonstrations etc.
- Promote opportunity for co-operative learning and collaborative learning.
- Facilitate the interpersonal and intra-personal interactions
- Acts as a democratic leader
- Acts as a problem solver

Vocational Higher Secondary School – 11 Year (Theory)

- effectively guide the students for the selection and conduct of various continuous evaluation elements.
- continuously evaluate the progress of the learners.
- gives scaffolding/support wherever necessary.
- motivate for learning
- promote divergent thinking
- ~~thinking~~ democratic group leader.
- act as a co-learner
- gives variety of learning experiences.
- be a constant student
- facilitate for reference/data collection
- have a clear understanding about the age, needs, peculiarities, abilities, nature, aptitude etc. of the learner.
- have the ability to motivate the learner in order to acquire and enrich their knowledge.
- be a guide to the learner in developing insights and creating responses on current affairs.
- be capable to lead the learner into a variety of learning methods and process based on curricular objectives.
- be a link between school and community.
- be a good organiser, guide, friend, philosopher and co-learner:
- have an inter disciplinary approach in learning activities.
- be able to guide the learner in his/her career prospects based on his interest aptitude and ability.
- be impartial and democratic.
- provide ample experiences to attain the basic values and objectives of the curriculum.

## New Concepts of Learning

### 1. Discovery Learning

The teacher has to create a motivating atmosphere for the learner to discover concepts and facts, instead of listening always. Creating occasion to progress towards discovery is preferred. Instead of telling everything before and compelling to initiate the models, situations are to be created to help the children act models as themselves.

### 2. Learning by discussion

That discussion leads to learning is Burner's theory. Here discussion is not opposing each other. It is a sharing on the plane of ideas. New ideas are arrived at by seeking explanations, by mutual giving and taking of ideas and by problem solving.

### 3. Problem solving and learning

Only when the learner feels that some thing is a problem to be solved that he takes the responsibility of learning it. It is an inborn tendency to act to solve a problem that causes cognitive disequilibrium in a particular area. It is also needed to have confidence that one is capable of doing it. The problems are to be presented in consideration of the ability and level of attainment of the learner.

### 4. Collaborative learning

This is the learning in which the responsibilities are distributed among the members of the group keeping common learning objectives. The common responsibility of the group will be successful only if each member discharges his duties. All the members will reach a stage of sharing the result of learning, equally through the activity with mutual understanding. The teachers who arrange collaborative learning will have to make clear the responsibilities to be discharged. This is possible through the discussion with the learners. Collaborative learning will help to avoid the situations of one person working for the whole group.

### 5. Co-operative learning

This is the learning in which the learners help one another. Those who have more knowledge, experience and competency, will help others. By this exchange of resources the learners develop

a plane of social system in learning also. As there are no high ups and low ones according to status among the learners they can ask the fellow students doubts and for helps without any hesitation or in hesitation Care should be taken not to lead this seeking of help to mechanical copying. It should be on the basis of actual needs. So even while encouraging this exchange of ideas among the members of the group cautions acceptance is to be observed as a convention. There should be an understanding that satisfactory responses should come from each member and that the achievement of the group will be assessed on the basis of the achievement of all the members

### 6 Zone of Proximal Development

Vygotsky observes that these is a stage of achievement where a learner can reach by himself and another higher zone where he can reach with the help of his teachers and peers and elders. Even though some can fulfil the learning activity by themselves there is the possibility of a higher excellence. If appropriate help is forth covering every learner can better himself.

### 7 Scaffolding

It is natural that the learner may not be able to complete his work if he does not get support at the proper time. The learner may require the help of the teacher in several learning activities. Here helping means to make the learner complete

the activity taking responsibility by himself The teacher has to keep in mind the objective of enabling the learner to take the responsibility and to make it successful.

### **8 Learning: a live mental process**

Learning is a cognitive process, only a teacher who has an awareness as to what the cognitive process is alone can arrange learning situations to the learner to involve in it. Learning can be made effectively and intellectual sharpness can be improved by giving opportunity for the cognitive processes like reminding, recognising, compromising, co-relating, comparing, guessing, summarising and so on. How is cognitive process considered in language learning? Take guessing and prediction for example.

- Guessing the meaning from the context.
- Guessing the content from the heading.
- Predicting the end of the story.
- Guessing the incident, story from the picture
- Guessing the facts from medications.
- and other such activities can be given the following activities can be given for the cognitive process of summarisation.
- Preparation of blue print.
- Preparation of list.
- Preparation of flow chart.

- Epitomising in one word.
- Giving titles and so on.
- Symbols, performance of characters indications, lines of a poem, tables, pictures, concepts, actions, body language and such things can be given for interpretation. Process based language given for interpretation. Process based language learning has to give prime importance to the cognitive process.

### **9 Internal motivation**

Internal motivation is given more importance than external motivation. The teacher has to arouse the internal motivation of the learner, A person internally motivated like this alone can immerse in learning and own its responsibility. How motivating is each of the activities is to be assessed.

### **10 Multiple intelligence**

The Theory of Multiple Intelligence put forward by Howard Gardener has created a turning point in the field of education. The National curriculum document has recommended that the curriculum is to be designed taking into consideration of this theory.

Main factors of the intellect:

#### **1. Verbal/linguistic Intelligence**

Ability to read and write, making linguistic creations, ability to lecture competence effective

a communication, all these come under this. This can be developed by engaging in language games and by teaching others.

## **2. Logical/mathematical Intelligence**

Thinking rationally with causes and effect relation and finding out patterns and relations come under this area, finding out relations and explaining things sequential and arithmetical calculations are capable of developing this area of intelligence.

## **3. Visual/spatial Intelligence**

In those who are able to visualise models and bringing what is in the imagination into visual form and in philosophers, designers and sculptors this area of intelligence is developed. The activities like modelling using clay and pulp, making of art equipments, sculpture, and giving illustrations to stories can help the development of this ability.

## **4 Bodily Kinaesthetic Intelligence**

The activities using body language come under this. This area of intelligence is more developed in dancers and actors who are able to express ideas through body movements and in experts in sports, gymnastics etc.

## **5 Musical Intelligence**

This is an area of intelligence which is highly developed in those who are able to recognise the different elements of music in musicians and in those who can here and enjoy songs. Playing musical instruments,

initiating the songs of musicians, listening silently to the rhythms and activities like this are capable of developing this area of intelligence.

## **6 Interpersonal Intelligence**

Those in whom this area of intelligence is developed show qualities of leadership and behave with others in a noble manner. They are capable of understanding the thought of others and carrying on activities like discussion successfully.

## **7 Intrapersonal Intelligence**

This is the ability to understand oneself. These people can recognise their own abilities and disabilities. Writing diaries truthfully and in an analysing way and assessing the ideas and activities of others will help developing this areas of intelligence

## **8 Naturalistic Intelligence**

A great interest in the flora and fauna of the nature, love towards fellow beings interest in spiritual and natural factors will be capable of developing this area.

## **9. Existential Intelligence**

The ability to see and distinguish ours own existence as a part of the universe, ability to distinguish the meaning and meaninglessness of life, the ability to realise the ultimate nature of mental and physical existences, all these are the

Peculiarities of this faculty of intelligence.

### **Emotional Intelligence**

The concept of emotional intelligence put forward by **Daniel Golman** was used in framing the new curriculum. The fact that one's **Emotional Quotient (E.Q)** is the greatest factor affecting success in life is now widely accepted. The teacher who aims to focus on improving the emotional intelligence of students need to concentrate on the following.

#### **i) Ability to take decisions**

Rather than imposing decision on students while planning and executing activities, the students may be allowed to take part in the decision making process. Taking decisions through open discussion in the class, inviting students suggestions on common problems etc. are habits to be cultivated.

#### **ii) Ability to reach consensus**

- When different opinions, ideas and positions arise the students may be given the responsibility to reach a consensus.
- Imaging what would be the course of action in some situations, allowing to intervene in a healthy way in problems between individuals.

#### **iii) Problem solving**

- Developing the idea that there is reason and solution to any problem.

- Training in finding reasons for problems.
- Suggesting solutions through individual or group efforts.
- Discussing social problems.
- Analyzing the shortcomings in methods to Solve problems.

Whether plastic can be banned within school premises can be given as a problem. Group discussion will provide reasons and solutions. Problems which can influence classroom learning and for which the learner can actively contribute solutions need to be posed.

- Self criticism, evaluation  
Ability to face problem-situation in life
- Thinking what one would do if placed in the situation of others, how one would respond to certain experiences of others  
All these foster the growth of emotional intelligence.

#### **iv) Life skills**

Life skills need to be given a prominent place in education. W.H.O. has listed ten skills required for success in life.

- Self-awareness
- Empathy
- Inter personal relations
- Communication



- Critical thinking
- Creative thinking
- Decision making
- Problem Solving
- Copying with emotion
- Copying with stress

The new curriculum addresses these areas.

Knowing the characteristics of the learner, role of the teacher and how to use the teachers handbook help the teacher to plan and effectively implement learning activities

### **Objectives of the Vocational Higher Secondary Curriculum.**

- To facilitate higher education while giving opportunity to enter in the field of employment.
- To develop environmental awareness, sense of national integration, tolerance and human values so as to ensure social and cultural improvement.
- To enable the learner to find on his own employment
- To inculcate mental courage in the learner to face unfavourable situations.
- To make human resource development possible
- To enable the learner to understand social problems and to react appropriately.

- To develop the learner to identify and develop his own competencies.
- To develop vocational aptitude, work culture and attitude in the learner so as to provide useful products and services to the society.
- To create an awareness about mental and physical health.
- To acquire awareness about different job areas and to provide backgrounds for acquiring higher level training in subjects of interest.
- To develop possibilities of higher education by creating awareness about common entrance examinations.
- To provide situation for the encouragement of creative thinking and organising training programmes in each area, creative abilities and to develop artistic talents.

### **Nature of Approach**

The learning device is to be organized in the selected vocational subjects in such a way that adequate practical experience should be given, making use of the modern technology. The development in each area on the basis of information technology is to be brought to the learner. The work experience in the respective fields (OJT, Field trip, Production/Service ..... training, Survey, Workshop, Exhibition, Youth festival, Physical fitness etc.) are to be adjusted

suitable to the learning and evolution process. The participation and leadership of the students in planning and execution is to be ensured through this kind of activities. Social service is to be made a part of the course.

### **Approach towards Vocational Higher Secondary Education**

The learning methodology has to be organized so as the learning provide adequate practical thinking on the opted vocational subject utilizing the new technology. The development of information technology should be made available in each sector. Work experience, OJT, Field trip production, Service cum training centre, Survey, Workshops, Exhibitions, Youth festivals, Physical fitness etc should be systematised well appropriate to learning and evaluation. Learner participation should be ensured in the planning and implementation of these activities. Social service should be a part of the course. If a learner has to change his school, he should be provided an opportunity to continue his studies in the new school. While considering criteria for admission to higher courses, grades of vocational subjects

should also be given due weightage. In tune with the changes in the Vocational Higher Secondary Education changes should be ensured in the field of higher education.

The teachers have to take special care in arranging learning activities for the development of all the faculties of intelligence.

Learning activities and learning atmosphere.

A proper learning atmosphere is essential for the betterment of learning activities.

They are:

- Proper physical environment
- Healthy mental atmosphere
- Suitable social atmosphere
- Active participation of PTA, Local bodies and SRG
- Reference materials and visual media equipments.
- Academic monitoring
- School Resource Group (SRG)

\* \* \* \* \*

## **PART-1**

### **Subject wise Approach**

In the first year course of study, colouring of textile materials with soluble group of dyes were covered. During the second year, dyeing with insoluble colours, Printing and Textile finishing are to be completed.

The attractiveness & service ability of the textile materials are improved by dyeing, printing and finishing. By dyeing, a uniform colour is produced while by printing, it is possible to produce different coloured patterns on a textile material. Finishing is done in accordance with the final requirement of the fabric.

This hand out covers the method of dyeing, printing and finishing of Textile materials, list of reference books, equipments, apparatus & machinery required.

The “Textile Dyeing and Printing” courses will help the students to acquire sufficient skill and practice in the colouring of Textiles. At present, there are a number of vacancies for textile technicians in the fields of knitting, garment making, fashion designing, dyeing and printing units. It is hoped that the students completing this course of study will get gainful employment without any delay in the Textile industries.

### **TEACHING STRATEGIES**

#### **LEARNING APPROACH**

Learning is the construction of knowledge, and the learning approach of this course is based on learning to know, learning together and learning to deal.

Following are the different methods used for the construction of knowledge.

- (1) Discovery learning
- (2) Enquiry learning
- (3) Collaborative learning
- (4) Co- operative learning
- (5) Social Culture learning

The learning approach should stimulate the multiple intelligence and E:Q of students. Learning should be learner centered and problem related. The role of teacher is to facilitate the learning process, by orating knowledge in the learner.

#### **Need of New approach**

Students can develop knowledge to select Textile materials for Dyeing Printing and finishing develop skills to handle equipments machinery, tools, testing

instruments etc which are required for colouring. Technical aptitude, discovery learning and group working skills of students will be enhanced as detailed below.

- i) Improve the ability to analyse
- ii) Enhance the curiosity
- iii) Familiarize to use the tools, equipments, machinery and testing instruments
- iv) Provide skills to face technical problems related to the subject
- v) Improve the skills for communication and convey the knowledge to the society.

### **Role of Teachers**

Teacher is the person to give motivation to the students. For this, the teachers should be

- i) A good communicator
- ii) A facilitator for learning
- iii) A good evaluator
- iv) A good organizer
- v) Able to understand the limitation of students
- vi) A good guide
- vii) Able to raise the leadership abilities of students
- viii) An authority in the subject
- ix) A good observer
- x) A resource manager
- xi) A systematic record keeper
- xii) A good counselor
- xiii) Practically competent
- xiv) A self evaluator
- xv) Able to create awareness in social problems
- xvi) A professional and philosopher
- xvii) Able to keep up moral values
- xviii) Impartial
- xix) Optimistic

### **Role of students**

- i) Data collection from Textile Industries, Research Industries, selling outlets
- ii) Express their views related to the data collected
- iii) Hold discussions, seminars and Industrial visits with the active participation of faculty members and Research Institutions.
- iv) Prepare project reports on selected topic with an aim to start a small scale industry in Textile dyeing , printing and Finishing

### **Teaching aids**

- i) Text books, Reference books, Source books.
- ii) Charts, slides, Diagrams
- iii) Teaching notes, observation notes, Seminar and Project report.
- iv) Laboratories and workshops
- v) Textile Industries, Research institutes, Polytechnics
- vi) Study tours, exhibitions
- vii) Journals
- viii) Library and Internet
- ix) Discussion, Seminars

### **Learning strategies**

Important learning strategies are experiments, discussions, debates, seminars, Drawings, Model Preparation, Specimen Collection, quiz, exhibition and field visit. The overall performance of students are improved which include the skills, leadership, research mentality etc.

### **Experiments**

It is an important learning strategy. teacher has to give the guide lines regarding the experiments and demonstrate the required instruments.

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Students can be either permitted individually or in groups. Most of the topics in Textile Dyeing, Printing and Finishing require experiments, which will be conducted simultaneously with the engagement of theory of related topics.

### **Discussions, Debates, Seminars**

Particular topics for the above are selected and are held under the guidance of the faculty members and subject experts from out side. Learner centered seminars guided by experts in Textile Field have to be conducted.

### **Drawings, Model Preparations, Specimen Collection**

Preparation of drawings and models required for the curriculum are to be prepared. Collection of specimens from selling outlets, industries and research institutions are to be made and the quality particulars are to be noted.

### **Exhibition, quiz**

Exhibition of the products manufactured by dyeing, Printing and finishing has to be done, the manufacturing details to be noted in detail. Individual/group quiz will help to update knowledge on selected topics under the guidance of faculty members or subject experts.

### **Field visits**

It is necessary to conduct a number of local visits to industries related to Textile, dyeing, Printing and Finishing. One or two study tours are to be conducted to cover the major industries outside the state. Field visits help the students to acquaint with the most modern techniques adopted in Textile Industries for Textile Dyeing, Printing and Finishing.

### **Project work**

Project work help to develop interest in learning and ensure the active participation of the students. Each student should be assigned with a project work, either alone or as a group guided by the teacher and the report of work done should be submitted at the end of the year.

The structure of the project report should contain.

1. Project title
2. Name of student/students
3. Branch/School
4. Certificate
5. Preface
6. Introduction
7. Survey
8. Need for the Project
9. Existing market Potentiality
10. Site for the Project
11. Plan and layout
12. Product Manufacture
13. Equipments/tools/machinery required
14. Consumables required
15. Staff and labour pattern
16. manufacturing Process
17. Marketing
18. Profit and loss account
19. Conclusion

Some of the project work which can be assigned to the Textile Dyeing and Printing Students are:

1. Setting up a small scale dyeing unit
2. Dye a minimum of 1 meter of fabric with each class of dyestuff.
3. Prepare a chart of different combinations of naphthols and bases.
4. Produce fancy designs on a sari fabric by way of tie and dye method.
5. Produce fancy design on a sari fabric using the batik method of printing

6. Produce fancy design on a bed sheet fabric using Azoic style.
7. Produce a fancy design on a curtain fabric using different methods of direct style of application
8. Set up a small scale printing unit.
9. Prepare the lay out for processing a fine dhoti from a suitable grey cotton cloth .

### CURRICULUM OBJECTIVES (THEORY)

1. Familiarize the properties and application of sulphur and vat colours on various textile materials through discussion, experimentation and observation.
2. Understand the method of application of dispersed and oxidised colours, there properties through demonstration and experimentation.
3. Know the method of production and properties of mordant and mineral colours through demonstration.
4. Familiarize the production of different azoic colours by using suitable naphthol and diazotised bases through demonstration and experimentation.
5. Differentiate Dyeing and Printing, preparation of various textile materials for printing and developing an idea about the ingredients required for the preparation of printing paste by discussion and observation.
6. Understand various methods of printing and machines used for printing. Through discussion and field visits.
7. Know the various styles for the application of printing paste by discussion, and experimentation
8. Understand the preparation of various recipes for different colours and materials and the object of after- treatments through demonstration and group work.
9. Identify and classify the different types of finishes required for different classes of textile materials by discussion and field visit.
10. Familiarise various machinery required for textile finishing through field visit and group work.

### CURRICULUM OBJECTIVES (PRACTICAL)

1. Acquires skills in the methods of application of sulphur dyes on cotton.
2. Familiarises and practises the procedure of application of vat colours on cotton.
3. Knowledge and skills are acquired for the production of azoic colours on cotton.
4. Practises the procedures for the application of dispersed dyes on nylon and Terylene.
5. Analyses and identifies the soluble/ insoluble group of dyes.
6. Skills are achieved by matching different coloured samples.
7. Identifies different colours produced by mixing different dyes.
8. Acquires skill and practise to make stencil, screen and blocks.

9. Practises to print designs with Direct, Reactive, vat, azoic and dispersed colours on cotton, wool, silk, nylon and treylene.
10. finding out the various patterns produced by batik and Tie dyeing.

**TEXTILE DYEING & PRINTING  
(II YEAR)  
TIME SCHEDULE**

Theory: 160 Hours

Unit no	Name of unit	Hours
1	Sulphur and vat colours	20
2	Dispersed and oxidised colours	15
3	Mordent and mineral colours	10
4	Azoic dyes	20
5	Introduction to textile printing	10
6	Methods of printing	20
7	Styles of printing	10
8	Recipes of printing and after treatment	15
9	Introduction to textile finishing	20
10	Finishing machinery	20
	TOTAL	160 hours

**TERM WISE DISTRIBUTION OF UNITS**

Second Year

Theory

TERM	UNITS	HOURS
I	1,2,3,4	60
II	4,5,6,7,8,9	70
III	9,10	30
	TOTAL	160



## **SYLLABUS**

### **UNIT – 1**

#### **SULPHUR AND VAT COLOURS**

**SULPHUR DYES** – Properties, solubility, fastness, affinity towards textile fibers, exhaustion, tinctorial power, assistant for dissolving and functions. Application on cotton, assistants, functions standing bath and feeding baths. After treatments – objects – After treatment to improve fastness to light and washing. Topping with basic dyes. Tendering- reason for tendering, after treatments to prevent tendering and bronziness.

**VAT DYES** – Properties, Method of dissolving Classification – Indigoid, Anthraquinone, sulphide. General method of application of the above colours and their properties, suitability for dyeing vegetable and animal fibers Assistants and their functions, different methods of application of Anthraquinone Vat dyes – IN method, IK method, I W method and IN special method for Vat black.

Solubilized Vat dyes, Properties, advantages, method of application on cotton – Nitrite Process, Dichromate Process and Ferric salt process.

### **UNIT 2**

#### **Dispersed and Oxidized Colours**

Dispersed dyes, Properties, function of dispersing agent, meaning of dispersion, Method of dyeing Acetate Rayon, Nylon, Terylene – High Temperature dyeing without carrier and with carrier at low temperature Oxidized colour, Aniline black, Chemicals used – Aniline hydrochloric acid, oxidizing agent, oxygen carrier. Different stages of oxidation. Method of application on cotton- Single bath Process, Ageing Process, Steaming Process.

### **UNIT-3**

#### **Mordant and Mineral colours**

Mordant dyes, function of mordant, importance of mordanting, Methods of mordanting with salts of Aluminum and chromium Natural mordant colours – Logwood black application on wool. Production of Turkey Red colour on cotton using Alizarine.

Mineral colour – Chrome Yellow, Prussian blue, Iron Buff, Chrome green and Mineral Khaki, Chemicals used for producing the above colours and the method of production of mineral Khaki colour on cotton.

**UNIT 4****Insoluble Azoic dyes**

Properties, method of application on cotton, Selection of Combinations of naphtholes and bases for different colours, dissolving naphthol, diazotizing base, Padding, developing, after treatment.

**UNIT – 5****Introduction to textile Printing**

Textile printing, differentiate dyeing and Printing, Preparation of cloth for printing –singeing, desizing, scouring and bleaching. Ingredients used for printing their functions – thickeners, dissolving agents. Classification and properties of thickeners like your Arabic, gum tragacanth and starches.

**UNIT – 6****Methods of Printing**

Methods of printing – Hand block Printing – Preparation of block, Printing table,printing pad. Stencil printing – cutting the stencil, aerograph printing. Screen printing different methods for the preparation of the screen – direct painting method – method of printing. Roller printing – single colour, multi colour and duplex printing machines. Transfer printing – Principle, method of printing a Transfer-printing machine .

**UNIT – 7****STYLES OF PRINTING**

Styles of printing – Direct style, dyed style discharge style, Resist style, Batik printing, tie and dye, Azoic style, crepon style, metal printing style.

**UNIT – 8****Recipes for printing and after treatments**

Recipe for printing with Direct, Basic, Acid, Reactive, Sulphur, Vat, Solubilized Vat on cotton wool and silk Azoic colour, Pigments. Printing with dispersed colours on Terylene, Nylon and Acetate Rayon. Discharge Pattern on Direct dyed ground. Batik printing with Reactive and Azoic colours. Tie and dyeing with all colours on cotton, wool, silk, Nylon, Terylene and Acetate Rayon.

After treatment – Steaming, Batch wise Ageing, continuous ageing, Soaping, Washing, Clearing by passing through bleaching powder solution, washing.

**UNIT – 9****Introduction to Textile Finishing**

Objects- Classification – Physical and chemical, Temporary and permanent. Types of finishes – Pure finish, Assisted finish, Stiffened finish. Ingredients used in finishing – filling materials, adhesives, softeners, deliquescent substance, antiseptics, whitening agents. Starches wheat starch, rice starch, Potato starch, Tapioca starch, Soluble starches – Properties. Preparation of finishing mixture, detailed study of water proofing, water repellency, Fire proofing and moth proofing.

**UNIT – 10****Finishing machineries**

Padding Magles – Objects , 2 bowl mangle – 3 bowl mangle, Water mangle, Washing Mangle, Calendering – Objects , 5 bowl calender , 7 bowl calender, embossing calender , Schriener calender , Swizzing calender , Chasing calender, Stenter, sanforization - principle, objects and process.

**TEXTILE DYEING AND PRINTING****SECOND YEAR****PRACTICAL****Time schedule**

UNIT	Name of unit	Periods (Hours)
1.	Application of sulphur dyes on cotton	20
2.	Vat dyes on cotton	60
3.	Azoic dyes on cotton	80
4.	Dispersed dyes on nylon and Terylene	50
5.	Analysis of Dyestuffs	40
6.	Colour Matching	50
7.	Colour mixing	40
8.	Preparation of stencil, screen and block	20
9.	Printing with Direct, Reactive, vat, azoic & dispersed dyes on different fibers	60
10	Batik and Tie dyeing	20
	Total	440

**TERM WISE DISTRIBUTION OF UNITS**

**Practical**  
**Second Year**

	TERM	UNITS	HOURS
	I	1,2,3	130
	II	3,4,5,6,	170
	III	7,8,9,10	140
		TOTAL	440

**YEAR PLAN (PRACTICAL)**  
**TEXTILE DYEING AND PRINTING**  
**SECOND YEAR**

Month	Unit	Hours	Other Activities
June	1,2	40	Industry visit
July	2,3	50	Assignment
August	3	50	Assignment test
September	3,4	40	Industry visit
October	5	60	Study Tour
November	6,7	60	
December	7,8	40	Assignment
January	9	60	Seminar
February, March	10	40	Assignment, Revision, Test
Total		440 hors.	

**LIST OF EXPERIMENTS TO BE DONE**

**UNIT – 1**

Application of sulphur dyes on cotton

- 1.1 Application of Sulphur black, blue, brown colour on cotton
- 1.2 After Treatment with copper sulphate
- 1.3 After Treatment with Potassium dichromate
- 1.4 Topping with Basic colours
- 1.5 After treatment with  $H_2O_2$ ,  $K_2Cr_2O_7$  and  $Na_2CO_3$

**UNIT – 2**

Application of Vat dyes on cotton

- 2.1 Application of following Vat colours on Cotton

- i) Yellow
- ii) Orange
- iii) Red
- iv) Blue
- v) Green
- vi) Violet
- vii) Brown
- viii) Pink
- ix) Khaki
- x) Black

### **UNIT – 3**

Application of Azoic dyes on cotton

3.1 Application of the following naphthols on cotton.

- i) Naphthol A S G
- ii) Naphthol A S
- iii) Naphthol ASTR

And coupling with the following bases

- i) Fast Yellow G C base
- ii) Fast Orange G C base
- iii) Fast Red T R base
- iv) Bordeaux G P base
- v) Garnet G B C base
- vi) Red R C base.

### **UNIT – 4**

Application of Dispersed dyes on Terylene and Nylon.

4.1 Application of dispersed dyes with carrier and without carrier with the following dyes on Nylon and Terylene

- i) Dispersol Yellow
- ii) Dispersol Orange
- iii) Dispersol Red
- iv) Dispersol Blue
- v) Dispersol Green
- vi) Dispersol Violet, Black

### **UNIT – 5**

#### **Analysis of dyestuffs**

5.1 Analyse the following colours in powder form

- i) Direct
- ii) Acid
- iii) Basic
- iv) Vat

- v) Sulphur
  - vi) Dispersed
  - vii) Reactive
- 5.2 Analyse the following dyed material
- i) Cotton dyed with direct dye stuffs
  - ii) Wool dyed with direct dye stuffs
  - iii) Silk dyed with direct dye stuffs
  - iv) Cotton dyed with reactive dye stuffs
  - v) Wool dyed with reactive dye stuffs
  - vi) Silk dyed with reactive dye stuffs
  - vii) Cotton dyed with vat dye stuffs
  - viii) Cotton dyed with sulphur dye stuffs
  - ix) Wool dyed with acid dye stuffs
  - x) Silk dyed with acid dye stuffs
  - xi) Wool dyed with basic dye stuffs
  - xii) Silk dyed with basic dye stuffs
  - xiii) Nylon and Terylene dyed with dispersed dye stuffs

## **UNIT – 6**

### **COLOUR MATCHING**

6.1 Match the colour of the following dyed materials

- i) Cotton coloured with direct, sulphur, Vat reactive, Azoic dyes with varying percentage of shades.
- ii) Silk coloured with Direct, Acid, Basic and Reactive
- iii) Wool coloured with, Direct, Acid, Basic and Reactive dyes
- iv) Nylon and Terylene coloured with dispersed dyes

## **UNIT – 7**

### **COLOUR MIXING**

- 7.1 Mix two or more dyes to produce a single colour on
- i) Cotton with different Direct/Sulphur/Vat /Reactive dyes.
  - ii) Wool with Acid/Basic/Reactive dyes.
  - iii) Silk with Acid/Basic/Reactive dyes
  - iv) Nylon with Disperse dyes
  - v) Terylene with Disperse dyes

## **UNIT –8**

### **PREPARATION OF STENCIL, SCREEN AND BLOCKS**

- 8.1 Prepare stencil patterns on Hard boards and metallic sheets.
- 8.2 Prepare screen with suitable designs by wax paper and photo chemical process.
- 8.3 Produce Raised patterns on wooden blocks.

**UNIT – 9****PRINTING WITH DIRECT, REACTIVE, VAT, AZOIC AND DISPERSED DYES ON DIFFERENT FABRICS**

- 9.1 Print, Cotton, Wool, Silk, Nylon and Terylene with
- i) Direct dyes
  - ii) Reactive dyes
  - iii) Vat dyes
  - iv) Azoic dyes
  - v) Dispersed dyes.
- 9.2 Give necessary after treatment to the above printed material

**UNIT – 10****BATIK AND TIE DYEING**

- a. Application of a mixture of bee wax and shellac wax on cotton, wool, silk on certain parts
- b. Dye the material with cold brand reactive dyes/azoic dyes
- c. De waxing to remove the wax.
- d. Tie different textile materials with threads/twines/clips/pins etc.
- e. Dye the tied fabrics with different groups of colours.
- f. Removal of the ties after dyeing.

**PLANNING**

In order to provide learning experience that would help to develop process skills and components of multiple intelligence in Textile, alyeing , printing and finishing the activities should be completed in a time bound manner.

The teacher has to plan the activities necessary to make learning effective, . Teacher must prepare at last 3 planning documents.

1. Year plan
2. Unit plan
3. Daily plan

**1. Year plan**

The year plan will include the total numbers of units to be transacted through the three terms, units to be covered during each month and the number of periods required for each unit. A model of the year plan is given below.

**TEXTILE DYEING & PRINTING**  
**( II YEAR )**  
**Year Plan (Theory)**  
**Second year**

Term	Month	Topics/ Units	Total hours	Other Activities
First term I	June	1	20	Industry visit
	July	2,3	20	Seminar, Class test
	August	3,4	20	Seminar, Class test
	September	4,5	15	Terminal exam
Second term II	October	6	20	Study tour, Assignment
	November	7,8	20	Industry visit, Project work
	December	8,9	15	Terminal exam
Third term III T	January	9,10	20	Sports & games, assignments
	February	10	10	Seminar
	March	Revision, Model exam		
		Total	160 hours	

## **2. Unit Plan**

Prior to the actual transaction of the unit in the class room the teacher should prepare the unit plan. This plan must make the curriculum objectives intended, Periods required for transaction of these objectives, instructional strategies to be used and materials required. How the out comes are to be evaluated may also be spelt out. Unit analysis for each unit given in the source book may be utilized for preparing unit plan. A model of unit plan is given below.



**UNIT PLAN**  
**SULPHUR AND VAT CLOURS**

Sl No	Curriculum objective	Learning /Concepts	Process skills	Activities	Learning Materials	Products	Evaluation	Time Hours
1.	Familiarize the properties and application of sulphur and vat colours on various Textile materials through demonstration and experimentation	<ul style="list-style-type: none"> <li>• Properties of sulphur and vat colour</li> <li>• Dyeing assistants</li> <li>• Application on cotton</li> <li>• After Treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Observing</li> <li>• Experimenting</li> <li>• Controlling variables</li> <li>• Measuring</li> <li>• Inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration</li> <li>• Experimentation</li> </ul>	<ul style="list-style-type: none"> <li>• Dye stuffs</li> <li>• Cotton yarn</li> <li>• Shade cards</li> <li>• Colour spectrum</li> <li>• Chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Dyed samples</li> <li>• Subject diary</li> </ul>	<ul style="list-style-type: none"> <li>• Participation</li> <li>• Process</li> <li>• Experimentation skill</li> </ul>	20

**Daily Lesson Plan for sulphur and vat colours**

The Daily lesson plan includes curriculum objectives to be transacted during class period, learning activities, learning aids and feed back.

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Model Daily Lesson Plan is given below.

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Date : .....

Class: .....

Curriculum Objectives

Familiarize the properties and application of sulphur and vat colours.

Objective

Demonstration and experimentation

Duration Hours	Activity	Discussion points	Required learning materials	Learner participation	Teacher supplement	Remarks/ Value points
2	Demonstration	<ul style="list-style-type: none"> <li>• Solubility</li> <li>• Affinity towards fibers</li> <li>• Dissolving</li> <li>• Chemicals</li> <li>• Other facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Fabric/yarn</li> <li>• Dyes /Chemical</li> <li>• Vessels</li> <li>• Heater</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Classification</li> </ul>	Skill of students evaluated
2	Experimentation	<ul style="list-style-type: none"> <li>• Dissolving</li> <li>• Application</li> <li>• After treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Yarn/Fabric</li> <li>• Dyes/Chemicals</li> <li>• Vessel</li> <li>• Heater</li> </ul>	<ul style="list-style-type: none"> <li>• Practices</li> </ul>	<ul style="list-style-type: none"> <li>• Gives instructions</li> </ul>	Practical ability evaluated

Signature of Principal

Signature of Teacher

## Evaluation

It is the process of scientific assessment of achievements by the students in relation to the curriculum objectives. Learning being a continuous process, evaluation should also be continuous. It should be comprehensive and students should be graded on the basis of their knowledge and skills. Evaluations can be done in many ways like.

(i) Continuous evaluation

The multi dimensional competencies of the students can be evaluated through

- |                |               |
|----------------|---------------|
| 1. Seminar     | 2. Project    |
| 3. Assignment  | 4. Lab work   |
| 5. Collections | 6. Class test |

How to evaluate CE items?

The table showing the CE items, their indicators, weightage and score.

CE Items	Evaluation Indicators	Score 4/3/2/1	Total Score
Seminar	1. Ability to plan and organise (time, topic, sources of data, method of presentation etc.) 2. Skill in the collections of data (relevance, authenticity, variety of sources etc.) 3. Awareness of the content (presentation of the paper, participation in discussion, ability to substantiate his own ideas and views) 4. Ability to prepare the report (sequence in the presentation of the concepts, authenticity and clarity of ideas/views/concepts) 5. Skill in communication (presentation of the paper, participation in discussion)	4/3/2/1  4/3/2/1  4/3/2/1  4/3/2/1  4/3/2/1	20

CE Items	Evaluation Indicators	Score 4/3/2/1	Total Score
Project	<p><b>1 Ability to plan</b></p> <ul style="list-style-type: none"> <li>• ability to select suitable learning method for</li> <li>• solving the problem</li> <li>• ability to develop suitable tools</li> <li>• ability to plan the duration of study, and the various activities to be carried out in each stage</li> </ul> <p><b>2. Ability to collect data</b></p> <ul style="list-style-type: none"> <li>• ability to collect sufficient and relevant data</li> <li>• Ability to classify and arrange data for analysis</li> <li>• reliability and authenticity of the collected data (this can be assessed based on their recording in the project diary)</li> </ul> <p><b>3 Ability to analyse the data and arrive at conclusions/inference</b></p> <ul style="list-style-type: none"> <li>• ability to analyse the data</li> <li>• ability to draw inference based on the analysis of data</li> </ul> <ul style="list-style-type: none"> <li>• Ability to give suitable suggestions based on the inferences.</li> </ul> <p><b>4 Ability to prepare the project report</b></p> <ul style="list-style-type: none"> <li>• ability to prepare the project report reflecting the process skills involved.</li> <li>• communicability of the report</li> <li>• authenticity of the report</li> <li>• relation with the project diary</li> <li>• time bound completion</li> </ul> <p><b>5. Viva - Voce (Knowledge of the content and processes)</b></p> <ul style="list-style-type: none"> <li>• Ability to analysis the data</li> <li>• Ability to justify the inference</li> <li>• Ability to explain the strategies and methods adopted and communicate the findings</li> </ul>	<p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p>	<p>20</p>

Vocational Higher Secondary School VY ear (Theory)

CE Items	Evaluation Indicators	Score	Total Score
Assignment	1. Awareness of the content	4/3/2/1	20
	2. Comprehensiveness of the content (coverage of content)	4/3/2/1	
	3. Systematic and sequential arrangement (clarity, structure, language)	4/3/2/1	
	4. Own observations/suggestions/views/judgement/evaluation	4/3/2/1	
	5. Timely submission	4/3/2/1	
Lab Work	1. Preparation for the work (procedure, apparatus needed, knowledge of the concepts or principles)	4/3/2/1	20
	2. Skill in handling the apparatus	4/3/2/1	
	3. Accuracy and specificity in carrying out the experiment (controlling variables, measurement recording.)	4/3/2/1	
	4. Analysis of data and arriving at conclusion	4/3/2/1	
	5. Recording of the work and timely -submission	4/3/2/1	
Collections	1 Relevance	4/3/2/1	20
	2 Variety	4/3/2/1	
	3 Uniqueness	4/3/2/1	
	4 Systematic recording	4/3/2/1	
	5 Neatness ad timely submission	4/3/2/1	
Class Test	<p>For the year end evaluation the best score out of two class test should be considered for the continuous evaluation. But with in a term, class tests may be conducted after the completion of each unit. Therefore within a term various class tests may be conducted for diagnostic purpose and the average score of them should be taken and recorded in the evaluation profile. The features of a class test for diagnostic purpose are as follows:-</p>		20

## Vocational Higher Secondary School-II Year

CE Items	Evaluation Indicators	Score
Class Test	<ul style="list-style-type: none"> <li>• It is a tool used to find out and to solve the learning problems faced by pupils.</li> <li>• It may be used as a tool to collect feedback from pupils during the learning process.</li>   <li>• Class test need not be a written test. It can also be organised as a performance test.</li>   <li>• After completing a unit, it can be in the form of a unit test.</li>   <li>• It may not be a test including more than one unit.</li>   <li>• Attendance of all pupils may be ensured during class test.</li> <li>• Class test may be carried out by the teacher handling the subject.</li> <li>• Questions may be prepared in school I by following the directions of school examination board.</li> <li>• Class test should be informal. No time table or printed question paper is required. No need of blue print.</li> <li>• Questions should be suitable for subject approach.</li> <li>• Should be completed in one period.</li> <li>• Arrange more remedial activities to solve the problems identified through the class test after discussing it with pupils.</li> <li>• Discussion of value points with pupils and peer evaluation and self evaluation may be used.</li>   <li>(Average marks of all tests is converted in to 20.)</li> </ul>	

Out of the above 6 CE items class test is compulsory. Consider any other two CE items for evaluation and recording.

Vocational Higher Secondary School-II Year (Theory)

## Summary of Methods

2. Project	Feeling the problem
	Formulating
	Hypothesis
	Data collection
	Analysis
	Drawing conclusion
	Report Writing
	Presentation

3. Seminar	Planning
	Data Collection
	Presentation of paper
	Completion

4. Lab work	Planning
	Execution
	Completion
4. Assignment	Sharing Phase
	Completion phase

5. Collection	Sharing in the class room
6. Class test	Interim evaluation
	Completion phase

**Distribution of scores for year end evaluation**

For year end evaluation both theory and practical test will be conducted

	Score
Theory-written test (external)	80
Continuous evaluation (internal)	20
Total	100

## Grading

Continuous evaluating is necessary for activity based learning process. But the skills achieved by the students cannot be completely measures in terms of Marking system. Marking System failed in recording the growth and development of individual students both in scholastic and co-scholastic learning outcomes. Classification of students in terms of marks were both unjust and indefensive. It also creates mental stress and strain among the students. To overcome this limitation, a popular mode of evaluating students' performance known as grading system has been evolved. It is quite extensively used all over the world. In the Higher Secondary stage, it is desirable to use a 9 point scale absolute grading to consolidate and record the evaluation. After giving the score, they are changed into percentages and appropriate letter grades are awarded corresponding to each percentage. This system is termed as absolute grading.

The Score percentage and Corresponding Grade is given below

Score in percentage	Grade
90-100	A+
80-89	A
70- 79	B+
60-69	B
50-59	C+
40-49	C
30-39	D+
20-29	D
Below 20	E

### **Test items of Termed Evaluation (TE) and year end evaluation**

- Class tests, term end evaluation and year end evaluation should be justifiable to new approach
- Questions should not lead to mugging up of content.
- Questions should consider the learning process and subject approach
- It should help to analyse the result with a research mind.
- Test items for different cognitive levels may be provided.

- Allow chances for pupils to attempt multilevel questions

### **Selection of COs**

- Care should be given to select items from areas where more activities are possible
- Stress should be given for the higher level thinking/mental process of pupils.
- Learning by heart and knowledge not relating to real life need not be encouraged.
- Cluster of more than one CO can be used.

### **Question Text**

- Questions should be in tune with the approach to technological learning.
- Stress should be given to apply the innate thinking/mental abilities of pupils
- Importance may be given to both the process as well as product.
- More than one possible answers to the same question need not be discouraged.
- Questions should be clear and hints may be given wherever needed.
- Life related questions should be included.
- Language of the questions must be simple and direct.
- When formulating questions and fixing scores, time required to read, think, understand and write answers may be taken into consideration



- To avoid blind guessing, multiple choice and supply type questions may be mixed.
- The questions may be of such type that make it possible for students of different ability levels to interact.

## Consolidated Statement of C.E.

Sl. No.	Name	Seminar 20	Assignment 20	Class Test 20	Total Score 60	Score reduced to 20 Score 20 obtained X 60
1.	Vinitha	10	8	14	32	10.75
2.	Rema	12	13	15	40	13
3.	Nitha	14	9	10	33	11

## Consolidated Statement of T.E. and C.E.

Sl. No.	Name	T.E. 80	C.E. 20	Total Score 100	Grade
1.	Vmitha	55	10.75	66	B
2.	Rema	68	13	81	A
3.	Nitha	42	11	53	C+

**Vocational Subject Evaluation**

Vocational subject evaluation is used to evaluate the skills of the learner in the concerned subject. The facilitator has to make learning in print production techniques activity based, product based, student centered and society bound.

**Part II Vocational Subject****Evaluation of Second year**

	CE	TE	PE	IE	Total	Minimum
VT	20	80	-	-	100	30%
VP	-	-	150	-	150	40%
VCE	-	-	-	50	-	30%

No minimum for CE

**Practical Evaluation (PE)**

In practical evaluation, the learner's capability on basic workshop skills and proficiency in operating machines and equipment for print production skills are to be examined. Questions are framed in such a way that it should evaluate working skills and knowledge in print production.

**Rating Scale**

Sl. No.		I	2	3	4	5
1.	Regularity	Never Regular	Often Regular	Usually Regular	Most of the time Regular	Always Regular
2.	Punctuality	Never Punctual	Often Punctual	Usually Punctual	Most of the time Punctual	Always Punctual

Regularity and punctuality can be amassed by using attendance of the student and time bound completion of tasks.

**II. Indicators for field visit**

Attitude and readiness towards the task.

Capacity for observation.

Data collection.

Application of ideas.

Documentation/Recording.

**Survey**

- **Planning**

- Data collection

- Consolidation of data and analysis

- Drawing inference

- Reporting

**III. Simulated Experiment/OJT**

- Evolvement/participation  
Skills in doing work/communicates  
skill

- Time bound action

- Capacity for observation, analysis and innovation.

- Documentation, recording and display.

**Performance - clinic/Camp/exhibition**

- Ability for planning and
- organisation. Mastery of subject
- Ability: ITO communication.
- Innovation.
- Involvement/social commitment.

**Performance - Production/Service cum Training Centre (PSCT)**

- Mastery of Voc. skills.
- Managerial capacity.
- Promoting self confidence.
- Innovative approach.
- Promoting self-reliance.

## Vocational Higher Secondary\_School II Year (Theory)

<b>Note: VC</b>		
Items	Score	
<ul style="list-style-type: none"> <li>• Regularity and</li> <li>• Punctuality Field</li> <li>• visit/survey (anyone)</li> </ul>	10 20	<p>A minimum of 80% attendance is required for promotion to the second year. Those who have shortage of attendance should repeat first year. Those who have 80% attendance but failed to achieve 30% of internship valuation will be promoted to the second year. He has to improve the component in which he performed poor. He has to attain the minimum by improving the particular component to get eligible for appearing second year public examination.</p>
Simulated experiment/OJT	20	
Performance - clinic/caup/exhibition Performance - PSCT (Anyone)		
Total	50 Scores	

**Detailed format for Vocational Competency Evaluation (VCE)**

VCE Item	Evaluation Indicators	Score	Total Score
1. Regularity and Punctuality	1. Attendance	5	10
	2. Discipline and Obedience	5	
2. Value addition	Field Visit		20
	1. Attitude and readiness towards the task.	4/3/2/1	
	2. Capacity for observation.	4/3/2/1	
	3. Data collection.	4/3/2/1	
	4. Application of ideas.	4/3/2/1	
	5. Documentation/ recording.	4/3/2/1	
	OR		
	Survey		
	1. Planning.	4/3/2/1	
	2. Data collection.	4/3/2/1	
3. Consolidation of data and analysis.	4/3/2/1		
4. Drawing inference.	4/3/2/1		
5. Reporting.	4/3/2/1		
3. Capacity building	OJT/ Simulated Experiment		20
	1. Involvement/ Participation.	4/3/2/1	
	2. Skills in doing work/ Communication skill.	4/3/2/1	
	3. Time bound action.	4/3/2/1	
	4. Capacity for observation, analysis and innovation.	4/3/2/1	
	5. Documentation, Recording and display.	4/3/2/1	



Vocational Higher Secondary School1-II Year (Theory)

VCE Item	Evaluation Indicators	Score	Total Score
	<p style="text-align: center;"><b>OR</b></p> <p><b>Performance in camp Exhibition</b></p> <p>1. Ability or planning and orgamsng.</p> <p>2. Mastery of subject.</p> <p>3. Ability for communication.</p> <p>4. Innovation.</p> <p>5. Involvement/Social commitment.</p> <p style="text-align: center;"><i>OR</i></p> <p><b>Performace in production! service cum training centre (PSCTC)</b></p> <p>1. Mastery of vocational skills.</p> <p>2. Managerial capacity.</p> <p>3. Promoting self confidence.</p> <p>4. Innovative approach.</p> <p>5. Promoting self - reliance.</p>	<p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p> <p>4/3/2/1</p>	

**FORMAT FOR EVALUATION OF VOCATIONAL SUBJECT**

Sino:	Name	CE				TE (80)	Total (100)	Grade	PE								Vocational Competency Evaluation				
		1 Clas Test (20)	2 (20)	3 tal t (60)	4 Total out of 20				1	2	3	4	5	6	7	8	Total	Grad. and Punctual- ity (10)	Value Addition (20)	Capacity building (20)	Total (50)



## Government of Kerala

### Board of Vocational Higher Secondary Examinations

Reg: No.

Thiruvananthapuram

Dated: - - - - -

#### Evaluation Sheet

Sri./Smt. ----- is awarded Scores/  
grade as detailed below in the First Year Vocational Higher Secondary Examination held  
in

Name of School

Admission No . - - - - -

Name of Vocational Course: - - - - -

Subject	Score Obtained					Positional Grade	Grade in words
	CE20	1E 80	PE 150	IE 50	Total		
<b>Part- I</b>							
English			-	-			
General Foundation Course			-	-			
<b>Part- II Vocational Subjects</b>							
Vocational Theory			-	-			
Vocational Practical	-	-		-			
Vocational	-	-	-				
<b>Part- III Optional Subjects</b>							
	20	60	20				
Physics				-			
Chemistry				-			
	20	80					
Mathematics			-	-			

CE- Continuous Evaluation, TE- Term End Evaluation, PE- Practical Evaluation, IE-  
Internship Evaluation.

Grades	A + 90% and Above Outstanding	A	80- 89%	Excellent.
	B+ 70 -79% Very Good	B	60- 69%	Good
	C+ 50 - 59% Above Average	C	40- 49%	Average
	D+ 30 - 39% Marginal	D	20- 29%	Need improvement
	E Below 20% Need improvement			

Marks Entered by

Marks checked by

S updt/ T. 0

SECRETARY

**TEXTILE DYEING AND PRINTING****SECOND YEAR****PART-II****UNIT-I****SULPHUR AND VAT COLOURS****INTRODUCTION**

These colours are extensively used for colouring cotton textiles. Sulphur colours are very cheap and produce colours, which are fast to washing. Fastest colours are produced with vat dyes, but they are very costly and hence applied only on superior varieties of cotton materials. Completing this unit, the students will be able to understand the properties and the method of application of sulphur and vat colours.

**Curriculum Objective**

Familiarize the properties and applications of sulphur and vat on various textile materials through demonstration.

**Syllabus**

**SULPHUR DYES-** Properties, solubility, fastness, affinity towards textile fibers, exhaustion, tinctorial power, assistants for dissolving and their function. Application on cotton, dyeing assistants and their functions, standing and feeding baths. After treatments-objects, after-treatments to improve fastness to light and washing, Topping with basic dyes. Tendering – reasons for tendering-after treatment for tendering and bronziness

**VAT DYES-** Properties, method of dissolving. Classification- Indigoid, Anthraquinone, sulphide. General method of application of the above vat dyes and their properties, suitability for dyeing vegetable and animal fibers, assistants and their functions. Different methods of applications of Anthraquinone Vat dyes-IN method, IK method, IW method and IN. Special method for Vat Black.

**SOLUBILISED VAT DYES-** Properties, advantages, method of application on cotton- Nitrite process, Dichromate process and Ferric salt process.

Pre-requisites.

- ❖ Learners should be aware of the colouring technique of textile materials like fabrics and yarns of various forms.
- ❖ They should have a general idea about insoluble group of dyes and various chemicals used in dyeing of Vat and Sulphur dyes.

**Activity -I**

Name : Solubility of Vat and Sulphur Dyes.

Activity : Demonstration.

Materials: Vat and Sulphur dye stuffs, Hot and cold water and solutions of NaOH,  $\text{Na}_2\text{SO}_4$ ,  $\text{Na}_2\text{CO}_3$

**Process:** Divide the pupil into 5 groups

- Instruct each group to take a little amount of Vat and sulphur dyes separately using a glass rod.
- Try to dissolve them in cold and hot water.
- Note the solubility.
- Instruct them to add little NaOH Solution to Vat dye, then add  $\text{Na}_2\text{S}_2\text{O}_4$  solution and heat the whole solution well.
- Note the solubility of Vat dyes.
- Instruct again to add little  $\text{Na}_2\text{CO}_3$  solution to Sulphur dye, then add  $\text{Na}_2\text{S}$  solution and heat the whole solution well.
- Note the solubility of Sulphur dyes.

**Consolidation:**

Teacher consolidates that Vat and sulphur dyes are insoluble in Water.

To dissolve Vat dyes NaOH and  $\text{Na}_2\text{S}_2\text{O}_4$  are used and for Sulphur dyes  $\text{Na}_2\text{CO}_3$  and  $\text{Na}_2\text{S}$  are used (An alkali and a reducing agent are required to dissolve).

**Activity II**

Name: Application of Vat dyes on Cotton

Activity: Experimentation.

Materials: Vat dye stuff, Cotton yarn, solutions of NaOH and  $\text{Na}_2\text{SO}_4$

Process: Dissolving of dyestuff.

Preparation of dye bath.

Shades to be dyed.

Dyeing

Oxidation

Washing

Instruct to note the procedure

### Consolidation

- Dye bath: a) Depth of shade (0.5%, 1%, 2%, 3% , 4% )  
 b) Dissolving of dyestuffs  
 I) NaOH  
 II)  $\text{Na}_2\text{SO}_4$   
 c) Preparation of dye bath  
 I) Dye solution  
 II) NaOH  
 III)  $\text{Na}_2\text{S}_2\text{O}_4$   
 IV) Water  
 V) Levelling agent if required.  
 d) Temperature – Different for different classes of dyes and different methods of dyeing.  
 e) M.L.Ration- 1:10 to 20.  
 f) Developing after dyeing by exposure to air.

**Product:** Subject diary, Dyed materials.

### Activity- III

Name: Application of sulphur dyes on cotton.

Activity: Experimentation

Materials: Sulphur dyes stuff, cotton yarn, and solution of  $\text{Na}_2\text{CO}_3$  and  $\text{Na}_2\text{S}$

- Process: Dissolving of dyestuffs
- Preparation of dye bath
- Shades to be dyed
- Dyeing
- Washing
- Instruct to note the procedure

### Consolidation:

- Dye bath: a) Depth of shade (0.5%,1%, 2%, 4%)  
 b) Dissolving of dyestuffs  
 i)  $\text{Na}_2\text{CO}_3$   
 ii)  $\text{Na}_2\text{S}$   
 c) Preparation dye bath  
 i) Dye solution  
 ii)  $\text{Na}_2\text{CO}_3$   
 iii) Water  
 iv) Levelling agent if required  
 d) Temperature – boiling  
 e) M.L.Ratio – 1:10 to 1: 20

After washing the dyed materials are treated with

- a. Copper sulphate and acetic acid to improve light fastness
- b. Potassium di chromate and acetic acid to- improve washing fastness
- c. Topping with basic dyes to improve brilliancy.

**Product**-Subject diary, dyed materials

### Sulphur and Vat colours

Sl no	Curriculum objectives	Learning concept	Process skills	Activities	Learning materials	Product	Evaluation	Time
	Familiarise the properties and application of sulphur and vat colors on various textile material through demonstration and experimentation	<ul style="list-style-type: none"> <li>• Properties of sulphur and vat dyes</li> <li>• Dyeing assistants</li> <li>• Application on cotton</li> <li>• After treatments</li> </ul>	<ul style="list-style-type: none"> <li>• Observing</li> <li>• Experimentation</li> <li>• Controlling variable</li> <li>• Measuring</li> <li>• Inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration</li> <li>• Experimentation</li> </ul>	<ul style="list-style-type: none"> <li>• Dye stuff</li> <li>• Cotton yarn</li> <li>• Shade cards</li> <li>• Color spectrum</li> <li>• Chemicals</li> </ul>	<ul style="list-style-type: none"> <li>• Dyed samples</li> <li>• Subject diary</li> </ul>	<ul style="list-style-type: none"> <li>• Participation</li> <li>• Process skill</li> <li>• Experimental skill</li> </ul>	20 hrs

## UNIT II

### DISPERSED AND OXIDIZED COLORS

#### Introduction:

Dispersed colors are specially manufactured for coloring hydrophobic fibres like Terylene, nylon and acetate rayon. This unit deals with the method of dispersing the dispersed color and its application on different fibres. This unit also deals with the method of production of oxidized color by using chemicals as and when it is required. On completion of this unit, the learner shall be able to understand the properties and the method of production of dispersed and oxidized colors on various textile materials

#### Curriculum objectives

Understand the method of application of dispersed and oxidized colors their properties through demonstration and experimentation.

#### Syllabus

Dispersed dyes, properties, function of dispersing agent meaning of dispersion, method of dyeing Acetate Rayon, Nylon, terylene –High temperature dyeing without carrier and with carrier at low temperature oxidized colors, Aniline black, chemicals used Aniline Hydro chloride, Hydrochloric acid, Oxidising agents, oxygen carrier. Different stages of oxidation method of application on cotton –Single bath process, Ageing process, Steaming Process.

## UNIT 2

### Pre requisites

The learners should be aware of the technique of coloring textile materials in the form of yarn and fabric made with cotton, Nylon, Terylene and acetate rayon. They should have a general idea about dispersed dyes, meaning of dispersion, oxidised colors and various chemicals used for the production of oxidized colors at various stages.

### Activity I

Name –Solubility of dispersed dyes

Activity –Demonstration

Materials- Dispersed dye, Dispersing agent water

Process-Divide the pupil in to 6 groups

Instruct each group to take a little amount of dispersed dyestuff

Try to dissolve it in cold and hot water

Note the solubility

Instruct them to take a little dispersing agent into the above bath

Note the change

### Consolidation

The teacher consolidates that dispersed dyes are insoluble in water but can be dissolved in water with the aid of a dispersing agent

Product; Subject diary

### Activity II

Name –Application of dispersed dyes on Terylene

Activity-Experimentation

Materials – Dispersed dye, Dispersing agent, carrier samples of Terylene yarn and fabric

#### Process

- Make a fine dispersion of the dye stuff in water
- Preparation of the dye bath
- Dyeing
- Washing
- Instruct to note the procedure

#### Consolidation

Dye bath (a) Depth of shade –0.5% , 1% , 2% , 3% and 5%

(b) Dispersion of dyestuff

- (i) Dyestuff
- (ii) Dispersing Agent

© Preparation of dye bath

- i) Dye dispersion in water
- ii) Carrier
- iii) Temperature –Boiling
- iv) M:L ratio-1:10 to 1.:20

The teacher consolidates that the dye is dissolved in the fibre  
Product-subject diary, Dyed sample

### Activity-III

Name –Production of Aniline black on cotton

Activity –Experimentation

Materials-Aniline Hydrochloride, Potassium dichromate, Copper sulphate,cotton yarn and fabric

#### Process

- Dissolving the aniline hydrochloric in HCl and water.
- Preparation of Impregnating bath
- Dyeing
- Soap boiling
- Washing

### Consolidation

Dye bath

- (a) Shade-8%
- (b) Dissolving the Aniline Hydrochloride
- ©Hydrochloric acid
- (d) Copper sulphate solution

Dyeing-Temperature –70 degree Celsius

M:L = 1:10 to 1:20

The teacher consolidates that a dull green color is observed in the dye liquor and the cotton acquires deep black color, on completion of dyeing

**Product:** Subject diary, Dyed samples

## Unit-2 Dispersed and Oxidised colours

Sl no	Curriculum objective	Learning concept	Process skill	Activities	Learning Materials	Product	Evaluation	Time
.	<ul style="list-style-type: none"> <li>Understand the method of application of dispersed and oxidized colors their properties through demonstration and experimentation</li> </ul>	<ul style="list-style-type: none"> <li>Properties of dispersed and oxidized dyes</li> <li>Methods of dispersing</li> <li>Application of dispersed dyes</li> <li>Method of producing oxidized colors</li> </ul>	<ul style="list-style-type: none"> <li>Participation</li> <li>Identifying</li> <li>Handling material and equipment effectively</li> <li>Communicating</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration</li> <li>Experimentation</li> </ul>	<ul style="list-style-type: none"> <li>Dispersed dyes</li> <li>Chemicals for oxidized colors</li> </ul>	<ul style="list-style-type: none"> <li>Subject diary</li> <li>Dyed sample</li> </ul> <p>Polyester yarn</p> <ul style="list-style-type: none"> <li>Nylon yarn</li> <li>Cotton yarn</li> </ul>	<ul style="list-style-type: none"> <li>Participation</li> <li>Process skill</li> <li>Product evaluation</li> </ul>	15 hrs

## UNIT- III MORDANT AND MINERAL COLOURS

### Introduction

Similar to oxidized colours, these are not ready made colours. A colour is produced by the dyer or printer as and when it is required with the help of chemicals. This unit deals with the various types of mordants and chemicals required for producing mordant colours and mineral colours. The students will be able to understand the methods of production of mordant colours and mineral colours on textile materials on completion of this unit.

### Curriculum Objectives

Know the method of production and properties of mordant and mineral colours through demonstration.



**syllabus**

Mordant dyes/ function of mordant, importance of mordanting, methods of mordanting with salts of Aluminium and Chromium. Natural mordant colours- Log wood block, application on wool. Production of Turkey red colour on cotton using Alizarine.

Mineral colours- Chrome yellow, Prussian blue, Iron buff, Chrome green and mineral Khaki, chemicals used for producing the above colours and the methods of production of mineral Khaki colour on cotton.

**UNIT-3****Pre-requisites**

- ❖ The learn should have a basic idea about metallic salts such as ferrous sulphate, Chromium salt, Aluminium sulphate, Turkey red oil.
- ❖ They should have an idea about oiling, mordanting, natural mordant colours like log wood block and Alizarin Red .

**Activity-I**

Name	Mordanting
Activity	Demonstration
Materials	Turkey Red oil, woollen yarn and fabric, water.
Process	Divide the pupil into six groups. Instruct each group to take some turkey red oil into a bath and add water. Treat the sample of woollen yarn and fibre in turkey red oil solution. Squeeze the sample to have an even oiling.

**Consolidation**

The teacher consolidates that the oil is present on the sample uniformly.

**Activity-II**

Name	Mordanting
Activity	Demonstration
Materials	Aluminium sulphate, Acetic acid, previously oiled samples of yarn and fabric.
Process	Divide the pupil into six groups Instruct each group to take some Aluminium sulphate. Dissolve Aluminium sulphate in cold water. Treat the sample of yarn and fabric in the above solution in cold. Note the change.

**Consolidation**

The teacher consolidates that the Aluminium salt is taken up by the yarn and fabric.

**Product :-** Subject diary

**Activity-III**

Name	Dyeing with Alizarine
------	-----------------------

- Activity Demonstration
- Materials Alizarine powder, Acetic acid , mordanted samples of yarn and fabric.
- Process Divide the pupil into six groups.  
 Instruct each group to take some Alizarine powder.  
 Dissolve the Alizarine powder in water  
 Prepare the dye bath with the addition of water, acetic acid and Alizarine solution.  
 Treat the sample of woolen yarn and fabric in the dye bath.  
 Wash the specimen.  
 Note the change.

### Consolidation

The teacher consolidates that the woollen yarn and fabric acquire a red colour.

Product

Subject diary, dyed sample.

### Activity-IV

- Name Mineral Khaki
- Activity Demonstration
- Materials Cotton yarn and fabric, Ferric salt, Chromium salt, Sodium hydroxide.
- Process Divide the pupil into six groups.  
 Instruct each group to take a little of chromium salt and iron salt.  
 Dissolve the Chromium and iron salt separately and added to dye bath.  
 Treat the samples of yarn and fabric separately in warm dye bath.  
 Squeeze the treated samples.  
 Prepare the developing bath with water and sodium hydroxide.  
 Treat the squeezed sample in the developing bath in cold.  
 Soap boil to remove surface colour.  
 Washing.

### Consolidation

The teacher consolidates that the samples of fabric acquire a khaki colour.

Product

Subject diary, samples of dyed fabric and yarn.

**UNIT-III**  
**MORDANT AND MINERAL COLOURS**  
**UNIT ANALYSIS**

Sl. No	Curriculum Objectives	Learning Concepts	Process Skills	Activities	Learning Materials	Pro
1	<ul style="list-style-type: none"> <li>Know the method of production and properties of mordant and mineral colours through demonstration</li> </ul>	<ul style="list-style-type: none"> <li>Properties of mordant colours</li> <li>Properties of mineral colours</li> <li>Production of mordant colours</li> <li>Production of mineral colours.</li> </ul>	<ul style="list-style-type: none"> <li>Participation</li> <li>Identifying</li> <li>Handling of minerals and equipments effectively</li> <li>Communicating</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration</li> </ul>	<ul style="list-style-type: none"> <li>Mordant dye</li> <li>Chemicals for mineral colours</li> <li>Woollen yarn</li> <li>Cotton yarn</li> </ul>	

**UNIT – IV**

**AZOIC DYES**

**INTRODUCTION**

Production of these colours involve two stages of application, namely, naphtholation and coupling with diazotised base. Different fast and bright colours are produced mainly on cotton with these dyes. The learners acquire the idea of application of naphthol and base on cotton to produce different colours.

**Curriculum objectives**

Familiarize the production of different Azoic colour by using suitable naphthols and diazolyzed bases through Demonstration and Experimentation.

## Syllabus

Properties, method of application on cotton, selection of combinations of naphthols and base for different colours, dissolving naphthol, diazotizing base, padding, developing, after treatments .

### Pre – requisites

The learners should be aware of the colouring technique of cotton fabric and yarn. They should have a general idea about the naphthols and bases.

#### Activity- I

Name : Solubility of Naphthols  
 Activity : Demonstration  
 Materials : Naphthols, Na OH + water

Process :

- ❖ Divide the students into 6 groups
- ❖ Instruct each group to take a small quantity of naphthol and add water.
- ❖ Try to dissolve
- ❖ Heat the solution
- ❖ Instruct to add Na OH
- ❖ Note the solubility of Naphthol

#### Consolidation

Teacher consolidates that the Naphthols are insoluble in water but their sodium salts are soluble in water.

**Product :-** Subject diary

#### Activity II

Name : Solubility of Bases  
 Activity : Demonstration  
 Materials : Base, Na NO<sub>2</sub>, Hcl

#### Process

- ❖ Divide the students into 6 groups
- ❖ Instruct each group to take a little quantity of base.
- ❖ Try to dissolve the base in water
- ❖ Note the solubility
- ❖ Instruct them to diazotise the base with Hcl + Na NO<sub>2</sub>
- ❖ Note the solubility of base.

**Consolidation**

Teacher consolidates that the bases are insoluble in water.

To dissolved add Na NO<sub>2</sub> + Hcl.

Product :- Subject diary

**Activity III**

Name : Application of azoic dyes on cotton

Activity : Experimentation

Materials : Naphthols, Na OH water

Bases, Na NO<sub>2</sub>, Hcl, sod: acetat

Alu: Sulphate

Cotton yarn

**Process:** Dissolving Naphthols

Dissolving Bases

Shade –deep

Padding

Developing

Washing

Instruct to note the procedure

**Consolidations**

- Shade – Deep
- Dissolving the Naphthol
  - a. Naphthols
  - b. Na OH
  - c. Water
- 2. Dissolving the base.
  - a. Base
  - b. NaNO<sub>2</sub>
  - c. Hcl
- 3. Preparation of the padding bath
  1. Naphthol solution
- d. Temperature cold bath- preparation of the developing bath
  1. Base solution
  2. Sod. Acetate
  3. Al Sulphate- Alkali binding agent- Temperature cold bath
  4. Padding with Naphthol solution
  5. Developing the padded yarn in the diazotised base solution
  6. After treatment – soap solution- to give brightness of the colour

**Product :** Subject diary, Dyed sample

**UNIT-V****INTRODUCTION TO TEXTILE PRINTING****Introduction**

On completion of this unit, the students will be able to understand the difference between dyeing and printing, various ingredients used for the preparation of printing paste and the pre-treatments required for textile materials

**Curriculum objectives**

Differentiate dyeing and printing, preparation of various textile materials for printing and developing an idea about the ingredients required for the preparation of the printing paste by discussion and observations

**Syllabus**

Textile printing, difference between dyeing and printing, preparation of cloth for printing- singeing, desizing, scouring and bleaching. Ingredients used for printing, their functions thickeners, dissolving agents. Classification and properties of thickeners like gum Arabic, gum tragacanth and starches.

**Pre-requisites**

A clear understanding of various types printing like letter printing practised by news papers, computer printing, type writing, stamping, tattoos etc.

**Activity-I**

Name : Printing

Activity : Discussion

Materials : New papers, photos-colour and black and white type  
written documents, computer print, out printed fabrics etc.

**Process** :

- ❖ Give a brief introduction to various types of printing including textile printing
- ❖ Distribute the materials to the students
- ❖ Ask the students to identify the type of prints in the distributed the material
- ❖ Allow about 5 minutes for this exercise
- ❖ Discuss the following  
Letter printing  
Photo printing  
Type writing

Banner writing and printing

Computer printing

Fabric painting

Fabric printing / textile printing

- ❖ Students to discuss similarities and dissimilarities of the above types of printing and note the points
- ❖ Students are asked to differentiate textile printing from other types of printing and note the points.

**Consolidation:** The teacher differentiates dyeing and textile printing

### Activity-II

Name : Textile Printing

Activity : Observation

Materials : Fabrics of cotton, silk,. Polyester, rayons etc. various groups of dyestuffs, starches, oils, hygroscopic agents, antiseptics, thickening agent etc

process :

- ❖ Exhibit the various types of fabrics
- ❖ Ask the students to identify the improving present in each types of fabrics
- ❖ Ask them to prepare a chart showing various types of impurities present in each type of materials and suggest various pre-treatments required to remove the impurities already studied in the 1<sup>st</sup> year classes
- ❖ Then exhibit the various ingredients required to prepare printing paste
- ❖ Familiarize with the various ingredients
- ❖ Classify and name the ingredients
- ❖ Make the students be aware of properties of ingredients
- ❖ Developing an understanding of method of preparation of printing paste for various groups of dyestuffs

**Consolidation** : The teacher consolidates the impurities presents in various textile fabrics and the treatments required for each material before printing various ingredients used for the preparation of printing paste are

I Dyes and assistants

II Adhesive

III Softeners

IV Hygroscopic substance

V Dissolving agents

**UNIT-V INTRODUCTION TO TEXTILE PRINTING**

**UNIT ANALYSIS**

Sl. No	Curriculum objectives	Learning concepts	Process skills	Activities	Learning materials	Products
1	Differentiate between dyeing and printing preparation of various textile materials for printing and developing an idea about the ingredients required for the preparation of printing paste by discussion and observation	*definition of printing *pretreatments required *ingredients for printing *properties of ingredients *preparation of printing paste *recipes	*observing *identifying *experiencing	*discussion *observation	*samples of clothes *ingredients *news paper *photos *type written documents *computer printers *printed fabrics *banners etc.	*subject di

**UNIT-VI**  
**METHODS OF PRINTING**

**Introduction**

The unit covers the different methods of printing like hand block, stencil, screen, roller and transfer printing. The students will get a clear idea of transferring designs on textile materials using different types of printing machines

**Curriculum objectives**

Understand various methods of printing machines used for printing through discussion, and field visits

**Syllabus**

Methods of printing hand block printing preparation of blocks, printing table, printing pad, printing method. Stencil printing-cutting the stencil. Aerograph printing. Screen printing different methods for the preparation of screens direct painting methods, pro film method, resist method photographic method, method of printing- roller printing-single colour, multi colour and duplex printing machines. Transfer printing principles, method of printing



**UNIT-VI**  
**Pre-requisites**

The learner should have a clear idea of textile printing, equipments, ingredients and repairs

**Activity-I**

Name : Methods of printing

Activity : discussion

Materials : Hand block, stencil, spray gun, screen , squeegees, materials for preparation of screens, provision to setup dark room, pre-treated fabrics and various types of printed fabrics

**Process** :

- ❖ Give a brief introduction to various methods of printing
- ❖ Display the materials
- ❖ Students are asked to discuss the various methods of printing based on the printed samples
- ❖ Try to identify the various type of prints
- ❖ Students are asked to differentiate the students of designing in different samples and note the points

**Consolidation** : The teacher consolidates the various methods of printing like

I Hand block printing

II stencil printing

III screen printing

IV machines printing

!. Single colour, multi colour, duplex colour

Product : Subject diary

**Activity-II**

Name : Method of printing

Activity : Field visit

process :

- ❖ Planning
- ❖ Data collection
- ❖ Consolidation of data and analysis
- ❖ Drawing
- ❖ As a part of the field visit the students are asked to prepare a brief report consisting of the details of machinery and equipments required for textile printing unit, especially in the field of block, stencil and screen printing

**Consolidation** : The teacher consolidates various aspects of printing

Product : Report of field visit

**UNIT-VI**  
**METHODS OF PRINTING**  
**UNIT ANALYSIS**

Sl. No	Curriculum objectives	Learning concepts	Process skills	Activities	Learning materials	Products
1	Understand methods various printing and machines used printing through discussion and field visits	*methods of printing *hand block printing *stencil printing *screen printing *machine printing *preparation of screens *setting of dark room	*participation *identification *comparison *discussion *chart forming	*discussion *field visit	*charts *drawings *text books *equipments related to textile printing	*subject di *report o visit

**UNIT-VII**  
**STYLES OF PRINTING**

**Introduction:**

Styles denote for the manner by which a particular colour is applied. The learners will be able to understand the various styles of printing like direct, dyed, discharge, resist, crepons, azoic and metal printing styles

**Curriculum objectives**

Know the various of printing for the application of printing paste by discussion and experimentation

**Syllabus**

Styles of printing-direct style, dyed style, discharge style, resist style, batik printing, tie and dye, azoic style, crepon style, metal printing style

**UNIT-VII****PRE REQUISITES**

The learner should have a basic idea about various methods of printing

**Activity-I**

Name : Styles of printing

Activity : discussion

Materials : Samples of fabrics printed in different styles

process :

- ❖ Give a brief outline on the various styles of printing
- ❖ Display the sample fabric printed using various styles
- ❖ Ask the students to identify the style employed in printing each of the above samples
- ❖ Try to identify the various type of prints
- ❖ The students to discuss the similarities and differences between various styles of printing
- ❖ The students to discuss the merits and demerits of each style of printing

Consolidation : The teacher differentiates different styles of printing

Product : Report

**Activity-II**

Name : Direct styles of printing

Activity : Experimentation

Materials : Water soluble dye stuff and other ingredients for the printing paste, pre treated cloth, hand blocks

process :

- ❖ Divide the students into 6 groups
- ❖ Ask each group to prepare the printing paste using dye stuff and other ingredients
- ❖ Prepare the hand block, printing table
- ❖ Spread the fabric on the printing table
- ❖ Make impression of the printing block on the fabric with the aid of printing paste
- ❖ The colour to be fixed on the fabric by suitable after treatments
- ❖ Washing
- ❖ drying

Consolidation : The teacher consolidates the methods of producing patterns on the fabric using direct style

Product : Report, samples

**Activity-III**

Name : Dyed style

Activity : Experiments

Materials : Basic dye, mordant, fixing agent and their ingredients, pre-treated fabric

Process :

- ❖ Divide the students into 6 groups
- ❖ Ask each group to prepare a paste of mordant gum and water
- ❖ Print the mordant on the fabric by using hand block
- ❖ Fix the mordant by treating in a solution of the fixing agent
- ❖ Prepare a solution of the basic dye using suitable solvent and assistants
- ❖ Dye the above sample of fabric in the dye bath
- ❖ Washing
- ❖ Drying

Consolidation : The teacher consolidates the method of printing using dyed style

Product : Report, samples of printed fabric

**Activity-IV**

Name : Discharge style

Activity : Experimentation

Materials : Direct dyed sample of fabric discharging agent and other ingredients, hand block

process :

- ❖ Divide the students into 6 groups
- ❖ Ask each group to prepare the printing paste using discharging agent and other ingredients
- ❖ Prepare the hand block, printing table and the printing pad
- ❖ Spread the direct dyed fabric on the printing table
- ❖ Print the discharging agent on the direct dyed fabric using hand block
- ❖ Washing
- ❖ drying

Consolidation : The teacher consolidates that the pattern is produced on the dyed fabric by removing the dye from the dyed ground by printing with the discharging agent. The colour is removed only from portion where the discharging agent is applied

Product : Report, samples of printed fabrics

**Activity-V**

Name : Resist style of printing

Activity : Experimentation

Materials : pretreated fabrics, direct dyestuff and assistants, wax coated thread  
 process :

- ❖ Divide the students into 6 groups
- ❖ Ask the students to prepare a solution of the direct dye using necessary assistants
- ❖ Prepare the dye solution by adding suitable amount of water and other assistants to the dye solution
- ❖ Tie the fabric sample with waxed thread at different places tightly so as to prevent the dye solution entering into the fabric where the dye is applied
- ❖ Dye the tied fabric in the dye bath, in hot condition
- ❖ Wash the dyed sample
- ❖ Remove the wax from the fabric
- ❖ Drying

Consolidation : The teacher consolidates that pattern are produced on the fabric by the absence of dye at places where the dyeing is resisted by tying with waxed thread

Product : Report, samples of resist printed fabrics

### Activity-VI

Name : Azoic style of printing

Activity : Experimentation

Materials : Naphthol, base, assistants for naphthol and base. Pre treated fabric, printing block

process :

- ❖ Divide the students into 6 groups
- ❖ Prepare a paste of the naphthol for printing
- ❖ Prepare the diazolised solution of the base using necessary assistants
- ❖ Prepare the developing bath
- ❖ Print the naphthol on the pre treated fabric using a hand block
- ❖ Dry the fabric in shade
- ❖ Develop the naphthol printed fabric in the developing bath
- ❖ Washing
- ❖ Soap boiling
- ❖ Washing
- ❖ drying

Consolidation : The teacher consolidates that the pattern is obtained by the presence of colour only in regions where the fabric was printed with naphthol

Product : Report, samples of fabrics

**UNIT-VII**  
**STYLES OF PRINTING**

**UNIT ANALYSIS**

Sl. No	Curriculum objectives	Learning concepts	Process skills	Activities	Learning materials	Products
1	Know the various styles for the application of printing paste by discussion and experimentation	*Styles of printing definition *Different styles of printing *Production of designers using various styles	*observing *Participation *Inference	*discussion *observation	*Printed cloth samples *Hand block *Screens *Stencil *Spray gun *Printing pastes *Chemicals	*Subject d *Printed sa

**UNIT – VIII**  
**RECIPES FOR PRINING AND AFTERTREATMENTS**

**INTRODUCTION**

This unit deals with the printing paste preparation using different groups of colours and various ingredients. Fixation of colour after printing requires various after treatments. The students will be able to prepare different printing paste and fix the colour after printing by suitable after treatments on completion of this unit.

**Curriculum objectives**

Understand the preparation of various recipes for different colour and materials and the object of after treatments through demonstration and group work.

## Syllabus

Recipe for printing with Direct, Basic, Acid, Reactive, Sulphur, Vat, Solubilized Vat on Cotton, Wool and silk. Azoic colour, Pigments. Printing with dispersed colours on Terylene, Nylon and Acetate Rayon. Discharge Pattern on Direct dyed ground, Vat dyed group, Naphthol dyed ground. Batik printing with Reactive and Azoic colours. Tie and Dyeing with all colours on cotton, wool, silk, Nylon, Terylene and Acetate Rayon. After treatment- steaming, batch wise ageing, Continuous ageing, Soaping, washing, clearing by passing through bleaching powder solution washing.

## Pre – requisites

A clear understanding of Textile printing, methods of printing, styles of printing, Ingredients for printing paste, printing machinery and chemicals required for after treatment .

## Activity – I

**Name : Recipes for printing**

**Activity : Demonstration**

**Materials : Various ingredients for printing paste.**

**Process**

- Through reference students are asked to find out suitable recipes to prepare printing paste for various types of fabrics using different group of dyestuffs.
- Students are asked to prepare sample printing pates using suitable ingredients for various types of fabrics as per the recipe.
- Group assignment: make a booklet of recipes of printing paste for various styles, methods and group of dyestuffs.
- Field trips to printing industries to observe and understand more about the preparation of printing paste and method and styles of printing.

## Consolidation

### Sample Recipe

- |    |   |
|----|---|
| 1. | Direct dye printing                       |
| a) | Dyestuff – 5 parts                        |
| b) | Urea or Glycerin – 5 parts                |
| c) | Nacl – 5 parts                            |
| d) | Na <sub>2</sub> Co <sub>3</sub> – 2 parts |
| e) | Thickening agent – 40                     |
|    | parts                                     |
| f) | Hot water – 43 parts                      |

Product : Booklet

### Activity- II

Name : After treatment given to printed materials.

Activity : Group work

Process

- ❖ **Group work -** A group of students are given an assignment of preparing a chart of after treatments given to materials printed with different group of dyestuffs
- ❖ Field trips to printing industries are conducted to observe and understand more about after treatments

### Consolidation -

Fabric printed with different group of dyes required different after treatments like steaming, curing, developing with chemicals, ALL printed fabric require steaming for the fixation of colour.

### Product – Assignment

## UNIT VIII

### RECIPES FOR PRINTING AND AFTER TREATMENTS

#### UNIT ANALYSIS

Sl. No.	Curriculum objective	Learning concepts	Process skills	Activities	Learning Materials	Products
1	Understand the preparation of various recipes for different colours and materials and the objects of after treatments through demonstration and group work.	<ul style="list-style-type: none"> <li>❖ Meaning of recipe</li> <li>❖ Objects of after treatments</li> <li>❖ Different after treatments</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observation</li> <li>❖ Participation</li> <li>❖ Identification</li> </ul>	<ul style="list-style-type: none"> <li>❖ Demonstration</li> <li>❖ Group work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Various ingredients to prepare printing paste</li> </ul>	<ul style="list-style-type: none"> <li>❖ Booklet</li> <li>❖ Assignment</li> </ul>



## UNIT – IX

### INTRODUCTION TO TEXTILE FINISHING

#### INTRODUCTION

Finishing is the last stage of Textile processing which gives the required attractiveness and other desirable properties to a textile material according to the requirement and include water proofing, water repellency, fire proofing, moth proofing, calendering, sanforising, antcreasing etc. The learners will acquire sufficient knowledge about the objects of various types of finishes.

#### Curriculum objectives

Identify and classify the different of finishes required for different classes of Textile materials by discussion and field visit.

#### Syllabus

Objects , Classification – physical and Chemical- Temporary and permanent. Types of finishes- pure finish, assisted finish, stiffened finish, Ingredients used in finishing- filling materials, adhesives, softeners, deliquescent substances, antiseptics, whitening agents. Starches – wheat starch, Rice starch, potato starch, Tapioca starch, soluble starches – properties. Preparation of finishing mixture, detailed study of water proofing, water repellency, fire proofing and moth proofing

UNIT – 9

#### Pre- requisites

- ❖ The students should have a general idea about the objects finishing, types of finishes.

#### Activity – I

Name : Textile finishing

Activity : Discussion

Materials : Different samples of finished fabrics and finishing ingredients

**Process**

- ❖ Give a brief outline on the various types of finishes given to textile fabrics
- ❖ Display the different samples of finished fabrics
- ❖ Students to discuss various types of finishes applied in the fabric
- ❖ Try to identify the various finishes applied to the fabrics
- ❖ Students are asked to differentiate various finishes applied on the sample and note the points.

**Consolidation**

The teacher consolidates the various types of finishes as

- (i) Pure finish
- (ii) Assisted finish
- (iii) Stiffened finish

**Product** : Report

**Activity- II**

Name : Methods of Finishing

Activity : Field Visit

Process :

- ❖ Planning
- ❖ Data collection
- ❖ Consolidation of data and analysis.
- ❖ Reporting
- ❖ As the part of the field visit the students are asked to prepare a brief report consisting the details of machinery, equipments and finishing ingredients required for textile finishing

**Consolidation**

*The Teacher consolidation various aspects of Textile finishing*

**Product :Report field visit.**

**UNIT IX**  
**INTRODUCTION TO TEXTILE FINISHING**  
**UNIT ANALYSIS**

Sl. No.	Curriculum objective	Learning concepts	Process skills	Activities	Learning Materials	Products
1	Identify and classify the different types of finishes required for different classes of textile materials by discussion and field visit.	<ul style="list-style-type: none"> <li>❖ Objective of finishing</li> <li>❖ Types fabric</li> <li>❖ Ingredients used in finishing mixture</li> <li>❖ Various types of starches</li> <li>❖ Preparation of finish mixture</li> <li>❖ Water proofing</li> <li>❖ Water repellency</li> <li>❖ Fire proofing</li> <li>❖ Moth proofing</li> </ul>	<ul style="list-style-type: none"> <li>❖ Participation</li> <li>❖ Identifying</li> <li>❖ Observation</li> </ul>	<ul style="list-style-type: none"> <li>❖ Discussion</li> <li>❖ Field Visit</li> </ul>	<ul style="list-style-type: none"> <li>❖ Samples of different finished fabrics</li> <li>❖ Samples of finishing ingredients</li> </ul>	<ul style="list-style-type: none"> <li>❖ Subject diary</li> <li>❖ Report of field visit</li> </ul>

**UNIT – X**  
**FINISHING MACHINERY**

**INTRODUCTION**

For finishing, various types of machines are used like water mangles, damping machine, stenters sanforizing m/c etc. The students will be able to familiarize with the working of various types of finishing machines on completion of this unit.

**Curriculum objectives**

Familiarize various machinery required for Textile finishing through field visits, and group work.

## **Syllabus**

Padding mangles – objects, 2 bowl mangle, 3 bowl mangle, water mangle, washing mangle. Calendaring – objects, 5 bowl calendar, 7 bowl calendar, schreiner calendar, chasing calendar, stenter, sanforization principle, objects and process.

### **Pre-requisites :**

Learners should have a clear idea about the various types of finishing machines.

### **Activity – I**

Name : Finishing machinery

Activity : Field visit

Process:

- ❖ Planning
- ❖ Data Collection
- ❖ Consolidation of data and analysis
- ❖ Drawing inference
- ❖ Reporting
- ❖ As a part of the field visit, the students are asked to prepare a brief report consisting of the details of Textile Finishing machinery.

### **Consolidation**

The teacher consolidates various aspects of Textile finishing and working of finishing machinery.

### **Product**

Subject diary, report of field visit and Diagram of machinery

### **Activity – II**

Name : Finishing machinery

Activity : Group work

Materials : Samples of finished fabrics

### **Process**

- ❖ Divide the students into six groups
- ❖ Instruct each group to observe the samples
- ❖ Instruct the students to list the kind of finish applied to each sample
- ❖ The students discuss the finishing applied on each sample, their objects and how it affects the end use of the fabric and the ingredients required for each finish. The students should also discuss various machinery and equipments required in obtaining the particular finish.
- ❖ The students are asked to list and prepare a chart containing all the aspects concerned with finishing, their objects and advantages.

**Consolidation**

The teacher consolidates the various aspects of finishing and finishing machinery

**Product :**

Subject diary, Chart.

**UNIT – X**  
**FINISHING MACHINERY**

Sl. No.	Curriculum objective	Learning concepts	Process skills	Activities	Learning Materials	Products
1	Familiarise various machinery required for textile finishing through field visit and group work	<ul style="list-style-type: none"> <li>❖ Machineries used for finishing</li> <li>❖ Calendaring</li> <li>❖ Padding mangles.</li> <li>❖ Stenter</li> <li>❖ Sanforization</li> </ul>	<ul style="list-style-type: none"> <li>❖ Participation</li> <li>❖ Observation</li> <li>❖ Inference</li> <li>❖ Identifying</li> </ul>	<ul style="list-style-type: none"> <li>❖ Field visit</li> <li>❖ Group work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Slides</li> <li>❖ Charts</li> <li>❖ Diagram</li> <li>❖ Reference books</li> </ul>	<ul style="list-style-type: none"> <li>❖ Subject diary</li> <li>❖ Report of field visit</li> <li>❖ Diagram of machinery</li> </ul>

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**PART-III**  
**Unit wise Learning Activities**

Section-B (Practical)

Unit	Topic	Page no
1	Application of sulphur dyes on cotton	
2	Vat dyes on cotton	
3	Azoic dyes on cotton	
4	Dispersed dyes on nylon and terylene	
5	Analysis of dyes tuffs	
6	Colour matching	
7	Colour mixing	
8	Preparation of stencil, screen and blocks	
9	Printing with direct, reactive, vat, azoic& dispersed on different fabrics	
10	Batik and tie dyeing	
1	List of books	
2	List of Equipments/Apparatus/Machinery	
3	Sample Questions	

## UNIT-I APPLICATION OF SULPHUR DYES ON COTTON

### INTRODUCTION:

Sulphur dyes are insoluble in water and are dissolved by mixing the dyestuff with sodium sulphide, sodium carbonate and water. They are mainly used for dyeing cotton. After treatments are required to improve light and washing fastness and brilliancy. Tendency to tender is prevented by suitable after treatments. Learners attain skill to produce sulphur colours on cotton.

### CURRICULUM OBJECTIVES

Acquires skills in the method of application of sulphur dyes on cotton

### SYLLABUS

Application of black, blue and brown colour on cotton yarn and cloth with shades ranging from 5% to 20%. After treatment with  $\text{CuSO}_4$  to improve light fastness, with  $\text{K}_2\text{Cr}_2\text{O}_7$  to improve washing fastness, topping with basic dyes to improve brilliancy and with  $\text{H}_2\text{O}_2$ ,  $\text{K}_2\text{Cr}_2\text{O}_7$ , or  $\text{Na}_2\text{CO}_3$  to prevent tendering on storage.

### Pre-requisites:

Learners should have the idea of dissolving sulphur dyes and the method of application and after treatments.

### Activities:

Discussion and demonstration will be held by the teacher. After each experiment, the learners will be evaluated and recorded by the teacher.

1. Application of sulphur dyes on cotton with

- (i) Sulphur Black
- (ii) Sulphur Blue
- (iii) Sulphur Brown
- (iv) After treatment with  $\text{CuSO}_4$
- (v) After treatment with  $\text{K}_2\text{Cr}_2\text{O}_7$
- (vi) Topping with Basic colours
- (vii) After treatment with  $\text{H}_2\text{O}_2$ ,  $\text{K}_2\text{Cr}_2\text{O}_7$ , or  $\text{Na}_2\text{CO}_3$

### Product

Samples, Produced, Procedure and record of work done.

**UNIT-I (PRACTICAL)**  
**APPLICATION OF SULPHUR DYES ON COTTON**

**UNIT ANALYSIS**

Sl.No	Curriculum objectives	Idea/concept	Process skill	Activities	Material required
1	<ul style="list-style-type: none"> <li>Acquire skills in the methods of application of sulphur dyes or cotton</li> </ul>	<ul style="list-style-type: none"> <li>Sulphur dyes, cotton, chemical procedure for application</li> </ul>	<ul style="list-style-type: none"> <li>Observation</li> <li>Experimenting controlling</li> <li>Variables inferring</li> </ul>	<ul style="list-style-type: none"> <li>Practical</li> <li>Recording</li> <li>Presentation</li> <li>Discussion</li> <li>Consolidation</li> </ul>	<ul style="list-style-type: none"> <li>Cotton, Sulphur dyes, <math>\text{Na}_2\text{S}</math>, <math>\text{Na}_2\text{Co}_3</math>, <math>\text{NaCl}</math>, <math>\text{K}_2\text{Cr}_2\text{O}_7</math>, <math>\text{CuSO}_4</math></li> <li><math>\text{CH}_3\text{COOH}</math>, Basic dyes</li> </ul>

**UNIT II**  
**VAT DYES ON COTTON**

**Introduction**

Vat dyes give fast and bright shades. They are insoluble in water and dissolved in a mixture  $\text{Na}_2\text{S}_2\text{O}_4$ ,  $\text{NaOH}$  and hot water. There are different classes of vat dyes, but in practice, only Anthra quinone vat dyes are used. This color can be applied in different methods. The learners experience in dyeing cotton with vat colors.

**CURRICULUM OBJECTIVES**

Familiarizes and practices the procedure of application of vat color on cotton

**Syllabus**

1. Application of vat dyes on cotton –Stages of application dissolving, preparation dye bath, dyeing, oxidation, & washing

**Pre requisites:**

The learner should be aware of the method of dissolving vat dyes, Preparation of dye bath, dyeing and the necessity for oxidation.

**Activities:**

Preliminary discussion and demonstration will be held by the teacher. Experiments done by learner will consolidated and recorded after each experiment, learner practice the application vat dyes on cotton with

- (i) Yellow
- (ii) Orange
- (iii) Red
- (iv) Blue
- (v) Green
- (vi) Violet
- (vii) Brown
- (viii) Pink
- (ix) Khaki



(x) Black

All the above dyes are to be colored to a depth ranging from 0.5 to 5% except black. Black is colored in the range of 5 to 15%

Product

1. Record, dyed samples, Procedure.

### UNIT –II –VAT DYES ON COTTON (PRACTICAL)

#### UNIT ANALYSIS

SL NO	CURRICULUM OBJECTIVES	IDEAS OR CONCEPT	PROCESS SKILLS	ACTIVITIES	MATERIALS REQUIRED	P
1	<ul style="list-style-type: none"> <li>Familiarize and practices the procedure of application of vat color on cotton</li> </ul>	<ul style="list-style-type: none"> <li>Method of dissolving and application on cotton</li> </ul>	<ul style="list-style-type: none"> <li>Observing, experimenting, communicating, measuring, inferring</li> </ul>	<ul style="list-style-type: none"> <li>Practice, recording, presenting, discussing, consolidation</li> </ul>	<ul style="list-style-type: none"> <li>Cotton</li> <li>Vat dyes</li> <li>Assistants required</li> <li><math>\text{Na}_2\text{S}_2\text{O}_4</math></li> <li>Na OH</li> </ul>	

### UNIT III

#### AZOIC DYES ON COTTON

##### Introduction:

These are not ready made colors. A color has to be produced by the dyer or printer as and when it is required by using naphthols and diazotised bases. It is possible to produce different colors by changing the naphthols and bases and is mainly applied on cotton. Important colors are different types of yellow, red, and brown. The learner gets experience in producing different colors on cotton using suitable naphthol and bases.

##### Curriculum objectives:

Knowledge and skill are acquired for the production of azoic color on cotton.

##### SYLLABUS

Selection of suitable naphthol and base for producing a particular color.

Methods of dissolving naphthol - application on cotton. Bases- method of diazotisation coupling the naphthol treated material with diazotised base solution. After treatment with boiling soap solution to improve rubbing fastness

##### PRE REQUISITES

Learner should be aware of the principle of production of azoic dyes- procedure for the application of naphthol and the diazotised base solution Necessity for after treatment.

##### ACTIVITIES:

Discussion and demonstration will be held by the teacher. Experiment done by the learner will be consolidated and recorded after each experiment.

Learners practice the identification of suitable naphthols and bases to produce a particular color

1. Dissolving naphthol
2. Application on cotton.
3. Diazotisation of base.
4. Coupling
5. After treatment and
6. Washing with following
  - a) Naphthol ASG
  - b) Naphthol AS
  - c) Naphthol ASTR
  - d) Naphthol ASBR

And coupling with

- a) Fast Yellow GC Base
- b) Fast Orange GC Base
- c) Fast Red TR Base
- d) Fast Bordeaux GP Base
- e) Fast Garnet GBC Base
- f) Fast Red RC Base

**Product:**

Procedure, record and dyed samples.

### Unit Analysis

Curriculum objectives	Ideas/ concept	Process skill	Activities	Material required	Product	Evaluation
Knowledge and skill are acquired for the production of azoic color on cotton.	<ul style="list-style-type: none"> <li>• Dissolving naphthol</li> <li>• Application on cotton.</li> <li>• Diazotising of base.</li> <li>• Coupling</li> <li>• After treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Observing, experimenting, measuring, inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Practical, recording, presentation, discussion, consolidation</li> </ul>	<ul style="list-style-type: none"> <li>• Cotton</li> <li>• Naphthol</li> <li>• Bases</li> <li>• NaOH</li> <li>• NaNO<sub>2</sub></li> <li>• HCl</li> <li>• Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub></li> <li>• CHCOONa</li> </ul>	<ul style="list-style-type: none"> <li>• Colored</li> <li>• Samples</li> <li>• Record</li> </ul>	<ul style="list-style-type: none"> <li>• Quality of samples</li> <li>• Record</li> </ul>

## UNIT IV DISPERSED DYES ON NYLON AND TERYLENE

### INTRODUCTION

Dispersed colors are used for coloring hydrophobic fibres like nylon, Terylene and acetate rayon. They are manufactured in a dispersed form and further dispersion is done in the dye bath with the help of a suitable dispersing agent.

It is possible to color a material either at high temperature ranging from 130 to 140 Degree Celsius or at a low temperature of 90 degree Celsius with the help of dye assistant called as carriers. Fast colors are produced with these dyes. The learner acquires skill to color hydrophobic fibres with dispersed dyes on completion of this activity.

### **CURRICULUM OBJECTIVES**

Practices the procedure for the application of dispersed dyes on nylon and Terylene.

### **SYLLABUS**

Application of dispersed color on nylon, Terylene and acetate rayon with the help of carriers at low temperature and at high temperature without the help of carriers.

### **PRE\_REQUISITES;**

The learners should have the idea of the properties of hydrophobic fibres like nylon, Terylene and acetate rayon. They should have the knowledge of the methods of application of dispersed colors.

### **ACTIVITIES**

The knowledge and skill of the students will be evaluated by the teacher at the end of each experiment and will be consolidated and recorded. Learners practice the application of dispersed dyes with carrier and without carrier with the following dyes on nylon and Terylene.

- a) Dispersal Yellow
- b) Dispersal Orange
- c) Dispersal Red
- d) Dispersal Blue
- e) Dispersal Green
- f) Dispersal Violet
- g) Dispersal Black

Product

Colored samples, procedure and record

**UNIT IV (PRACTICAL)**  
**DISPERSED DYES ON NYLON AND TERYLENE**  
**Unit Analysis**

Sl no	Curriculum objectives	Ideas/ concept	Process skill	Activities	Material required	Pr
1.	<ul style="list-style-type: none"> <li>Practices the procedure for the application of dispersed dyes on nylon and terylene</li> </ul>	<ul style="list-style-type: none"> <li>Method of application of dispersed dyes on nylon and terylene</li> </ul>	<ul style="list-style-type: none"> <li>Observation, experimentation, communication, inferring</li> </ul>	<ul style="list-style-type: none"> <li>Practical, record, presentation, discussion, consolidation</li> </ul>	<ul style="list-style-type: none"> <li>Dispersed dyes</li> <li>Dispersing Agent</li> <li>Nylon</li> <li>Terylene</li> </ul>	

**UNIT V**  
**ANALYSIS OF DYE STUFFS**

**INTRODUCTION**

Different groups of colors are used for coloring different textile materials. A particular textile material can be colored with different groups of colors. Therefore, when colored material is given for reproduction, it is necessary to identify the group of color by which it is dyed. Analysis of dye stuff is necessary to identify the group of color applied on a material. The learners acquire knowledge in identifying the group of color applied on a material after the completion of this activity.

**CURRICULUM OBJECTIVES**

Analyses and identifies the soluble/insoluble group of dyes.

**SYLLABUS**

Samples of dyes belonging to direct acid, basic, sulphur, vat, reactive and dispersed group are to be analysed. Textile materials colored with the above groups are also analyzed to find out the group of color applied on it.

**PRE-REQUISITIES**

The student should be aware of the properties of different groups of colors with regard to their ability to color different fibres and their solubility

**ACTIVITES**

The learner should analyze the following colors in powder form

- 1 Direct
- 2 Acid
- 3 Basic
- 4 Vat
- 5 Sulphur
- 6 Dispersed
- 7 Reactive

Colored samples of different textile materials dyed with different groups of color as mentioned below should be given for the analysis of dyes.

1. Cotton dyed with direct dyestuff
2. Wool dyed with direct dyestuff
3. Silk dyed with direct dyestuff
4. Cotton dyed with reactive dyestuff
5. Wool dyed with reactive dyestuff
6. Silk dyed with reactive dyestuff
7. Cotton dyed with vat dyestuff
8. Cotton dyed sulphur dyestuff
9. Wool dyed with acid dyestuff
10. Silk dyed with acid dyestuff
11. Wool dyed with basic dyestuff
12. Silk dyed with basic dyestuff
13. Nylon and Terylene dyed with dispersed dyes.

**Product**

Analyzed samples, procedure and record

**UNIT V (PRACTICAL)**  
**ANALYSIS OF DYESTUFFS**  
**Unit Analysis**

Sl no	Curriculum objectives	Ideas/ concept	Process skill	Activities	Material required
1.	<ul style="list-style-type: none"> <li>Analysis and identifies the soluble/in soluble group of dyes</li> </ul>	<ul style="list-style-type: none"> <li>Properties of different groups of colors, direct, acid, basic, sulphur, vat, reactive, dispersed dyes</li> </ul>	<ul style="list-style-type: none"> <li>Observation experimentation, measuring, inferring</li> </ul>	<ul style="list-style-type: none"> <li>Practical, procedure, record, discussion, consolidation</li> </ul>	<ul style="list-style-type: none"> <li>Cotton, wool, silk, nylon, terylene, direct dye, acid dye, basic dye, reactive dye, sulphur dye, vat dye, dispersed dye</li> </ul>

## UNIT- 6 COLOUR MATCHING

### **Introduction.**

When it is required to reproduce a color given from a coloured sample, it is necessary to identify the group of color present on the material. The group/ groups of color and the percentage of shade are found out by coloring identical samples with suitable groups of color to the same depth of shade. The learners acquire skill to match a given colored sample with the suitable group of dyes stuff to the correct depth of shade on completion of this activity.

### **Curriculum objectives.**

Skill is achieved by matching different colored sample.

### **Syllabus**

Colored samples of different textile materials with different groups of colors are given for matching.

### **Pre- requisites.**

Students should have the knowledge of the properties of different groups of colors including their affinity towards different textile fibers.

### **Activities**

The teacher will hold demonstration and discussion on matching colored samples of different origins dyed with different groups of colors. At the end of the activity, the learners will be evaluated by the exactness of matching and the record of work done. Learners are given the following samples, dyed with different groups of colors like.

- I. Cotton colored with direct, sulphur, vat, reactive and azoic dyes with varying percentage of shades.
- II. Silk colored with direct, acid, basic and reactive dyes.
- III. Wool colored with direct, acid, basic and reactive dyes.
- IV. Nylon and terylene colored with dispersed dyes

### **Products:**

Procedure, record and matched samples

**UNIT- 6**  
**(PRACTICAL) COLOR MATCHING**

UNIT ANALYSIS

Curriculum objective	Idea/ concepts	Process skills	Activities	Materials required	Products	Evaluation
Skill is achieved by matching different colored samples	Properties of different fibres and dyes stuff	<ul style="list-style-type: none"> <li>• Skill to observe</li> <li>• Experimenting</li> <li>• Communication</li> <li>• Controlling variables</li> <li>• Recording</li> <li>• Inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Practice</li> <li>• Record</li> <li>• Presentation</li> <li>• Discussion</li> <li>• Consolidation</li> </ul>	<ul style="list-style-type: none"> <li>• Colored samples of cotton, wool, Silk, Nylon and Terylene</li> <li>• Dye stuffs of direct, acid, basic, sulphur, vat, azoic dispersed</li> <li>• Assisting chemicals for the above groups.</li> </ul>	<ul style="list-style-type: none"> <li>• Matched sample</li> <li>• Record</li> </ul>	<ul style="list-style-type: none"> <li>• Exactness of matching</li> <li>• Record</li> </ul>

**UNIT- 7**  
**COLOR MIXING**

**Introduction:**

It is possible to produce any color on a textile material by mixing two or three primary colors in suitable proportions. eg. If orange dyestuff is not available, it can be produced by mixing red and yellow primary colors. By varying the proportion in mixing, different depths of colors can be produced.



**Curriculum objective.**

Identifies different colors produced by mixing different dyes.

**Syllabus**

Dyestuffs belonging to all groups are given for mixing. Coloring is done on important textile fibres, cotton, wool, silk, nylon and terylene after preparing the mixed colors.

**Pre- requisites**

The learners should have the ideas of primary, secondary and tertiary colors and the affinity of different groups of colors towards different textile fibres

**Activities**

Discussion and demonstration on color mixing will be held by the teacher on the theory of color mixing. Learners will be evaluated at the end of the activity. Learners are given to produce different colors by mixing two or more dyes to produce a single color on

1. cotton with different direct/ sulphur/ vat/ reactive dyes.
2. Wool with acid/ basic/ reactive dyes
3. Silk with acid/ basic/ reactive dyes
4. Nylon with dispersed dyes.
5. Terylene with dispersed dyes

**Product**

Colored samples produced by mixing different colors, procedure, record.

UNIT – 7  
COLOR MIXING

UNIT ANALYSIS

Sl no	Curriculum objective	Idea/ concepts	Process skills	Activities	Materials required	Products	Evaluation	
1	<ul style="list-style-type: none"> <li>• Identifies different colors produced by mixing different dyes</li> </ul>	<ul style="list-style-type: none"> <li>• Primary, secondary and tertiary colors</li> </ul>	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Experimenting</li> <li>• Measuring</li> <li>• Inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Practicals</li> <li>• Recording</li> <li>• Presentation</li> <li>• Consolidation</li> </ul>	<ul style="list-style-type: none"> <li>• Dyes</li> <li>• Chemicals</li> <li>• Fibers</li> </ul>	<ul style="list-style-type: none"> <li>• Colored</li> <li>• Samples</li> <li>• Record</li> </ul>	<ul style="list-style-type: none"> <li>• Correctness of the color and the depth</li> </ul>	4 F

**UNIT- 8**  
**PREPARATION OF STENCIL, SCREEN AND BLOCKS**

**Introduction**

Textile printing is done with stencil, screen and blocks. This unit deals with the method of preparation of screen, stencil and blocks required for printing. The color paste is applied through the cut outs of stencil and screen. For producing color with blocks it is charged with the printing paste on the raised surface which is further transferred to the fabric.

**Curriculum objectives**

Acquires skills and practice to make stencil, screen and blocks.

**Syllabus**

Preparation of stencil from hard board or metallic sheet, preparation of screen with nylon cloth by wax paper method and photo chemical method. Designing and cutting out designs on wooden blocks.

**Pre- requisites**

Students should have the ability to sketch the designs on paper and cutting out the designs on stencil and block. They should know the method of preparation of screen by wax paper method and photochemical process.

**Activities**

Demonstration and discussion will be held by the teacher for the preparation of stencils, screen and blocks. The ability of learners will be evaluated and recorded. The learners will

1. Prepare stencil patterns on hard boards and metallic sheets.
2. Prepare screens with suitable designs by wax paper and photo chemical process
3. Produce raised patterns on wooden blocks.

**Product**

Stencil, screen and blocks with desired designs.

## UNIT – 8 (PRACTICAL) PREPARATION OF STENCIL, SCREEN & BLOCKS

### UNIT ANALYSIS

Curriculum objectives	Ideas/ concepts	Process skills	Activities	Materials required	Products	Evaluation	T H
Acquires skills, practice to make stencil, screen and blocks	<ul style="list-style-type: none"> <li>Method of cutting design on blocks and stencil</li> <li>Producing design on nylon screen</li> </ul>	<ul style="list-style-type: none"> <li>Ability to draw designs on paper</li> <li>Ability to prepare stencil, screen and blocks</li> </ul>	<ul style="list-style-type: none"> <li>Practice</li> <li>Recording</li> <li>Presentation</li> <li>Consolidation</li> </ul>	<ul style="list-style-type: none"> <li>Hard board</li> <li>Metal sheet</li> <li>Nylon cloth</li> <li>Frame</li> <li>Wooden block</li> <li>Chisel</li> <li>Chemical</li> <li>Wax paper</li> <li>Transparent paper</li> <li>Black ink</li> <li>Lacquer</li> </ul>	Prepared stencil, screen and blocks	Quality of designs record	2

### UNIT- 9

## PRINTING WITH THE DIRECT, REACTIVE, VAT, AZOIC AND DISPERSED DYES ON DIFFERENT FABRICS

### Introduction

Different textile materials like cotton, wool, silk, Nylon, Terylene, Rayons etc are printed with different groups of colors. For printing, a paste is to be prepared with the addition of dye, required assistants, thickening agent and water. The prepared paste is transferred on to the fabric by any one of the methods of printing with the help of stencil/screen /block/roller. The learners attain skill to print various textile materials with different groups of colors.

### Curriculum objective

Practice to print design with direct, reactive, vat, azoic and dispersed colors on cotton, wool, silk, nylon and terylene

### Syllabus.

Preparation of printing paste with 1. Direct 2. Reactive 3. Vat 4. Azoic 5. Dispersed dyes. Printing the above colors on cotton, wool, silk, nylon and Terylene by different methods under different styles. After treatments.

**Pre- requisites.**

The learners should know the method of preparation of printing paste, the different methods and styles of printing. Objects of after treatments and methods.

**Activities**

Demonstration and discussion will be held by the teacher. Learners will be evaluated after each experiment. Following activities are conducted.

1. Preparation of printing paste with
  - a) Direct dye
  - b) Reactive dye
  - c) Vat dye
  - d) Azoic dye
  - e) Dispersed dye
2. Print the above colors on
  - a) Cotton
  - b) Wool
  - c) Silk
  - d) Nylon and
  - e) Terylene
3. Give necessary after treatment according to the method and style of printing

**Product.**

Printed fabrics, procedure, record

**PRACTICAL PRINTING WITH DIRECT, REACTIVE, VAT, AZOIC AND  
DISPERSED DYES ON DIFFERENT FABRICS**

Curriculum objectives	Ideas/ concept	Process skills	Activities	Materials required	Products	Evaluation
Practice to printing design with direct, reactive, vat, azoic and dispersed colors on cotton, wool, silk, nylon and terylene	know the method of preparation of printing paste, with different colors on different fabrics. Objects and method of after treatments	<ul style="list-style-type: none"> <li>• Experiment</li> <li>• Observation</li> <li>• Discussion</li> <li>• Inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Preparation of paste</li> <li>• Printing</li> <li>• Practical</li> <li>• Recording</li> <li>• Consolidation</li> </ul>	<ul style="list-style-type: none"> <li>• Colors</li> <li>• Assistants</li> <li>• Gum</li> <li>• Fabric</li> <li>• Chemical</li> <li>• Facility for after treatment</li> <li>• Equipments for printing</li> </ul>	<ul style="list-style-type: none"> <li>• Printed samples</li> <li>• Record</li> </ul>	<ul style="list-style-type: none"> <li>• Ne of</li> <li>• Re</li> </ul>

## UNIT - X BATIK AND TIE DYING

### Introduction

Patterns resembling prints are produced on textile materials by dyeing it with a suitable colours, provided that the textile materials are given some resists where colour is not required. The resists used is bee wax and paraffin wax for Batiks while threads, twine, clip etc. are used for producing tie dyed fabrics. Give suitable ties or resist by wax application and dye it. Further, the ties are removed, the fabrics gets a printed effect. Learners attain skill to produce batik and tie dyed fabrics.

### curriculum objective.

Finding out the various patterns produced by batik and tie dyeing.

### Syllabus

Textile materials made with different fibres in the form of yarn or fabric are resisted by wax / threads / pins/ clips/ twines etc. Prepare dyebath with different group of colours according to the fibre to be printed. Dyeing – removal of resists or ties- after treatment.

### Pre-requisites

The students should have the idea of producing printed effects by resisting either with wax or mechanical resisting agents. They should also know the methods of application of different colours on different fibres.

### Activities

Demonstration will be held by the teacher and the learners will be evaluated after each experiment. Activities to be done are

- i) Application of a mixture of Bee wax and shellac wax on cotton / wool / silk on certain parts.
- ii) Dye the material with cold brand reactive dyes / Azoic dyes.
- iii) De-waxing to remove the wax.
- iv) Tie different textile materials with threads / twines / clips / pins etc.
- v) Dye the tied fabrics with different groups of colours.
- vi) Removal of ties after dyeing.

### Product :

- Batik and tie dyed samples.
- Record, procedure.

**UNIT – X (PRACTICAL)  
BATIK AND TIE DYEING  
UNIT ANALYSIS**

<i>o</i>	<i>Curriculum objective</i>	<i>Idea/ concepts</i>	<i>Process skills</i>	<i>Activities</i>	<i>Materials required</i>	<i>Products</i>	<i>Evaluation</i>	<i>Time Hrs.</i>
	Finding out the various patterns produced by Batik and Tie Dyeing	Know the methods of resisting textile fabrics with wax, pin, clip, twine, threads etc. Methods of dyeing different fibres with different groups of colours.	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Experiment</li> <li>• Discussion</li> <li>• Inferring</li> </ul>	<ul style="list-style-type: none"> <li>• Recording</li> <li>• Presentation</li> <li>• Discussion</li> <li>• Practical</li> <li>• Consolidation</li> </ul>	<ul style="list-style-type: none"> <li>• Different fabrics.</li> <li>• Different dyes.</li> <li>• Assistants.</li> <li>• Bee wax.</li> <li>• Parafin wax.</li> <li>• Tyeing agents like thread, twine, in clip etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Batik printed fabrics.</li> <li>• Tie-dyed fabrics.</li> <li>• Procedure</li> <li>• Record.</li> </ul>	Printed sample. Record.	20

**PRACTICAL EVALUATION AND VOCATIONAL EVALUATION**

Practical Evaluation	150 scores
Vocational Competency Evaluation	50 scores
Total	200 scores

**SPLIT-UP OF SCORES FOR PRACTICAL EVALUATION**

<i>Indicator</i>	<i>Score</i>
Identification	15
Record	15
Procedure	35
Handling of equipments	10
Observation /Tabulation	30
<i>Interpretation/ Inference</i>	15
Result	15
Viva	15
Total	150

**SPLIT UP OF SCORE FOR VOCATIONAL EVALUATION**

<i>Indicators</i>	<i>Score</i>
Regulating and punctuality	10
Field visit / survey report (anyone)	20
experiment Performance- /camp/exhibition Performance –production cum training center(anyone)	20
Total	50

**LIST OF APPARATUS /EQUIPMENTS/MACHINERY REQUIRED**

<i>Sl No.</i>	<i>Name of equipment/Apparatus/Machinery</i>	<i>Quantity Required Nos.</i>
1	Laboratory model multi colour roller printing machine	1
2	Laboratory model screen printing machine	1
3	Laboratory model Transfer printing machine	1
4	Laboratory model Calendering machine	1
5	Laboratory model Padding mangle	1
6	Laboratory model Dyeing range	1
7	Laboratory model Stenter	1
8	Laboratory model Sanforising machine	1
9	Laboratory model Jet dyeing machine	1
10	Laboratory model Duplex printing machine	1
11	Laboratory model Boiler	1

**TERMINAL EVALUATION****Sample questions****UNIT-I**

1. Sulphur coloured materials are tendering on storage. Give reasons and remedial measures.
2. Washing and light fastness of Sulphur coloured materials are improved by after treatments. Suggest the chemicals required and procedure.
3. Brilliancy of Sulphur colours are improved by topping. Name the dye used for topping and the method of topping.
4. Application of any colour involves different stages. What are the stages for dyeing Sulphur colours? Give a brief account.
5. Sulphur dyes are insoluble in water. It is dissolved by mixing with a reducing agent and alkali. Name these chemicals.

6. Dissolving of vat dye is known as vatting. It is done with help of a strong reducing agent and alkali. What are the chemicals used for this purpose and and give the procedure.
7. After dyeing with any vat colour, it is essential to oxidize the coloured material. Mention the necessity for oxidation.
8. There are three groups of vat colours of which one group is mainly used for producing fast colours. Name the group.
9. Vat dyes can be applied in four different ways. Name the method by which vat dye can be dyed at room temperature.
10. Black dyes of vat group require chemical oxidation after air oxidation suggest the chemicals suitable for this purpose.
11. Give the sequence of operations involved in the application of vat colours on cottons. Write the procedure.
12. Solubilised vat dyes are leuco esters of vat dyes which are soluble in water. Give the different methods to develop this colour.

#### UNIT-II

13. Dispersed dyes are insoluble in water. They are dispersed in the dyebath with a dispersing agent. Name the dispersing agent commonly used for this purpose.
14. There are two methods by which a dispersed dye can be applied on hydrophobic fibers of which one method is by using carriers. What is the function of carriers.
15. Name three hydrophobic fibres.
16. With dispersed dyes, the dyestuff dissolves in fibre. What is the theory of dyeing.
17. Give the procedure for colouring a hydrophobic fibre with dispersed dye.
18. Aniline black is the only oxidized colour produced by oxidation of a chemical. Which is the chemical used for this purpose.
19. Oxidising agents and oxygen carriers are required for the production of oxidized dyes. Give the names of these agents.
20. Oxidised colours can be produced on textile materials in three different methods. Give the procedure for application in these methods.
21. In older dyes cotton umbrella cloth were mainly coloured with an oxidized colour. What was it.

#### UNIT-III

22. Mordant is used when there is no affinity between a fibre and a colour. The function of mordant is to make affinity . Name the dyes and fibres which require mordanting before dyeing.
23. Mordants make affinity between a fibre and colour where there is no affinity. Suggest some mordants.
24. Most of the mordant colours are polygenetic in nature. Give its meaning.
25. The most important colour produced in mordant group is Turkey Red shade. How is it produced . Write the procedure.



26. Logwood black is a mordant colour produced on wool . Give the combination of mordant and mordant colour.
27. Mineral khaki is the most popular colour produced on cotton. It is a combination of two minerals. What are they.
28. Give the method of production of mineral khaki on cotton with a chart.
29. Name the important mineral colours produced in Textile Industries.
30. Chromium yellow colours can be changed to orange by developing. Name the chemical used.

#### **UNIT-IV**

31. The production of azoic colour involves the application of two separate chemicals. Give the principle of production.
32. Naphthols are insoluble in water. How is it dissolved in water.
33. Bases are required for producing a colour with azoic dyes. These are diazotised before application. Give the conditions required for diazotisation.
34. Aluminium sulphate is added in the diazotising bath as an alkali binding agent. Give reason for this addition.
35. Neutralisation of excess acid is possible with the addition of a neutralizing agent in the diazotizing bath. Which chemical is used for this purpose.

#### **UNIT-V**

36. Give the procedure for the application of Nephthol colour on cotton textiles.
37. Differentiate dyeing and printing.
38. Impurities present on textile materials are removed prior to printing. Give the objects of the same and the different treatments.
39. Thickeners are added in the printing paste. What is the function of the thickening agent.
40. Give the properties of important thickeners used in Textile Printing.

#### **UNIT-VI**

41. Hand blocks for printing are made from wood. Give the procedure for cutting the design on blocks.
42. For making banners and large patterns, stencils are made. How aerograph printing is done to make designs with stencils.
43. Screens for printing can be prepared in different ways. Write the procedure for making screen by any one of the methods.
44. There are single, multi and duplex printing machines used for printing textile materials. Sketch and explain the working of any one of them.
45. Transfer printing is done on hydrophobic fibre with dispersed dyes. Sketch amachine suitable for the same and discuss the merits of the same over other types of printing machine.
46. Note the merits and demerits of screen printing machine.

#### **UNIT-VII**

47. The term style denots for a particular performance in textile printing. What is it?
48. You are given a dyed fabric. How is it possible to produce a discharge pattern on it.

49. Apply a fancy pattern on a given cloth by Batik method of printing.
50. Tie and dye a cotton fabric to produce a design on the given fabric with reactive dye.
51. Compare the process of Batik with Tie and dye.
52. Discuss the merits and demerits of different styles of printing.

#### **UNIT-VIII**

53. Prepare a printing recipe for vat dye on cotton.
54. Silk is usually printed with reactive and basic colours. Name the ingredients required for these colours.
55. Terylene and nylon are printed with dispersed colours. Give the recipe for the same.
56. Make a printing paste with acid dyestuff to print on a woollen cloth.
57. Discuss the objects of after treatments of the printed fabrics.
58. Mention the importance of steaming after printing.

#### **UNIT-IX**

59. Discuss the importance of textile finishing.
60. Several ingredients are required for finishing textile materials. Give the functions of each ingredient and the method of preparation.
61. Write the procedure for waterproofing and water repellency.
62. Certain fabrics require fire proofing. Give the procedure for the same.
63. Moth proofing is done on textile fabrics to prevent the formation of moth on storage. How is it done?
64. Compare the properties of different types of starches used in Textile finishing.

#### **UNIT-X**

65. Padding mangle is an important part in textile finishing. Mention its importance.
66. Sketch a water mangle and explain the working.
67. Calenders are of different types to impart different types of finishes. Compare the properties achieved by schreiner and swizzing calenders.
68. Embossed effect is formed with embossing calenders. Show the passage of cloth through the machine.
69. Give some important properties achieved by calendaring.
70. Sanforization is based on a particular principle. Show it with a diagram.
71. Differentiate antcrease and antishrink finishes.
72. Show the passage of cloth through a sanforising range. Give a brief description of working.

## LISTS OF BOOKS

<i>Sl.No.</i>	<i>Title of the Book</i>	<i>Author</i>
1	Technology of Dyeing	V.A. Shenai
2	Technology of Dyeing	Trotman
3	Technology of Printing	V.A. Shenai
4	Technology of Finishing	V.A. Shenai
5	Textile Printing	R.S. Prayag
6	Textile Dyeing	R.S. Prayag
7	Textile Finishing	R.S. Prayag