

VOCATIONAL HIGHER SECONDARY EDUCATION

PRINTING TECHNOLOGY

**TEACHER'S SOURCEBOOK
FIRST YEAR**



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**State Council of
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Vidyabhavan, Poojappura, Thiruvananthapuram-12
Kerala**

*Prepared by State Council of Educational Research and Training (SCERT)
Poojappura, Thiruvananthapuram - 695 012, Kerala.
Website www.scert.kerala.gov.in e-mail scertkerala@asianetindia.com*

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Director

Preface

Dear Teachers,

The Coursebook on Printing Technology developed by SCERT for class XI of Vocational Higher Secondary is specially designed to fulfil the requirements of the new activity-based, learner-centred, interactive curriculum. The Coursebook deals with the different methods to be adopted for making the modern print production techniques easily intelligible to the learners undergoing VHSE in Printing Technology.

The main objectives of this curriculum are to make the learners proficient in the use of different types of machines and equipment richly provided in the modern printing industry and to inspire them with much confidence for further studies in this technological branch, in addition to increasing the scope for communication and interaction through classroom/practical works. The approach envisages the learner as manager of the classroom, the director of tasks and activities; and the teacher as facilitator and resource. Through interaction between learners, between learner and the teacher, and between learner and the text, learning will become a natural and enjoyable process of participation and implementation. There will be total sharing of information.

In this initiative, the role of the teacher is a multifaceted and important one. The teacher is a facilitator, democratic leader, co-learner, partner, guide and a friend.

This Sourcebook forms part of a package that includes Coursebook and a book on Modern Printing Techniques. It is designed to empower the teacher to handle the learner-centred, activity-oriented classrooms and thus, to make learning 'Modern Printing Techniques' a joyous and rewarding experience for the learners.

With regards,

**Thiruvananthapuram
25-11-2005**

**Dr E. Valsala Kumar
Director
SCERT, Kerala**

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I

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 severe 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 to be 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 and 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.

A curriculum for selecting vocational areas according to the aptitude of the students, learning it in depth, acquire general awareness in the basic areas and to secure jobs has become the social need of the day. A learner centred, process

oriented, need based vocational curriculum is envisaged.

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 be able to view education and life with the perspective of social well being.

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 interests
- 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.
-
- To experiment
- To predict
- To recognise and control the variables
 - To raise questions
- To generalise
- To form a hypothesis and check.

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

The *knowledge* domain consists of

- 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 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 sub-groups.*

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 findout new and uncommon uses of objects
- To fantasize
- To dream

- To develop creative isolated thoughts
- **Creativity** is an essential component of process and activities. The element of creativity is involved in finding out problems, formation of hypothesis, finding 'solutions' to problems etc. Through activity oriented learning experiences, opportunities to express creativity can be created.
- 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.

Again, the following factors consisting in the **Attitudinal domain** are also important as;

- 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
- ⑩ The vision, approach, structure and content of the curriculum.
- ⑩ The vision, approach, structure and content of the textbooks.
- ⑩ Role of the teacher and the learner.
- ⑩ Learner atmosphere, learning materials and learning techniques.

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

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

Constructivism

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
- 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 take 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 has 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 is framed in this particular age foreseeing national and international job opportunities. Some of the peculiarities of the learner at this stage are:

- Physical, intellectual an 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.
- Acts as a co- participant
- Observes his environment
- Experiments and realises
- Makes interpretations and draws inferences.

Role of the Teacher

The teacher should;

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 recognise and encourage the peculiar personality of the later adolescent period.
- To enable him to defend against the unfavourable circumstances without any help
- 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 situations to interact in and outside of the classroom.
- guide the students by explanations, demonstrations etc.
- promote opportunity for co-operative learning and collaborative learning.

Role of the Learner

- Active participant in the learning process.
- Acts as a researcher
- Sharer of information
- Sharer of responsibilities
- Collects information
- Takes leadership
- Involves in group work
- facilitate interpersonal and intra-personal interactions.
- act as a democratic leader.
- act as a problem solver
- 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.
- act as a 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 there 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 indications.
- 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 hear 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 our 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.
- Imagining 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.
- Analysing 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
- Coping with emotion
- Coping 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 organised 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 evaluation 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 organised so as the learning provide adequate practical thinking on the opted vocational subject utilising 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)

II

SUBJECT APPROACH

Approach to Learning Printing Technology

I. Introduction

The art of preserving all arts, printing has since the eighties undergone a complete transformation with the application of Electronics, Computers and Microprocessors and advanced science and technology. This technology has developed by incorporating the advancements from other disciplines and adopting the latest technical information from commercial art, photography, applied science, computer, mechanical and electronic engineering etc.

The diversity of language and the multitude of literate population, which is roughly 1000 million, create an ever increasing demand for printed materials in social, cultural, educational, artistic and scientific fields. Achievement of full literacy and higher levels of education mainly depends upon the availability of printed materials in the form of books, journals, magazines, newspapers, research papers, reports and so on. Printed

material is the main media of communication and dissemination of knowledge, but more than this, the medium of print is improving its position in today's multimedia society. The trend is towards approaching target groups directly, faster production, more and more colour and even higher quality. The methods of print production are also changing, in the direction of environmentally compatible, highly automated and easily operated printing systems integrated in a digital data environment. There is a dearth of technical man-power operators, technicians and supervisors with broad based science, engineering background combined with a knowledge of Business Administration to manage modern printing and allied establishments.

Packaging is an integral part of Printing Industry. The printing and packaging industries in India have assumed growing significance during the last decade. This has become a dynamic and key area for manufactures and trading

companies all over the country with the element of aesthetics, hygienic and cost effectiveness receiving increasing importance in commercial operations. The exterior looks and presentability of marketable goods leave a lasting impression on the minds of consumers and in this context packaging occupies the centre stage. New packaging machines and technologies have been introduced to meet the challenges. Today, the Indian Packaging Industry is growing at a rate of 15 – 20 percent per annum.

The printing industry is one of the biggest and fastest growing industries in India. More than one lakh printing presses are in operation all over the country with a capital investment of over Rs. 80,000 million. This industry provides direct and indirect employment to another two million people. It is natural that along-side the growth of literacy, there is a commensurate rise in demand for various inputs for the printing industry.

Training and Manpower Requirements

The Indian Printing Industry today requires trained and technically qualified personnel at the following levels.

1. Operators
2. Technicians
3. Supervisors
4. Managers and Production Executives
5. Sales Executives

6. Machine Manufacturing and Machine Maintenance personnel.

7. Personnel for research and development.

In order to meet the above demands for supplying required manpower to the printing industry, the entire system of printing education in India has lately been restructured and summed-up into three tiers. At the lowest level ie. first - tier, there are I.T.I.s offering certificate courses in the concerned specialised trades of Printing Technology mostly covering the categories (1) and (2) given above. Vocational Higher Secondary courses in printing technology has also been categorised under this group.

The categories (3), (4) and (5) are being covered by the middle level (second tier) Diploma institutions.

The categories (6) and (7) and also category (4) to a certain extent, are being covered by the higher level institutions (third-tier) offering degree in printing technology.

The present syllabus (VHSE) has been designed to produce operators and technicians in the first group as mentioned above.

The computer had entered every aspects of print production and had become the overriding element that guided all changes. Hence, the most current procedures and state-of-the-art materials in each phase of the printing process, fundamentals of computer imaging for graphic

reproduction, automatic page make-up, integration of text and graphics, page display systems, output devices, micro computer applications and desk top systems have been included in the syllabus for study in detail. Much more emphasis has also been given on xerographic, laser and ink-jet printing. The syllabus also covers screen printing, gravure and flexography.

The syllabus has been organized to allow the teachers to focus student attention on the digital and pre-press process, and achieve an overview of all of the major printing processes.

Pre-press imaging – photo composition, colour separation and image assembly – has been up dated to include information on the latest computer technology. On completion of the course on pre-press operations the students will be able to:

1. List the different ways to enter, train and advance in the different levels of the graphic arts industry.
2. Recognise the design considerations of balance, dominance, proportion, and unity and identify the common elements of alphabet design. They will also be able to cast off copies received for printing and understand several manual image generation techniques for art copy.
3. Identify the steps for dealing with photographs on a paste-up and the procedure of working from a rough layout.
4. Understand the three major components in a computer system and how a computer represents information in memory and explain the terms 'dot-matrix', 'bit' and 'pixel'.
5. Describe the methods of providing input to a computer composition system; different types of information storage media used on computer systems; operations performed during editing and during composition; the elements of a typical type setting command, the advantage of automatic page-make-up with text and graphics integration; how laser printers generate images and the difference in resolution between the images generated; composition systems which output the pages directly on to a printing plate, eliminating the need to produce films. In general it is intended to provide a general understanding about how composition systems operate and to describe some of the functions that they can perform. Functions of image scanners in general to be taught.
6. Understand the effect caused by electromagnetic radiation, such as light; sensitivity of films of different types to light, and what happens to the film emulsion during exposure and purpose of chemical baths, developer, stop, fixer and wash – used in processing film.
7. Explain the difference between density,

- contrast and tone, basic ideas of half tones, the necessary concepts of halftone procedure, methods of evaluating halftone negatives.
8. Understand the methods of producing duotones and posterisations.
9. Understand the general methods of making colour separations with special emphasis on electronic scanning.
10. Become proficient in preparing presensitized surface plates and chemistry of processing and properties of coating materials.
11. Understand the various other methods of preparing plates to suit the nature of work on hand.
12. Understand the working principles of offset machines used in the printing industry and their configurations, mechanical features in general.
- To acquire self employment.
 - To enter in Govt. and private industries.
 - To give an awareness of development of printing and make use of it in day-to-day life.
 - Acquire power of observation, experimental skill, knowledge of data analysis and interpretation etc. and the ability to generate knowledge.
 - To understand the latest developments in printing technology, information technology and its applications.
 - To develop creativity, innovative ability and productivity with quality.
 - To develop an ability to classify, store and retrieve information to compare them with new ones.
 - Acquire the ability to solve problems facing in the day-to-day life.
 - To familiarize with the latest development in printing technology.
 - To help for better planning, implementation and control in life.

II. Objectives of Printing Technology Curriculum

- To create interest in printing technology.
- Scientific study of printing technology.
- To provide technically qualified 'blue collar personal' for the printing industry, which is adopting the latest technology.
- To equip the students for higher studies and cope up with the growing demands in the employment markets relating to printing discipline.

1 Knowledge

The knowledge domain includes facts, ideas, principles and theories. Acquisition of knowledge is an important aim of teaching science. The student need to be given instruction for doing activities for developing information and concepts about the surrounding world. The activities

include both physical and mental activities.

2 Processes

Skills needed for solving real life problems are to be developed through science education. Only by involving continuously in processes of scientific enquiry, can these skills be cultivated.

Skills relating to the process domain of science are:

- Observing
- Classifying
- Measuring & Charting
- Communicating and understanding communication of others
- Using number relationships
- Using space-time relationships
- Predicting
- Inferring
- Making operational definition
- Formulating hypothesis
- Identifying & Controlling variables
- Interpreting data
- Experimenting

In this approach we have adopted the process skills acquired through different learning activities and are gradually strengthened. Each learning activity may focus on more than one skill.

The unit analysis makes clear the process skills that are to be emphasised in each chapter.

Observing

Observation is the process of acquiring knowledge through the five senses. Learning experiences which provide the opportunity to use all the five senses may be used.

Classifying

The process of grouping information gained through observation, based on salient features is called classifying. Starting from simple groupings of data, it can extend to the level of classification into minute sub groups. The ability to classify will vary according to the age, maturity and cognitive level of the student.

Using number relationships

This involves the analysis of available data, consolidation and meaningful explanation using the language of mathematics. Learning experiences may provide the opportunity to develop the skills of counting, addition, subtraction, multiplication, division and finding averages.

Measuring & Charting

As part of data collection the student will have to measure quantities such as length, time, mass, temperature, force and density. What instruments are required for this? How can these instruments be used? What is the level of

accuracy expected in measurements? How to record the data? All these are to be considered.

Using Space-time relationships

An in-depth enquiry relating to shape, distance, movement, speed, accuracy, direction and time comes under this area. It begins from identifying the shape, speed, direction and other such features of objects.

Communicating and understanding communication

It is essential that knowledge developed is expressed in different ways - oral and written. The students need opportunities to communicate through tables, graphs, pictures, models, short write-ups, descriptions and lectures and also to take part in debates and discussions. Clarifying doubts by asking appropriate questions is another skill in this area.

Predicting

An inquisitive person attempts to answer the question if..... then? and proceeds to try out the guessed answer. Answer to this question is important in science. The teacher expects the student to predict the outcome of various events and experiments. Students need to develop the skill of predicting by drawing on the knowledge gained through experiments and observations.

Inferring

Observation and data collection are not

important in themselves. Inferences based on them are however, crucial. A proper inference can be drawn only if the student has good skills of analysis. The defects in analysis of data will affect the quality of inference.

Making operational definitions

The meaning of ideas need to be stated precisely and clearly to make them useful. This helps in communication. Operational definitions may be incomplete and temporary. But in given situations they can be logical and practical.

Formulating hypothesis

A hypothesis is a temporary conclusion drawn using insight. A problem can have a number of casual factors and solutions. Based on knowledge and experiences relating to the problem the causes and solutions can be guessed. Such a guess is a hypothesis and need to be tested out and rejected if disproved. Hypothesis which are proved right become conclusions.

Interpreting data

Interpretation of collected data may lead to new ideas and generalizations. Opportunities may be provided for interpreting data and formation of new ideas.

Controlling variables

Variables influence the outcome of experiments. Variables are to be controlled during experiments. For the experiment to be

accurate and scientific the variables are to be effectively controlled.

Experimenting

An experiment is a planned activity to test the validity of hypotheses drawn. Experimentation contains the process skills in an integrated way. It is the main method used by scientists. Formulating methods to test the hypothesis, conducting experiments, recording, interpretation of data and drawing conclusions are included in it.

The duty of the teacher is to help the learner to acquire the method of science in a natural way through learning activities based on simple & complex process skills starting from observation. The students are to be given learning experiences that are learner-centred, process oriented, and environment based and not the conventional content/ product oriented experiences. When this approach is followed along with process skills the student acquires knowledge, facts, ideas, concepts and principles.

In the new approach of curriculum, the student forms ideas and conclusions through processes. Project activities, seminar presentations and experiments enable the student to employ more than one process skill.

3. Attitude

Very often in science learning, scientific facts and processes are given exclusive consideration.

But under the current social situation, values and attitudes need to be emphasised in physics learning. Teaching that does not give adequate emphasis on this domain cannot help to realize the aims of science learning. Don't you think that attitude towards physics (interest in physics, attitude towards physicists, etc.) and scientific attitude in behaviour (honesty, open mind, etc) need to be considered. Some indicators relating to this domain are given below.

- Developing a positive approach to scientific knowledge, science education and to teachers of science.
- Developing confidence in one's abilities.
- Taking appropriate decisions regarding social and environmental issues.
- Experimenting one's thoughts and emotions in a creative way.
- Taking logical decisions regarding personal values.

4. Application of knowledge

Along with acquisition of concepts, process skills and attitudes, the learners need to develop the ability to apply these in new situations and to solve problems. This is the proof of comprehension.

Using a problem-based approach relating to science, technical science and personal life the learner will be able to understand the need to apply knowledge, skills and attitudes.

The components of this domain are given below.

- Using scientific process in solving problems that occur in daily life.
- Applying learnt science concepts and skills to everyday technological problems.
- Seeing instances of scientific concepts in everyday life experiences.
- Understanding scientific and technological principles involved in the household and other common technological devices.
- Decision making related to personal health, nutrition and lifestyle based on knowledge of scientific concepts rather than on hear say or emotions.
- Understanding and evaluating mass media reports on scientific developments
- Integrating physics with other subjects.

5.Creativity

Creativity is an essential component of processes and activities in science. The element of creativity is involved in finding out problems, formation of hypothesis, finding solutions to problems. Through activity oriented learning experiences, opportunities to express creativity can be made available to pupils. Some of the abilities that come under this domain are listed below.

- Visualising-producing mental images
- Divergent thinking
- Using open ended questions
- Generating unusual ideas
- Combining objects and ideas in new ways
- Solving problems and puzzles
- Designing devices and machines
- Multiple modes of communicating results

For example, an activity to build a hydrometer using locally available materials will help the student to exercise creative skills. The hydrometer is an instrument for measuring the relative density of liquids.

III. Theoretical foundations of new approach

The basis of the new curriculum is derived from developments in philosophy, psychology, anthropology and sociology taking place in India and European countries. These developments have helped to make teacher centered learning evolve to student centred learning and to give currency to the idea that learning takes place through social interactions.

The new curriculum gives adequate thrust to the following.

1. Multiple intelligence.
2. Constructivism

3. Emotional Quotient (EQ)

1. Multiple Intelligence

The modern studies on intelligence are especially relevant to science education. The traditional view is that intelligence is hereditary and does not change. Because of this some students are considered to be deficient in logical thinking, mathematical operations and analytical skills and it is believed that such students cannot perform well in science subjects.

Modern theory states that by giving suitable environments and through continued efforts such students can improve the intelligence relating to the specific area. According to the theory of Howard Gardner, human intelligence has different components and all these components are present in all individuals in different proportions. Some components may be prominent in some individuals. All components of intelligence can be developed to certain extent in each individual.

Components of intelligence

1. Verbal/linguistic intelligence

The ability for reading, writing, verbal production, speak and lecture and communicate effectively belong to this type. This type of intelligence can be developed through activities such as report writing, presenting of reports etc.

2. Logical or mathematical intelligence

Abilities like logical thinking and finding out

patterns and relations belong to this component. This type of intelligence is developed through finding correspondences, ordered explanations and mathematical operations.

3. Visual/Spatial intelligence

People with prominently visual/spatial intelligence will be able to design models and execute ideas they have in various forms. Architects, designers and sculptors will be strong in this type of intelligence. Model building making of art materials sculpting, painting and drawing will help this component to develop.

4. Bodily-Kinesthetic Intelligence

This related to the ability to move the body parts. Dancers, actors, sports people and Gymnasts who can move the body aesthetically and express emotions through body movement belong to this category. Activities involving dance, aerobics, sports and games help the development of this type of intelligence.

5. Musical Intelligence

It is believed that this type of intelligence is highly developed in people with the ability to distinguish the different elements in music, performing musicians, people who can hum tunes and those who can appreciate music. Playing musical instruments, singing along with others, keeping rhythm etc. are activities that help the development of this component.

6. Interpersonal Intelligence

People who demonstrate leadership qualities and are able to interact in a positive way with others will have a better developed interpersonal intelligence. They can understand the thinking of others and can successfully involve in negotiation activities. Role play and group activities can be used to cultivate this intelligence.

7. Intra-personal intelligence

This is essentially the ability to understand one self. Such people will have the ability to understand their abilities and short comings. Analytical diary writing, assessment of ideas and activities of others and assignments can help the growth of this factor.

8. Naturalistic Intelligence

This is characterised by deep interest in nature and flora and fauna, love for fellow beings, interest in spiritual and naturalistic phenomena. This components can be strengthened through nature study and enjoying the beauty of nature.

Developing of Multiple Intelligence

A teacher can use an integration of various strategies listed above for teaching. If a teacher don't have ideas for bringing music into the class room, consider getting help from a colleague. In a classroom teacher is committed to develop students multiple intelligence, using expertise in all eight intelligences.

Students can often come up with suitable strategies and demonstrate expertise in areas

where teachers may be deficient.

Eg.:

- Pupils may be able to do some picture drawing on the board.
- Provide musical back ground for a learning activity.
- School's technical resources can be used to convey information.

Eg. :

- CD recordings of music.
- Video tapes for picture orientation.

II New Conceptions of Learning

The past decades have seen a radical change in the concept of learning. The contribution of Piaget, Vygotsky and Bruner have given a new direction to the developments in this area.

Important among these new concepts are :

- Learning is the construction of knowledge
- Learning takes place as part of problem solving
- Learning takes place by incorporating new elements of knowledge into the cognitive structure of the learner.

Features of constructivism

Important ideas put forward by constructivism may be examined now:

1. Discover learning

Teachers must create an atmosphere that enables the learner to discover ideas and facts. Rather than leaving the student to discover for herself, providing opportunities that prompts the learner to discovery is important. Providing direct explanations and asking the student to imitate models are not what is expected from the teacher. Helping the student to develop a model on her own is more important.

2. Learning through debate

That debates lead to learning is an idea of Bruner. Here debate does not mean an argument. It is a sharing of ideas. New ideas can be developed by asking for explanations, contributing ideas, internalising ideas and analysing ideas in debate. It is an active method where all in the class can participate.

3. Learning and problem solving

Learning takes place only when the student sees a problem that needs a solution in a particular learning situation. When an imbalance in knowledge is produced the natural tendency is to carry out some activity to correct this. The student needs to be confident that he/she will be able to find a solution. Problems framed need to consider the abilities, cognitive level and practicability.

4. Collaborative learning

This is a form of learning which shares the

learning responsibility among members of a group which works towards a common objective.

The common aim can be achieved only when all the members of the group. The teacher who facilitates learning need to clarify the responsibilities of each member. This can be done only through discussions with the members of the group. The situation where one person acts on behalf of the group can be avoided in this type of learning.

Collaborative learning method can be followed only by a teacher who is prepared to share knowledge and authority with the students.

5. Co-operative learning

This is a mode of learning where the learners help each other to learn. Those who have better knowledge and experience help other students. It must be ensured that the help is not mere copying of other students work. It is a need based interaction providing support for learning at all stages. All the members of the group will be ready to answer the question on the common task and the groups achievement will be evaluated on the basis of the performances of the group members.

6. Zone of proximate development (ZPD)

According to Vygotsky, there is level of achievement that can be reached by all learners on their own, and another higher level which can be achieved through help from teachers or peers.

While any learning activity can be successfully completed by many learners, with the help of competent elders all can reach a higher level. Those who complete the activity only in parts can complete it with the help of the teacher. If appropriate help is received all learners provided to better performance. The area between the level achieved by own efforts and that which can be achieved with the help of others is called as zone of proximal development by Vygotsky.

7. Scaffolding

It is only natural that many learners are unable to complete learning activities if help is not received in time. The student needs help from the teacher in many learning activities. Here, help does not mean taking over and completing the work for the student, but making the student herself complete it. Teacher may provide hints, examples, evidences, or ask questions to direct the thought to specific path. In some situations the student may be asked to examine how others have approached the problem. What is important in providing this scaffolding is to bear in mind that the student must gradually be equipped to take up and complete the task. The concept of scaffolding highlights the important role of the teacher in learner centred education.

8. Learning as an active mental process

Learning being a cognitive process, the teacher needs to know cognitive process to facilitate the creation of learning opportunities.

Learning can be made effective and intellect sharpened by providing learning experiences involving processes like remembering, identifying, correlating, connecting, comparing, classifying, selecting analysing, ordering, logical thinking, summarizing, justifying, guessing, predicting, asking practical questions, explaining, correcting, recreating, imagining, appreciating, creating, codifying, integrating, thinking critically and calculating.

9. Internal motivation

Constructivism emphasises internal motivation over external motivation. Teachers must make all efforts to see that students have internal motivation. Only a student who is internally motivated can involve completely in learning and own up responsibility for all activities in learning. The teacher may frequently evaluate how far she has been able to motivate the students and develop adequate strategies.

III 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 consensus.
- Imagining 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.
- Analysing the shortcomings in methods to solve problems.
- Group discussion will prove reasons and solutions. Problems which can influence classroom learning and for which the learner can actively contribute solutions need to be posed.

- Self criticism, self 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 WHO has listed ten skills required for success in life.

- Self awareness
- Empathy
- Inter personal relations
- Communications
- Critical thinking
- Creative thinking
- Decision making
- Problem solving
- Coping with emotion
- Coping with stress

Changed roles in the new approach of Printing curriculum

Knowing the characteristics of learner, role of the teacher and ways to use the teachers source book help the teacher to plan and effectively implement learning activities in the new approach of Printing curriculum.

1. How does the Child Learn?

The conceptions about learning have changed according to the times. Learning is the construction of knowledge.

- The child learn by continuously employing his mental processes.
- By analysing life experiences and by debating with others
- By actively experimenting and analysing failure
- Along with learning evaluation of learning also take place in the child

When you examine a learning situations, mental process that characterise human can be clearly seen. The application of these processes lead the student to learning. The various mental process are;

The Learners:

- retrieve/recollects/retells information
- readily makes connections to new information based on past experiences and formulates initial ideas/concepts
- detects similarities and differences
- classifies/categories/organises information appropriately.
- translates/ transfer knowledge or understanding and applies them in new situations
- establishes cause-effect relationships

- makes connections/relates prior knowledge to new information/applies reasoning and draw inferences.
- communicate knowledge/understanding through different media.
- imagines/fantasises/designs/predicts based on received information
- judges/appraises/evaluates the merits or demerits of an idea/develops own solutions to a problem.

Learning aims at the development of these skills. Learning becomes student centred when each student applies mental processes in learning situations. When learning becomes students-centred.

- What should be learned and what should be taught?
- What should be the nature of teaching and learning process?
- What should be assessed? How to assess?
- What are the changes needed in classes, schools and the system of education?
- How can the teacher be helped to take up the new role?
- What type of support systems, help and leadership are required for the changed schools?

The teacher needs a comprehensive understanding of these aspects.

II Learner Characteristics

Learning activities and class room environment that suit the student of the upper primary class is an important feature of learner centred education. Characteristics of the learners are listed below.

- Have great curiosity
- Likes to fantasize and imagine
- Likes love, acceptance and freedom
- Likes to be active
- Interested in group activity
- Ability to ask questions and respond to questions.
- Are interested in creative and constructive activities.
- Are interested in thinking independently and to work in fearless free situations
- Likes music and play.

III Role of the teacher

A real teacher is one who can come down to the level of children very easily. He/She should be able to link her soul to the soul of the child. He/She should be able to see through the eyes of the child and hear through his/her ears. Only such a teacher can motivate the learner and make learning effective.

The role of the teacher is central in transacting a child centred and activity oriented curriculum. What is the role of the teacher?

Democratic Group Leader

The teacher should be a democratic leader who can lead the group of students considering their characteristics. She can intervene in group activities in a suitable way and provide direction.

Motivator for learning

Finds out likes and dislikes and produces learning problems and provides help to develop interest in learning. Encourages activities for intellectual development and group work.

Fellow learner

A good teacher does not remain cut off from students during various activities. He/She functions as one among them.

A constant student

The teacher must internalise the visions of child psychology and new philosophies in education and endeavour to reform his/her teaching activities constantly. Carries out discussion and study to solve problems, reads a lot and is prepared to learn from students.

Problem Solver

The teacher is able to identify problem in the class and solve them. Finds out learning problems in students and initiates measures for solving them.

Planner

The teacher plans the activities to take place in and out of school. Takes into consideration

the learning speed, learning styles and multi levels to plan daily activities.

Researcher

Conducts research in relevant aspects of education and attempts to incorporate the knowledge gained thus in classroom practice.

Organiser

Teacher organises school activities, celebrations, study tours and other social activities.

Evaluator

Evaluates the achievements of the students

Self-evaluator

Evaluates her own activities and performances.

Evaluates practical aspects of curriculum transaction.

Evaluates the overall activities of the school.

Link to the Community

Teacher strengthens the bond between school and the community through bodies like PTA and SSG. Uses local resources and functions as a social activist.

Creator

Makes learning aids and equipment. Attempts to develop teaching strategies and present them in an enjoyable way.

IV Teachers' Source Book

The teachers source book is aimed at helping the teacher in the transaction of the new approach of curriculum.

- Makes clear the curriculum objectives
- Contains the minimum package of suggested learning activities

[Teachers are expected to find more suitable innovative activities rather than the activities suggested in the sourcebook.]

- Explains the points mentioned in the textbook.
- Provides guidelines for planning the activities
- Provides hints for assessing activities.
- Stimulates teacher's thinking.

V Rights of the pupil

A curriculum which aims at comprehensive development of the student must take into consideration international perspective. Following are the main ideas about rights of children put forward by the UNO.

- Irrespective of sex, all children must be given opportunities to form and express their ideas and due importance should be given for their ideas.
- All children must be given freedom of expression. They should have unlimited freedom to know and search for ideas and to select writing, print or art medium to express their ideas.

- Parents and elders must discharge the duty to develop the abilities of children.
- Education must realize the total development of physical and mental faculties of children according to individual abilities and creative skills.
- The child should have the right enjoy leisure time, involve in recreational activities and artistic and cultural life.
- The rights of children should not be violated in arbitrate and undemocratic ways. Democratic atmosphere must be ensured in class rooms. Children should be protected from torture, cruelty and inhuman behaviour. Insulating behaviour and punishment must be avoided.

Knowingly or unknowingly activities contrary to the spirit of the above rights take place often in our class rooms, schools and the society, This must change.

VI Role of the pupil

- active participant in the learning process
- acts as a researcher
- sharer of information
- sharer of responsibilities
- collects information
- takes leadership
- involves in group work
- acts as a co-participant
- observes his environment
- experiments and realise ideas
- makes interpretations and draws inferences

VII Child Friendly Classroom Atmosphere

Learning can be effective and enjoyable only when the class room atmosphere is according to the new conception of learning and the characteristics of the higher secondary student. The school and the class room should be made attractive for the student. What tare the features of a student friendly class room?

- Class and seating are arranged in an attractive way
- Democratic nature is upheld
- Always active
- Students interact with teachers without fear
- Opportunity for a variety of activities
- Students are allowed to involve in interesting group activities.
- Learning speed, learning style and differing levels of abilities are considered. Help is extended whenever needed.
- Sufficient instructional materials are available.
- Learning aids and other material made from natural objects and low cost materials by teachers and children are available.

- There is freedom of expression, children share their ideas and experiences.
- Walls are decorated with pictures, photographs of scientists etc.
- Children are given acceptance and encouragement
- Healthy atmosphere
- Needs of each child is given consideration.
- Happy and energetic atmosphere.
- Teachers work considering the rights of the children.
- Problems handled in a patient way
- Teachers look at all events from the child's viewpoint

VIII Differences in ability levels

There will be students of various ability levels in any class because learning style, learning speed, varying exposure to learning experiences, physical and psychological problems and varying socio-cultural background.

The learning experiences provided must help to bring the low achievers to an expected level and extend the breadth and depth of the skills of the high achievers.

By repeating learning experiences, introducing variations in a learning experience to suit different levels and if needed, formulating additional experiences, the problem of varying ability levels can be tackled. Peer tutoring, small group study techniques etc. can also be adopted.

III

Teaching

Learning Strategies

The explosion of knowledge has resulted in a new vision of knowledge. Earlier, it was thought that the most effective method was transmission of knowledge by teacher to the student. However, the modern view is that the student has the responsibility and the right to construct knowledge. The teacher of modern times hence has to use instructional approaches that motivate the student to construct knowledge on his own.

Instructional strategies should be viewed as a social skill which is part of the educational environment and not as a technique to be mastered. They are to be considered as important components of teacher-student interaction and not as teacher activities alone. While instructional methods are planned the social and psychological aspects of the learner need to be taken into consideration

Let us examine here some instructional strategies helpful in bringing out the curriculum objectives of Printing Technology.

I Project

Project is one of the most suitable methods of instruction for science, technology etc. It is a method of self instruction using the method of science and useful in the development of a number of process skills and hence it is essential to use projects in science and technology education.

What is a project?

When a problem is felt, data regarding the problem is collected. The collected information is summarised and analysed. The conclusion that are obtained from analysis are used to solve the problem - these steps reflect the essentials of a project. By doing projects the students are given the opportunity to train in the method of science. In doing so, the student acquires problem solving ability which helps to tide over problematic situations in life and progress in life.

Projects help to develop scientific temper, scientific attitude and interest in learning science and to ensure active participation of the student in learning activities.

Stages of a Project

1.1. Feeling the problem

The project topic should not be arbitrarily created. It should reflect a felt problem in the learning situation and which requires a solution to proceed further.

Project topics arise when discussions relating to lessons are held in the class. It is important that the student has an internal urge to find out a solution to the particular problem. When the topic is presented the teacher must ensure this.

Let us consider an example from Unit 4.

Image Generation

The teacher help the learner to aware the need of image generation. Equipment and technical features involved.

1.2 Defining the aim

If the student is to tackle the problem in a way suitable to his/her abilities, thinking skills and available facilities, the aim of the project need to be defined precisely. To state the aims of the project simply and clearly, the student needs the help of the teacher.

1.3 Planning

1.3.1 Hypothesising

Drawing temporary conclusions on the basis of information available at the time is known as hypothesising.

Hypothesis of the project may be

- Shape and features of printed product.
- Composition of images using computer/ scanner.
- Transfer of images to film or plate.

1.3.2 Methods and instruments

Study methods and instruments are to be selected based on aims of the project and the hypothesis drawn. The nature of the topic, instruments used and the scientific approach followed should be correlated. Some methods and instruments are listed below.

1.3.2.1 Survey

Once survey method is selected, where, when and how to conduct the survey must be decided. What will be the sample and who are to be contacted for data will also be considered. Questionnaires and survey form are to be drawn up. During the planning phase all these are to be discussed in detail. Teacher must interact with the students, give suggestions and ensure that the instructions are suitable and effective.

1.3.2.2 Experimentation

When experimental method is to be used, it must be considered whether necessary equipment is available. If not can these be improved? How can materials and instruments be made available? These questions must be considered.

1.3.3 Tabulation of data

- What information is to be collected?
- What method can be used for collecting information?
- When should observations be made?
- How to tabulate data?
- Are pictures, samples, and working models required?
- Are checklists, rating scales and score cards needed?
- The method of analysis should be decided in advance. Keeping to schedules, honest collection of data, accuracy of data and precision are important.

1.3.4 Analysis

The collected and tabulated data can be analysed to examine the validity of the hypothesis. The collected data need to be classified and compared. Comparison with standard information may also be required.

Graphics and similar representation will make the analysis easier.

1.3.5 Conclusion

Based on similarities, differences and relationships evident from analysis of data, the validity of hypothesis may be examined. Those found invalid are rejected and others are accepted as conclusions.

1.4 Execution of the Project

An outline of the project based on the components discussed above may be drawn up. The project activities may be carried out according to this plan with necessary modifications at the appropriate stages. Difficulties faced during execution of the project, data obtained and informations collected, are to be entered in the 'Project Dairy'. This will be helpful during report writing.

Visits made during the conduct of the project, experiments, arranging equipment, recording data and analysis should be supervised by the teacher. Teacher must take care to conduct discussions, with students frequently to evaluate the progress of the project.

Application

The suggestions that arise from the project must be used for problem solving wherever applicable.

1.3.5 Project Report

A model for project report is given below. Report is to be prepared by the students themselves. The structure of the report should be finalised through discussion with the students. It must be ensured that it is not too complex and hinders activities.

The cover page may show title of the project, name of the student/members of the group and school address.

I. The report may contain

1. Title
2. Introduction
3. Hypothesis/Aims
4. Method of study
5. Collected data
6. Analysis and Conclusions
7. Suggestions (if any)
8. Reference (if any)
9. Appendix (questionnaire, observation schedule, checklist etc.)

The project diary should be made use of to prepare the project report. The aims and method of study of the project would be recorded in the project diary during the time of doing the project. The credibility of the project and data can be established with the help of project diary. Teacher may give necessary directions to prepare the

project diary. At frequent intervals the teacher must check whether the recordings are made in the diary.

- A project diary should be maintained by the learner which is considered as the product of the authenticity of the work done.
- It should contain all the activities for the learner in detail.
- It should be recorded along with each process of project work.

1.3.6 Project Presentation

The project can be evaluated and the work done may be assessed when the project is presented. Ideas can be communicated and shared with others through presentation of the project.

The project can be presented in

- Class room
- Printing and media club meeting.
- Science fairs/exhibitions
- School annual day meeting
- PTA meeting
- 'Ayalkootam'
- Other selected forums

During presentation, bear in mind:

- Sufficient preparation must be done

- Make appropriate use of charts/ pictures/ articles/ transparencies
- Doubts raised must be cleared convincingly.
- Presentation must be brief and simple

When learning takes place in the class in the project method, the topic must be discussed and activities planned systematically. Information must be recorded in an ordered way and analysed objectively to draw appropriate conclusions. Collected information must be shared with others. The learning process is complete only when the relevant information is summarised efficiently.

The project method helps to train the students in the method of science to familiarise them with self study habits and to find solutions for local problems. We must take care to cultivate this as an important method of study in our schools.

2. Seminar

Reporting is a core component of learning science. In seminar, data relating to a specific topic is collected, analysed and presented as paper for the benefit of others. It helps the learner to improve his/her communication skills and provides opportunities for collection of secondary data and for drawing conclusions. It is useful in cultivating interests and attitude in science topics and in personality development. Topics chosen for seminars may be contemporary and should have social relevance.

Organisation of Seminars

- Topic presentation
- Finding out sub topics or different areas
- Group formation
- Assigning sub topics to different groups
- Discussion by each group on the assigned area or sub-topic (books, magazines, institutions, place and person)
- Organising ideas
- Paper writing
- Seeking the opinion of the teacher
- Presentation
- Discussion
- Summarising

The teacher may provide reference materials and given directions at all stages.

- Paper writing
- The paper may include new information gained through data collection, conclusions and findings
- The information collected by all the members may be included.
- Tables, charts, books and other resource materials may be included.

Teacher may examine the paper at different stages and provide guidelines. The activities and participation of each student in the group may be assessed.

Paper presentation

- Teacher may function as the moderator during the initial stages, but it is better to assign this role to students themselves
- The paper to be presented must be written out completely
- All the group members must be present in the dias during presentation and must actively participate in the discussion after presentation by the leader.
- Questions from the audience are to be answered by group members taking turns
- Teacher may intervene when necessary to provide instructions and help.
- When sub topics are presented, after all the presentations are over general discussion may be held. Teacher may summarise the discussion.
- A summarised version of the report may be recorded in the Printing diary.
- Seminar papers and reports may be kept in the information corner

3. Discussion

Discussion is a natural part of the transaction between teacher and student. In the process approach it has a significant role. Discussion are essential for the student to share new findings, ideas and conclusions at each stage of learning with fellow students and teachers and to assess progress.

Group discussion is an ideal method to inculcate social consciousness, co-operation, democratic attitude, friendliness, open mindedness and compromising attitude which are the ultimate aims of education. It helps the development of communication skill, hypothesis formulation, designing of experiments and analytical skills.

By sharing ones ideas with others and by listening to other peoples ideas, scientific literacy is also strengthened.

In a student centred classroom, the following points must be borne in mind while conducting a discussion.

Discussion points may be provided to guide the progress of the discussion. This will help the students to reach the proper conclusion. Discussion points may be in the form of quesitons or statements.

- During group discussion the teacher may observe each group and if needed help them to channel the discussion towards the common objectives.
- All students may be given opportunity to take part and express their ideas.
- It must be ensured that time limits are observed.
- The conclusion reached may be entered by each student in the Printing diary and a group representative must present these during consolidation.

- The teacher may correct or add to the conclusions and ensure that all the relevant ideas have been covered.
- Students may be instructed to enter the consolidated ideas in the Printing diary.

4. Debate

Debate is an important method of learning technology, social constructivist theories consider debate as an ideal method of learning.

After presenting a controversial topic, arguments in favour and against are put forward and a detailed analysis of facts is done by both sides in a debate.

4.1 Relevance of Debate

- To develop the skill of presenting ones views logically and argue convincingly
- To develop the ability to compare others views with ones own view and to understand relevant aspects of ideas of others.
- To develop leadership quality, democratic attitude, unity, and communication skills.

4.2 Conducting a Debate

The selection of the debate topic must be done very carefully. A controversial topic (one which can be viewed from two different standpoints) is suitable for debate. Both viewpoints must help in cultivating certain positive attitudes in students.

The teacher must not take a stand favouring one group. An objective approach is to be maintained while presenting the topic.

Only then the students will prepare to debate both aspects. The process in the debate are;

- Topic presentation
- Preliminary discussion-students are grouped into two
- The two groups discuss the arguments they are going to present
- Responsibilities assigned for presenting different viewpoints & arguments.
- Either the teacher or a student functions as the moderator.
- Each group presents their arguments.
- Moderator presents an analysis of the ideas and consolidate the points. Moderator may present the consolidate in tune with the method of science. The consolidated information is recorded in the printing diary.

4.3 Responsibilities of the moderator

- Introductory presentation
- Guiding the discussion
- Ensuring that the discussion are on right track
- Ensuring the time limits
- Consolidation of arguments

A model for Planning

Stage 1

- Introductory presentation of the topic
- Grouping of students
- Group discussion
- Collection of information within groups
- Assigning responsibilities
- Fixing date and time of debate.

Stage 2- Debate

- Seating arrangements
- Introductory remarks
- Presentation of arguments from two sides
- Discussion
- Consolidation

The moderator's main responsibility is consolidation. It must be unbiased, analytical and efficient as the role of a judge in weighing the merits of a legal points.

Stage-3

- Preparing report on the debate.
- Entering the details of the debate in Printing diary. (Subject diary)

5. Experiments

Experiments familiarise the students with the method of science and develop the process skills. It serves the following aims.

- Development of process skills.
- Ability to handle technology equipments
- Development of interest in technology, sense of responsibility, aptitude and attitude.
- Providing direct experience

5.1 Planning

- Must be related to curriculum objective.
- Introductory discussion must help the students to understand the need and aims of experiments. The students should develop an idea of what variables are to be controlled.
- Similarly they should decide on what to observe. They are also to be instructed on the manner of recording and the safe handling of equipments and materials must be demonstrated to them. Above all experiments must be simple and practicable.
- Experiments must be suitable to the age and maturity level of students.
- Must be interesting to the student

Points to note

- If only limited number of equipments is available students may work in groups.
- Each group must be given appropriate instruction
- Experiments must proceed according to instructions given.

- It must be ensured that measurements are accurate
- Observations must be recorded
- Time limits must be maintained

5.2 Evaluation

- Printing diary/practical record containing observations and conclusions
- Accuracy in experiments, discipline, scientific attitude, use of process skills
- Handling of equipments in proper way.

Teachers must be present during all stages of the experiment to provide necessary instructions.

6. Outdoor learning

Direct observations is essential for the development of ideas in a process based learning. It may be difficult to provide opportunities for this in all classrooms. Hence learning technology within the confines of the classroom is not advisable. Field learning provides experience in the natural settings that cannot be provided through a class room situation or laboratory.

Relevance

- Learning becomes environment based
- Direct learning experiences are gained
- Learning is linked to real life and practical situations,
- Helps to share experiences with people who

apply science in real situations.

- Develops values, attitudes and interests
- Helps to develop personal qualities
- Helps to evaluate the development of emotional domain

On the basis of method and conduct and duration, outdoor learning can be of two types

1. Field trip
2. Study tour

6.1 Field trip

This is a method of study which links learning activities with school surroundings with definite aims. If needed the services of local experts and parents may be sought. Proper planning is essential for the success of field trips as in the case of any other learning activity. As part of project activities, field trip or study tour may have to be carried out.

6.1.1 During Field Trip

- It must be ensured that all activities proceed according to the plan. The teacher may intervene and provide adequate instructions.
- Teacher may check whether the observations are recorded adequately whenever they made.
- Report of the field trip must be entered in the Printing diary.

6.1.2 After the field trip

- The information collected may be discussed in the class.
- The information consolidated by teacher after discussion may be entered in the Printing diary.

Report must give emphasis to activities conducted, findings and ideas gained through the field trip rather than to travel detail.

6.1.3 Evaluation

- Recording in the subject diary and report
- Participation of students
- Sharing of experiences and explanations given on questions raised
- Punctuality

6.2 Study tour

Study tour will have more than one aim. It requires more time and consequently extensive planning and preparation have to be done. Before the study tour, the student may be prepared, and assigned responsibilities to be shared between groups.

Planning

- Lesson unit - Objectives intended
- What are to be observed? to be enquired? to be collected?
- How to record?

- What services of local community are needed?
- Place, travel facilities, expected expenses, materials needed.

7. Parallel texts

Parallel texts will help to make learning enjoyable and effective in informal settings.

Effective learning of Printing Technology may require activities that need extensive time for collection of secondary sources, analysis and drawing of conclusions. Situations for similar type of learning can be found only outside the class room. The limitations of time and facilities in the class room can be overcome through parallel texts.

Possibilities

- Secondary sources of data
- Informal and accidental situations outside the class room
- Knowledge gained continuously through other people, institutions and the media

Use of parallel texts

- Proper planning needed
- There should be very clear understanding of activities to be completed
- Responsibilities may be divided
- Progress of learning must be evaluated at frequent intervals and consolidated at the end.

- Along with other units covered during a term, parallel texts may also be evaluated and instructions given.
- Possibilities for observation and data collection may be used.
- Books can be distributed to both teachers and students
- A students committee may be formed to manage library affairs.

8. Library

Materials that facilitate printing learning may be collected for the Printing Library. Scientific brochures, technical journals, industrial journals, books, CDs or cassettes may be brought as per the instruction of the teacher. It must be ensured that the books are appropriate to the age and level of maturity of the students. A library committee may be constituted under the leadership of the teacher in charge of the library and including teachers from all subjects.

Aims

- To develop reference skills in students
- To inculcate a positive attitude towards reading
- Develop deep knowledge in difficult subjects areas
- Collect data from secondary sources
- Familiarise the students with the life and discoveries of scientists

Activities

- The books may be kept in a corner of the class room or in the library itself according to availability of space

- With the help of students and the local community, science books, magazines, journals, pictures, paper cuttings and brochures may be collected
- Collections made by the students, can be acquired for the library.

The students may be asked to write short notes on books they read.

Evaluation

- Book review prepared by students
- Number and variety of books read
- Discipline, punctuality
- Interest in reading

9. Multimedia Room

To provide appropriate learning experiences in the new approach of curriculum, advances in science and technology may be made use of. Setting up a multimedia room in each school would help in this aim. The multimedia room may have the following equipment.

9.1 Over Head Projector (O.H.P.)

It is a very useful instrument as audiovisual aid. Transparency sheets showing written/printed material can be projected to the screen

O.H.P. is based on a simple working principle. A powerful beam of light from a bulb is allowed to fall on a mirror after passing through a lens. The mirror reflects the material to the screen. The transparency is placed in the path of the light beam.

The following can be used to record on transparency

- OHP marker pens
- Indian ink
- Hecto carbon paper
- Photocopy on transparency
- Laser print on transparency

If the bulb of OHP is used continuously for more than 10 minutes it may black out.

When transparency sheets are prepared the following points may be kept in mind.

- The main ideas relating to a topic may be presented under serial numbers.
- Use bigger sized letters. Write clearly
- Use colours
- One transparency may be limited to 12-15 lines. More lines will make it difficult to read.

9.2 Information Technology

During a time information explosion, comprehensive study of Printing Technology cannot be limited to books alone. Information

technology is a medium which can help one to collect and exchange new knowledge that is created by the minute. It helps us to study and understand phenomena which are not amenable to direct observation, new developments, habitats, and physiological activities. A contemporary mode of Printing teaching requires the help of it to a great extent.

9.2.1 Computer

The computer is a medium which can store enormous data and help in analysing and presenting data in many forms. 3D pictures, movements and sounds can be recorded and stored in a computer. It can also be shown on the monitor screen or printed when needed and can be sent to other computers through internet.

9.2.2 Making use of computer

- Slides and animators can be prepared based on lesson units.
- The animations and other demonstrations prepared can be used in connection with transaction of the lesson unit.
- Print out copies of the material prepared can be used for group work.

9.3 Internet

The internet is a network of millions of computers all over the world.

The learners can search and find the information required by themselves. They can

make use of the information collected from the net in a variety of ways.

The internet makes available not only information and ideas, but tools for evaluation also. A number of websites provide you a great variety of material at no cost.

9.4 Liquid crystal display (LCD)

Projector

The LCD projector helps to project to a big screen, the display on a computer monitor. School which do not have LCD Projectors must try to acquire one with the help of NGOs, PTA and local administration institutions.

Media like TV, VCD, DVD and tape recorders may also be utilized appropriately. Using the education programs Doordarshan and other channels is also important.

9.5 EDUSAT

Lauching of Satellite (EDUSAT) has helped to start to convey the latest innovation directly to teacher/learner without loss of time. It is pleasure to note that department of vocaitons Higher Secondary Education has also started to make use of this. It enables to reach latest information to rural areas.

10. School Clubs

Printing and Media Club

With the change in the approach of curriculum activities of the printing and media club can gain

a strength. The participation of students in printing and media club activities is to be evaluated and give grades. The printing and media club will function under the leadership of a teacher. Principal will be the patron. A committee of students may be constituted to manage the activities of the printing and media club.

10.1 Activities

- Simple projects, experiments, improvisations, building of models
- Conduct discussions, debate and seminar on articles in Printing and contemporary developments in science and technology.
- Celebrations of days relating to Printing, community camps.
- Quiz programmes, speech and writing competitions, short study tours, video-film shows, interviews, classes by experts.
- Collection and preservation of materials and objects for study of Printing Exhibitions of these objects and materials.
- Manuscript magazines
- Linking the activities of Printing and media club with activities of other clubs in school.

10.2 Bulletin Board

Bulletin boards can be set up by printing and media clubs in each class room or at least one in the school. Bulletin boards can be used in the following way.

- For exhibiting the information, specimens, paper cuttings and pictures collected by students on a particular topic
- To exhibit news items, notices, important events, brochure and other visual materials.

The responsibility for arranging exhibits for the bulletin board can be given to groups of students in turns. Thus all students can involve in the activities. This would help to improve students learning.

11. Assignments

Assignments are learning activities helping to achieve the curriculum objectives and also lead the pupil from the present level to a higher level of learning.

Assignments may be of the types - writings, drawings, constructions of models etc. In assignments involving construction of models, a note on methods used in construction may also be submitted.

The discussion of planning may be carried out in classroom to complete the assignments in time. Clarifications may be given about the sources. Teacher may provide the sources if needed.

12. Problem Solving

General Steps

- Analysis and data entry
- Selections of suitable equations
- Substitution and calculation

- Final Answer with unit

For a class of 25 pupils, 5 groups can be formed. Problems are given in groups. Each student should go through the problem. They should follow the above criteria for solving the problem. After individual attempt, let them start group discussion. With the clarification let them finish the problem and present the method of solving. After rearranging the groups, they share the findings of each group.

Different types of problems, can be given to groups and teacher should consolidate the findings.

13. Subject Diary

The student carries out a number of activities as part of learning Printing Technology. Observations, collections, data organisations in tables, analysis, consolidation and reports are some of these. The printing diary is a record of all activities that the student carries out in process based learning - problems faced, methods adopted to solve them and conclusions drawn. It is useful to the student as well as others who want to evaluate the student's work and progress.

The student must record all the information about activities. The subject diary must help to record data systematically to analyse the collected data and to consolidate the ideas so as to share it with others.

In short, the subject diary is expected to be a comprehensive record of learning of a year.

It is a record of all the learning experiences in Printing that a student is given during a year.

13.1 Recording

- Problems presented in the class as those which arise in classroom situations may be entered.
- Hypothesis or guesses about the problem may be recorded. The activities that the student or the group plans and conducts to test the hypothesis may be listed.
- The processes and facts relating to the phase of conduct of the activities may be recorded.
- All ideas that are consolidated after discussions in the class or group may be recorded. When this is done it becomes possible to ensure that the ideas and processes planned are actually realized.

The following information may be recorded

- Project diary
- Seminar report
- Report on collections
- Note on experiments
- Report on study tour

If students raise doubts relating to how to make entries in the subject diary, opportunities

may be provided for discussion and doubt clearance.

Teachers may take care to provide opportunities for the students to ask questions and clarify various ideas.

13.2 Evaluation

The teacher may examine the subject diary of all students frequently and verify the following.

- Systematic and orderly nature of entries.
- Scientific nature and comprehensiveness
- The quality of the students participation

Teacher should give chances for the pupils to present their recordings in the subject diary occasionally.

On the Job Training (OJT)

On the Job Training is an interesting and informative learning activity. OJT can be conducted yearly to the nearest printing or related firm so as the learner gets opportunity to apply the theoretical/practical knowledge he has already learned. It is intended to be a two weeks programme. After the completion of training programme each learner has to be evaluated by the head/authority of the firm. These points must be considered for vocational competency evaluation.

IV Planning

To make Printing Technology education activity based, we have to provide learning experiences that would help to develop process skills and components of multiple intelligence. Whether the activities are conducted in the class or outside, they are to be completed in a time bound manner.

The teacher has to plan the activities necessary to make learning effective, time required, evaluation methods and all other aspects. Teacher must prepare at least three planning documents.

- Year plan
- Unit plan
- Daily plan

1 Year Plan

The year plan will include the total number 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 year pan is given below.

Year Plan

Term	Month	Unit	Name of Unit	Period	Total
I	June	1	The printing industry	15	15
	July	2	Design concerns for printing	10	10
	August	3	Layout and paste-up	10	10
	September	4	Computer image generation	20	35
October	4	Computer image generation	15		
II	November	5	Colour separation	20	20
	December	6	Image Assembly	17	17
III	January	7	Offset plate making	18	18
	February	8	Printing presses	15	15

2 Unit Plan

Teacher may prepare unit plan before the actual transaction of the unit in the classroom. This plan must make clear the curriculum objectives intended, periods required for

transactions of these objectives, instructional strategies to be used and materials required. How the outcomes 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

1 - The Printing Industry

Curriculum Objectives	Activity	Learning Materials	Evaluation	Time
<ul style="list-style-type: none"> To get an awareness and importance of printing through discussion. 	Samples of printed products are collected.	Magnifying glass, reference book, internet.	Participation, subject diary.	2 hrs
<ul style="list-style-type: none"> To understand printing processes like relief printing, intaglio printing, screen printing, offset printing and its differences through discussion. 	Model presentation, visual aids and discussion based on collected materials as well as type, block and plate.	Type, block, plate, visual aids, models, reference books, internet.	Participation, subject diary.	3 hrs
<ul style="list-style-type: none"> To acquire the historical development of printing and innovations. 	Group discussion based on collected materials.	Reference books, collection of very old printed materials, internet.	Participation, subject diary.	2 hrs
<ul style="list-style-type: none"> To familiarise the printing steps involved in different printing process like relief printing, screen printing, offset printing through observatin and discussion. 	Flow chart presentation and discussion.	Film positives/Negatives/plate, block, chart, reference books, visual aids, internet	Participation, subject diary.	2 hrs
<ul style="list-style-type: none"> To understand the scope and purpose of each level of small to medium size printing industry. 	Group discussion, Grouping of small to big size printing industry.	Organization chart, samples, reference books, internet.	Participation, subject diary.	3 hrs
<ul style="list-style-type: none"> To acquire knowledge of different ways to enter, train and advance in printing industry. 	Discussion, Chart, Seminar	Carrier guidance, Publicaitons, Internet	Participation, subject diary.	3 hrs

3 Daily Plan

The daily plan included curriculum objectives to be transacted during class period, learning activities, learning aids and feedback.

Model of daily plan is given below :

Daily Lesson Plan for The Printing Industry

Date :

Class :

Curriculum Objective : Give an awareness and importance of printing in the day-to-day life of man.

Objectives : Thought discussion, data collection, observation, reference.

Duration Hour	Activity	Discussion Points	Required learning materials	Learner Participation	Teacher Supplement	Remarks/ Value points
1½	Discussion	<ul style="list-style-type: none"> • What is print • Photo-graph • Drawing 	Collection of different printed products	Learner Participation	Teacher Supplement	Remarks/ Value points
2	Data collection	<ul style="list-style-type: none"> • Black & white print product • Colour print product 	Collection of different printed products	Learner Participation	Teacher Supplement	Remarks/ Value points

Signature of Principal

Signature of Teacher

V

Evaluation

Evaluation is a systematic process of collecting, analysing and interpreting evidences of students progress and achievement both in scholastic and co-scholastic areas of learning for the purpose of taking a variety of decisions.

What are the features of evaluation in a child centred activity based curriculum which gives importance to both process and product?

Evaluation should be comprehensive

- Learning is an active mental process.
- Development of all the process skills are to be evaluated
- Scientific knowledge, facts, concepts, attitude and interest are to be evaluated.

Evaluation should be a continuous process

- Child progresses through different learning experiences. Learning progress should be

evaluated from time to time. Learner must develop a convincing understanding of new information developed through learning experience. They are to be given all help for this. The students may make use of the help of the teacher to solve difficulties in learning. Thus opportunities for continuous improvement is provided to the teacher and the student.

Evaluation should be an essential component of learning process

- Evaluations is a process which should proceed along with learning. The aims of evaluation cannot be achieved only through term end or year end evaluation of pupils. Continuous evaluations is important here. The activities that are carried out in a classroom are meant for developing different abilities in children. The pupil should achieve both in scholastic and co-scholastic areas. In all these

situations the pupil should be continuously evaluated.

Self evaluation and peer evaluation

- Various strategies can be adopted for evaluation. Self evaluation and peer evaluation by pupils is also found to be effective.

Types of evaluation

1. Term end Evaluation (T.E.)

Termed Evaluation should be in written form. The intention of the test must be confined to memory test alone. It is an important tool for evaluating the facts, concepts and ideas gained by the learner. While preparing questions for the term end evaluation, more emphasis should be given to the level of application, analysis, synthesis and evaluation than knowledge and understanding. The questions should be framed such a way that the students are able to apply their various mental process (The various mental

processes are given in Part I - Approach.)

2. Continuous Evaluation (C.E.)

Traditionally, we were following only single evaluation to which measures the intellectual capacity of the learner. To eliminate the limitations of this method we are forced to evaluate the multi-dimensional competencies of the learner with regard to the practicability and nature of subject the following tools are advised for continuous Evaluation.

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

All CE items should be evaluated for diagnostic purpose.

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.)	4/3/2/1	20
	2.Skill in the collections of data (relevance, authenticity, variety of sources etc.)	4/3/2/1	
	3.Awareness of the content (presentation of the paper, participation in discussion, ability to substantiate his own ideas and views)	4/3/2/1	
	4.Ability to prepare the report (sequence in the presentation of the concepts, authenticity and clarity of ideas/views/concepts)	4/3/2/1	
	5.Skill in communication (presentation of the paper, participation in discussion)	4/3/2/1	

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

Teacher's Sourcebook VHSE - XI • Printing Technology

CE Items	Evaluation Indicators	Score 4/3/2/1	Total Score
Assignment	1.Awareness of the content 2.Comprehensiveness of the content (coverage of content) 3.Systematic and sequential arrangement (clarity, structure, language) 4.Own observations/suggestions/views/judgement/evaluation 5.Timely submission	4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1	20
Lab Work	1.Preparation for the work (procedure, apparatus needed, knowledge of the concepts or principles) 2.Skill in handling the apparatus 3.Accuracy and specificity in carrying out the experiment (controlling variables, measurement, record of data, display) 4.Analysis of data and arriving at conclusion 5.Recording of the work and timely submission	4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1	20
Collections	1 Relevance 2 Variety 3 Awareness of the content 4 Systematic recording 5 Neatness and timely submission	4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1 4/3/2/1	20
Class Test	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:-		20

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

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

Summary of Methods

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

2. Seminar	Planning
	Data Collection
	Presentation of paper
	Completion

3. Practical	Planning
	Execution
	Completion
4. Assignment	Sharing Phase
	Completion phase

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

Distribution of CE tools for XI

Sl. No.	For Class XI	Score
1.	Main Project	5
2.	Semianr	5
3.	Assignment	5
4	Class Test	5
	Total	20

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
Continous 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.

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- 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 <small>Score obtained X $\frac{20}{60}$</small>
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.	Vinitha	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.

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.

Part II Vocational Subject - Printing Technology

Evaluation of First year

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

No minimum for CE

Format for Practical Evaluation

No	Evaluation Indicators	Percentage	Score
1	Identifying Tools/materials/Instruments	10%	15
2	Preparation of layout and handling of tools and equipments.	15%	22.5
3	Estimating material, study of parts equipments and procedure	15%	22.5
4	Accuracy / Working skills	20%	30
5	Calculation/result	15%	22.5
6	Viva-voce	15%	22.5
7	Record /Lab diary	10%	15
	Total		150

VOCATIONAL COMPETENCY EVALUATION (VCE)

Being a vocational course, judiciously evaluate the acquired value addition and consequent capacity building is highly essential. It is achieved by Internship Evaluation (IE).

The vocational competencies evaluation (IE) can assess by the following components like regularity and punctuality, value addition and the capacity building.

1. Regularity and Punctuality

Regular presence and habit of time bound completion of task is a must for attaining maximum

efficiency.

2. Value Addition

It is the addition of skills for the construction of socially committed semi professionals through motivation. Field visit or survey increase the level of intrinsic motivation and positive attitude towards the vocational field, there by increasing his/her value as a semi-skilled professional.

3. Capacity building

This component enables the learner to practice the acquired skills and in case self-confidence and self-reliance.

Format for Vocational Competency Evaluation Indicators

No.	Items	Score
1.	Regularity and punctuality	10
2.	Value Additon (Evaluating any one) 1. Field Visit 2. Survey	20
3.	Capacity Building [Evaluation of anyone] 1. Simulated experiments or Project/ OJT 2. Camp/ Exhibition 3 Production cum training centre	20
	Total	50

Regularity and Punctuality

Regularity and punctuality evaluate by using 5 points grading. Attendance and time-bond completion of task by the learner are the indicators.

Format for Rating scale of Regularity and Punctuality

Sl. No.	Items	1	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

Detailed format for Vocational Competency Evaluation (VCE)

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

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

Government of Kerala

Board of Vocational Higher Secondary Examinations

Thiruvananthapuram

Reg: No. _____

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
	CE 20	TE 80	PE 150	IE 50	Total		
Part- I							
English			—	—			
General Foundation Course			—	—			
Part- II Vocational Subjects							
Vocational Theory			—	—			
Vocational Practical	—	—		—			
Vocational Competency	—	—	—				
Part- III Optional Subjects							
	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 _____

Supdt/ T. O _____

SECRETARY

VI

CURRICULUM OBJECTIVES

Unit 1

The Printing Industry

1. To get an awareness and importance of printed products in the day-to-day life of the man through discussion, collection, observation, reference.
2. To understand major printing process and identify the difference between them through discussion.
3. To acquire the historical development of printing through reference and discussion.
4. To familiarise the printing steps involved in different printing process through discussion.
5. To understand the scope and purpose of each level of small to medium size Printing Industry through group discussion, reference, observation.
6. To acquire knowledge of different ways to

enter, train and advance in the Printing Industry through discussion, charts, seminar.

Unit 2

Design Concerns for Printing

1. To understand point system through models and examples.
2. To understand the basic principles of design through discussion, observation, experiment.
3. To identify common elements of alphabetic design through discussion, observation and drawing.
4. To understand terms like stroke, stress and serif through discussion identification, observation comparison and visual aids.
5. To understand measurement and copy fitting through group discussion.
6. To understand the different methods of colour printing and identify tints, surprint, reverse and

bleeds through discussion, observation, presentation of illustration.

7. To list out the design steps used to produce a printed product through tools identification and by practical.

Unit 3

Layout and Paste-up

1. To understand common layout paste up tools, materials and equipment through discussion, chart presentation, demonstration.
2. To understand the procedures of working from a rough layout through discussion, preparation of a finished layout and its demonstration.
3. To learn the steps for preparing a single colour paste up, including mounting the board, adding layout lines attaching the copy for art work through discussion and preparation.
4. To understand the procedures for cutting a mask, preparing a multi-colour paste up, reverse and surprint through discussion and preparation.

Unit 4

Computer Image Generation

1. Understand major components of computer system and identify the characteristics of hardware through discussion and software and by demonstrating computers.
2. To classify computers according to their size

and memory through observation, identification and discussion.

3. To understand the data representation in memory of computers through practical and discussion
4. To list out the components of typical computer composition system based on the function it performs through reference and discussion.
5. Understand different methods of providing input to a computer composition system, through observation, identification discussion and practice.
6. To understand various storage devices of a computer through demonstration and discussion.
7. To familiarize code-syntax and menu driven composition through comparison and discussion.
8. To familiarize important DTP packages and understand composition procedures through discussion, demonstration, practical.
9. To understand various output devices of computer composition system through discussion, demonstration and practice.
10. To make an awareness about internet application, e-mail, fasci-mail, EDI, talk, write, web applicaiotn, web browser etc. through discussion, demonstration, practice.

11. To familiarize parts of a book and style of setting through discussion demonstration.
12. To understand commonly used method of casting off and page measures for book work through discussion, work out.

Unit 5

Colour Separation

1. To learn the process colour photography, additive and subtractive colour theories through discussion and demonstration.
2. To understand colour filters through discussion, chart and demonstration.
3. To familiarize screen angles, process colour separation through discussion and demonstration.
4. To understand the purpose of Mask through discussion and demonstration.
5. To familiarize the primary steps in electronic colour separation including scanning, analysis and modification, storage, image editing and exposure through discussion and demonstration.
6. To familiarize traditional electronic separation and achromatic separation through discussion and demonstration.
7. To familiarize about image setter, automatic and online processor, through discussion, chart and demonstration.

Unit 6

Image Assembly, Stripping and Proofing

1. To understand the purpose of stripping and proofing in the printing process through discussion, preparation and demonstration.
2. To recognize the equipments and supplies (materials) used in stripping and proofing through discussion, presentation and demonstration.
3. To learn various methods of imposition up to 16 pages through discussion layout preparation, demonstration.
4. To understand the basic stripping steps through discussion and samples.
5. To familiarize several methods of multi-flat registration that include common edge, snap fitter and dowel, punch and register pins through discussion, samples, preparation and demonstration.
6. To understand the basic methods of preparing single colour proof through discussion, samples, preparation, demonstration.
7. To familiarize the techniques of preparing both opaque and transparent colour proofs through discussion sample, preparation and demonstration..

Unit 7

Offset Plate Making

1. To understand exposure unit or printing down frame through discussion and visual aids.
2. To understand actinic light and its action on plate emulsion through discussion, demonstration and experiment.
3. To understand how a sensitivity guide can be used to calibrate a plate maker through discussion, demonstration and experiment.
4. To understand the characteristics of an offset printing plate through discussion and demonstration.
5. To understand the term 'grain' through discussion, presentation of sample and experiment.
6. To familiarize the different types of plates like wipe on, deep etch, pre-sensitised, photopolymer, diffusion transfer, electrostatic, projection through discussion, demonstration, assignment.
7. To familiarize latest developments in plate-making like laser exposure system, step and repeat, plate processor automatic and on line, computer to plate (CTP), direct imaging (DI) compute to press through discussion, demonstration, presentation of chart.

Unit – 8

Printing Presses, introduction

1. To understand the four units that make up any printing press through discussion chart and demonstration.
2. To familiarize the principle of offset printing through discussion, presentation.
3. To understand cylinder configuration and different units of offset machine through discussion, chart, demonstration.
4. To understand the operation of the feeder unit, registration unit, printing unit, inking unit, dampening unit, delivery unit of an offset press through discussion, chart, demonstration.
5. To understand about web offset machine through discussion, chart, demonstration.

VII

SYLLABUS

Unit 1 - The Printing Industry

Historical development of printing, definition

Get an interest to learn importance, basic principles of relief printing, intaglio printing, screen printing, lithography printing and their differences image design, image generation, image conversion, image setting, preparation of image carrier, image transfer finishing. Size and scope for trade shop, special purpose printing, quick printing in plant printing, publishing, packaging and related industries. How to become an entrepreneur secure a job - 15 hours.

Unit 2 -Design Concerns for Printing

Point system, basic principle of design, common elements of alphabetic design, stroke, stress and serif. Measure and copy fitting the types. Different methods of colour printing and identify tints, surprints, reverse and bleeds. Design

steps used to produce a printed product, identification, of tools. - 10 hours

Unit 3 -Layout and Paste-up

Common layout, paste-up tools, materials and equipments, working from a rough layout, preparing a single colour paste-up, mounting the board, adding layout lines, attach the copy for art work. - 10 hrs.

Unit 4 -Computer Image Generation

Components of a computer system:-memory, CPU, Input/output devices. Computer composition system:- Input (OCR , ICR, Image scanners) Information storage, editing, composition, output. Information storage:- Magnetic tapes, magnetic disc, compact disc. Editing:- type setting commands, code- syntax, menu driven system. Composition:- justification, hyphenation, automatic hyphenation and

justification. Composition software, automatic page make up, text and graphics integration, page display.

Output devices:-dot-matrix image formation, strike-on printers, Line printers, Inkjet printers, Laser printers.

Microcomputer applications, DTP system
- 35 hrs.

Unit 5 -Colour Separation

Process colour photography, additive and subtractive colour theory, colour filters, screen angles, masking, steps in electronic colour separation, scanning, modification storage, image editing, and exposure, traditional electronic separation and achromatic separation, image setter, automatic and online processor. - 20 hrs

Unit 6 -Image Assembly Stripping and Proofing

Purpose of stripping proofing in the printing process, tools equipments, and supplies (materials) used in stripping and proofing various methods of imposition scheme, basics of stripping

steps, multi-flat registration that include common edge, snap fitter and dowel, punch and register pins, methods of preparing single colour proof, techniques of preparing both opaque and transparent colour proofs. - 17 hrs.

Unit 7 -Offset Plate Making

Equipments for proofing and plating, offset printing plates, PS plates, wipe on process, special purpose offset plates and plate making system. Diffusion transfer plate, electrostatic plate, projector plates, poly-master step and repeat plate making system, computer to plate (CTP),plate processor, automatic online.
- 18 hrs.

Unit 8 -Printing presses Introduction

Four press units, press development, offset principle, classifying offset presses, cylinder configuration.

Offset press operation feeder unit, registration unit, printing unit, inking unit, damping unit, delivery unit. Web offset machine. - 15 hrs.

Part II - Unit wise Analysis

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Unit I

The Printing Industry

Introduction

The word 'printing' defines multiplication of identical copies of graphic images. Printing plays a vital role in the day-to-day life of man. The scientific method used in the study of printing involves observation, classification, understanding of principles.

The aim of this chapter is to aware the learner the historical development, importance, basic methods, size, scope of the field and create interest for further study of the subject.

The teacher should adopt various strategies like sample collection, discussion, presentation of materials, visual aids and seminar.

Curriculum Objectives

- To get an awareness and importance of printed products in the day-to-day life of man through discussion, collection, observation, reference.

- To understand major printing process and identify the difference between them through discussion.
- To acquire the historical development of printing through reference and discussion.
- To familiarize the printing steps involved in different printing process through discussion.
- To understand the scope and purpose of each level of small to medium size printing industry through group discussion, reference, observation.
- To acquire knowledge of different ways to enter, train and advance in the printing industry through discussions, charts and seminar.

Syllabus

Importance of printing, basic principles of relief printing, intaglio printing, screen printing, offset printing and their differences historical development of printing, definition image design,

image generation, image conversion, image setting, preparation of image carrier, image transfer finishing. Size and scope for trade shop, special purpose printing, quick printing implant printing, publishing, packaging and related industries. How to become an entrepreneur and secure a job - 15 hours.

1.1 Importance of printing

Activity : Sample collection of printed specimen by various processes, group discussion.

- Divide the learner into small groups. Let them ask to collect samples of various printed products in the premises (classroom).
- Observe and classify the samples according to the nature of product with the help of magnifying glass.
- Let the learner aware how many of the products they come across every day.
- Let the group discuss about the collected material.

Discussion Points

- Beauty and technical aspects of the products.
- Substrate
- Quality of products.
- Periodicity of products.
- Life of the products.

Each group presents their findings.

Consolidation points:

How printing influences the day-to-day life of people.

Product : Subject diary.

Follow up

Assignment to collect wide range of printed materials. Classify the collection and arrange with necessary caption.

1.2 Major Printing Process

Activity : Presentation of models. Visuals and discussion. The learner submits the collected samples through group discussion. Let the learner identify.

Discussion Points:

- Quality of product.
- Means of print.
- Substrate.
- Feel the difference of model (printing surfaces.)

Identify the differences through visualizing.

Consolidation

Ensure that the learner is able to differentiate the printed materials and categorise them under different printing process like.

- Relief printing.
- Intaglio printing.
- Screen printing.

- Offset printing.

Product: Assignment and subject diary.

1.3 Historical development

Activity : Group discussion based on collection, reference books, journals, articles, internet. Based on the knowledge of pre historic printing era teacher facilitates to discuss the history of printing.

Discussion points

- Collected samples.
- Developments of printing in local, national and international.
- Information from internet.

Consolidation

- Innovation.
- Developments in printing.
- Impact of printing in human history.

Product - Subject diary.

1.4 Steps involved in different printing process.

Activity – Flowcharts, discussion.

The facilitator presents the flow chart in the class and demonstrate the film positives, negatives plates, blocks and other visual aids.

Discussion Points

- What is original.

- Image design.
- Image generation.
- Image conversion.
- Image setting.
- Preparation of image carrier.
- Image transfer.
- Finishing.

Consolidation

Different steps in making a printed product.

Product : Subject diary.

1.5 Scope and purpose of each level of printing industry.

Activity: Discussion, organisation of charts, printed products with the help of reference books etc., discuss the scope of each process of printing.

Discussion Points

- What is Board of Directors?
- What is management?
- Different levels of management
- What type of business.
- What is production management.

Consolidation

Size and scope of printing industry

Specialised print shop and related industries.

Product - Subject diary

1.6 Entrepreneurship and Job opportunity

Activity : Seminar on job opportunity and Entrepreneurship

Job Opportunity:

- Local level – Private, Semi Govt., Govt.
- National level – Private, Semi Govt., Govt.
- International level

Entrepreneurship

- Screen printing

- Digital pre-press processes
- Offset press
- Finishing
- Supply of allied materials

Discussion Points

- Job opportunities
- Entrepreneurship
- Allied industries

Refer to Seminar Procedures.

Consolidation

Exploring the prospects of job opportunity and entrepreneurship.

UNIT ANALYSIS
1 - THE PRINTING INDUSTRY

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To get an awareness and importance of printing in the day to day life of man.	Learn printing technology and its importance.	Observing, classifying, Analysing	Sample collection (class room) Discussion, Reference books and internet.	Various types of printed products, Magnifying glass, Reference books, internet	Learners participation in discussion and response, collection, subject diary	Participation, collection, subject diary.	2 hrs.
2.	To understand the major printing process and identify the difference between them .	Definition of printing, Basic principles of relief printing, intaglio printing, screen printing, offset printing.	Observing, communicating, raising questions, comparing	Materials collection, presentation of models, visual aids and discussion.	Type, block, plate, visual aids and models. Reference books, internet	Understanding of facts, subject diary	Subject diary	3 hrs.
3.	To acquire the historical development of printing.	Innovations and developments.	Communicating, Comparing, analysing	Group discussion based on collection	Reference books, very old printed materials, internet.	Subject diary.	Subject diary	2 hrs.

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Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
4.	To familiarise the printing steps involved in different printing process.	Image design, Image generation, Image conversion, Image setting, Preparation of image carrier, Image transfer, Finishing	Observing, comparing, analysing	Flowchart, Discussion	Positive films, negative films, plate/ block /charts/ other visual aids/internet.	Ability to analyse steps in printing. Subject diary	Subject diary.	2 hrs.
5.	To understand the scope and purpose of each level of small to medium size printing industry.	Size and scope of trade shops, special purpose printing, quick printing, implant printing, publishing, packaging, related industries.	Communi-cating, observing, analysing	List out examples of small to large size printing industry	Organisation of charts, various samples of printed products, reference books, internet	Ability to understand various level of printing industry, participation in group discussion. Subject diary	Subject diary.	3 hrs.
6.	To acquire knowledge of different ways to enter, train and advance in printing industry.	Get an idea how to become an entrepreneur or secure a job.	Observing, communi-cating, inferring	Discussion, chart, seminar	Reference of carrier guidance publications, internet	Participation, group activity, seminar paper report.	Subject diary.	3 hrs.

Unit 2

Design Concerns for Printing

Introduction

Image design is the first step in a typical printing job. The purpose of image design is the creation of an image which fulfils the customers need. The purpose of printing is the reproduction of this image.

A professional designer creates image by using the basic principles of design according to the customers need. This chapter gives an over all awareness about point system, basic principles, common elements of design, parts and classification of type faces, copy fitting techniques, colour printing methods, tints, surprints, reverse, bleeds, steps of design and identification of tools.

The facilitator adopts strategies like model presentation experiment, specimen, group discussion and observation.

Curriculum Objectives

- To understand point system through models and examples.
- To understand the basic principles of design through discussion, observation, experiment.
- To identify common elements of alphabet design through discussion observation and drawings.
- To understand term like stroke, stress and serif through identification, observation, comparison of visual aids.
- To understand measurements and copy fitting through group discussion.
- To understand the different methods of colour printing and identify tints, surprint, reverse and bleeds through discussion observation, presentation of illustration.

- To list-out the design steps used to produce a printed product through tools, identification and by practical.

1 inch = 6 ems

1 inch = 72 points

Record inference in subject diary.

Syllabus

Point system, basic principle of design, common elements of alphabetic design, stroke, stress and serif. Measure and copy fitting the types. Different methods of colour printing and identify tints, surprints, reverse and bleeds. Design steps used to produce a printed product, identification of tools. - 10 hours

2.1 Importance of point system

Activity : discussion

Presenting specimens of various fonts of type in different point size and ask to observe the features.

Discussion points

- Units for measuring length, width and height.
- How to measure the size of type?
- Which factor is considered for measuring?
- Why it is considered?

Consolidation

Unit for measuring line

1 point = $\frac{1}{72}$ of an inch.

1 en = 6 points

1 em = 12 points

2.2 Principles of design

Activity : Discussion

Presenting samples of printed products.
Example : visiting cards, invitation cards, advertisement, newspapers etc.

Discussion Points

- Methods for balancing a weighing balance.
- Relationship of length and width of samples.
- Arrangement of elements.
- Points to emphasis.
- How they are emphasized.

Consolidation

Balancing of elements - Symmetrical and asymmetrical. Create harmony among the elements in order to produce contrast.

Product : Subject diary.

Give an assignment to design a visiting card with given datas.

2.3 Common elements of alphabetic design.

Activity : Observation, identification.

- Observing capital and small letters and identify their differences.

- Identifying the differences of small letters like 'd' 'o' and 'p'.
- Recall the memory of four line transcription.

Consolidation

Upper case letters, lower case letters, ascenders, descenders, counter base line, body height.

Product : Subject diary

2.4 Classification of type faces.

Activity : Presentation of specimen, discussion, identification and comparison.

Presenting specimens of various styles of type and demonstrate the features of any one of the style.

Discussion points

- Parts of type face.
- Contrast between stroke.
- Decorative parts.
- Shape of corners.

Compare the styles and identify the differences based on discussion points.

Consolidation

Stroke, stress, serif, basic styles of type faces.

Product : Subject diary.

2.4.1 Font of type.

Activity : Discussion

Discussion : based on the previous presentation.

Discussion points

- Characters required for complete type setting.

Consolidation

Font of type

Product : Subject diary.

2.5 Copy fitting

Activity : Discussion based on problems.

How to determine the space required for fitting the given copy while working with a layout.

Discussion point

- Assessment of number of printed pages of a given manuscript.
- Width of printed page.
- Width of printed area.
- Length of page.
- Length of printed area.
- Number of characters in a line.
- Font size.

2.6 Methods of colour printing

Activity : Observation and identification.

Present samples of printed product which include process colour work print on coloured

paper special colour work bleeds reverse, surprints.

- Present each sample.
- Observe its features.
- Identify the features.

Consolidation

Importance of Fake colour, flat colour, process colour, tints, surprints, reverse and bleeds.

Product - Subject diary.

2.7 Design steps for layout.

Activity : Experiment and discussion.

Give data's and ask to design a layout based on the knowledge and group discussion based on experiment.

Discussion points

- Mental activity.
- Problem faced.
- Different ideas formed.
- Sketched ideas.
- Selected sketch.
- Sketch with explanation.
- Finished product.

Consolidation

Visualisation of thumb nails (miniature), rough, comprehensive/finished layout, dummy.

Product : Subject diary.

UNIT ANALYSIS
2 - DESIGN CONCERNS FOR PRINTING

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To understand point system.	Unit for measuring typography	Observing identifying	Model discussion, presentation, identification	Printers em scale tables and specimens, reference books	Subject diary	Understanding of facts. Subject diary	1 hr.
2.	To understand basic principles of design.	Balance, contrast, proportion, unity, optical centre	Experimenting, Observing, Conclusion.	Discussion, Experiment, Comparison	Drawing instruments, printers em scale, samples and visual aids reference books, internet	Subject-dairy, designed layout.	Handling of tools, Participation in discussion. Subject diary	2 hrs.
3.	To identify common elements of alphabetic design.	Upper and lower case characters, ascenders, descenders and other elements of alphabet.	Observing measuring comparing inference.	Presentation of specimen observation identification	Specimens visual aids various styles of type. Reference books, internet.	Subject-dairy	Drawing skill, Ability to identify. Subject diary	2 hrs.
4.	To understand terms like stroke, stress and serif.	Parts of type face, basic classification of type faces, font of type.	Obsrving comparing identifying measuring analysing.	Presentation of visual aids group discussion.	Visual aids of type faces or specimens. Reference book.	Subject-dairy	Observation, comparison, inference of the group.	2 hrs.

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
5.	To understand measurements and copy fitting.	Type measurement and copy fitting in different methods.	Observing, comparing, analysing, measuring, identifying	Discussion based on problems.	Printers em scale.	S u b j e c t diary	Copy fitting	1 hr.
6.	To understand different methods of colour printing and identify tints, surprint, reverse and bleeds.	Colour printing methods, fake colour, flat colour, process colour, tints, surprints, reverse and bleeds.	Observing, Identifying, Communicating, comparing, analysing	Discussion Presentation	Samples and other visual aids.	S u b j e c t diary	Identify colour prints and others	1 hr.
7.	To list out the design steps used to produce a printed product.	Type copy, transfer type, body copy type measurement, and copy fitting methods.	Measuring	Experiments Discussion	Printers em scale, type specimen.	Subject diary, Finished layout.	Inference	1 hr.

Unit 3

Layout and Paste-up

Introduction

The goal of layout and paste-up is to bring all the different pieces of composition together into a final form that meets job specification and is of sufficient quality to be photographically reproduced. Printers generally refer to this camera ready copy as a paste-up or a mechanical.

This chapter deals with common layout, paste-up tools, materials, equipments and working from a rough layout, single colour paste up, cutting mask, multi-colour paste-up reverse and surprint.

The facilitator adopts strategies like group discussion, model and chart presentation, tools, materials equipment, observation and preparation.

Curriculum Objectives

- To understand common layout, paste-up tools, materials and equipments through

discussion, presentation, demonstration of charts or models.

- To understand the procedures of working from a rough layout through discussion, preparation of a finished layout and its demonstration.
- To learn the steps for preparing a single colour paste-up including mounting the board, adding layout lines, attaching the copy for artwork through discussion and preparation.
- To understand the procedures for cutting a mask, preparing a multi-colour paste-up, reverse, and surprint through discussion and preparation.

Syllabus

Common layout, paste-up tools, materials and equipments, working from a rough layout, preparing a single colour paste-up, mounting the

board, adding layout lines, attach the copy for art work. - 10 hrs.

3.1 Common layout paste-up tools, materials and equipments.

Activity : Discussion, presenting layout chart, paste-up tools, materials, equipment and observe its features.

Discussion points

- What is a layout?
- What are the tools, materials and equipment used for preparing layout?

Consolidation

Definition of layout, tools, materials and equipments used for preparing layout.

Product : Subject diary.

3.2 Working from a rough layout.

Activity : Discussion, chart presentation, preparation of rough layouts to finished layouts, charts and to observe their developments and procedures.

Discussion Points

- What is rough layout?
- What is finished layout?
- Layout developments from rough to finished layout.

- Presence of information in rough to finished layout.

Consolidation

Rough layout, finished layout

Developments from rough to finished layout.

Presence of information in rough to finished layout.

Product - finished layout and subject diary.

3.3 The steps for preparing a single colour paste-up

Activity : Discussion, presenting models or charts and to observe the steps and prepare a single colour paste-up (Art work.)

Discussion Points

- What is a single colour paste-up?
- What are the steps required to prepare a single colour paste-up?
- What are the tools, materials and equipments required?
- What informations are presented in a single colour paste-up?

Consolidation

Single colour paste-up.

Steps in preparing a single colour paste-up.

Tools, equipments and materials required.

Information presented in single colour paste-up.

List of tools, materials and equipments with usage and steps required to prepare single colour production.

Product : Sub diary, single colour paste-up.

3.4 The procedure for cutting a mask, preparing a multi-colour paste-up, reverse and surprint.

Activity : Discussion, presenting models, mask, multi-colour pasted flat, positives and to observe the procedure of cutting a mask.

Discussion Points

- What is a mask?
- How a mask is cut and produced?
- How a multi-colour paste-up is produced?
- How a reverse and surprint is produced?

Consolidation

Mask,

Multi-colour paste-up.

Reverse and surprint.

Product : Mask, multi-colour paste-up, reverse and surprint, subject diary.

UNIT ANALYSIS 3 - LAYOUT AND PASTE-UP

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To understand common layout, paste-up tools, equipments and materials.	Definition of layout, rough layout, identifying tools, equipments materials.	Observing, identifying measuring.	Chart presentation, discussion, comparison.	Charts, tools, equipments materials, reference books, internet.	Subject diary	Layout, tools, equipments materials.	2 hrs.
2.	To understand the procedure of working from a rough layout.	Development from a rough to finished layout.	Observing, analysing, measuring, communicating.	Discussion, preparation of layout	Chart, tools, materials, equipments, reference books, internet.	Subject-diary, Finished layout.	Procedure of rough layout drawing skill	3 hrs.
3.	To learn the steps for preparing a single colour paste-up, including mounting the board, adding layout lines, attaching the copy for art work.	Stages of preparing a single colour paste-up.	Observing analysing, measuring, comparing.	Discussion, preparation of single colour paste-up.	Chart, models, tools, materials, equipments, Reference books, internet.	Single colour paste-up, subject diary.	Single colour, paste-up, skill	3 hrs.
4.	To understand the procedures for cutting a mask, preparing a multi colour paste-up, reverse and surprint.	Mask, multi-colour paste-up, reverse, surprint.	Discussing observing, analysing, measuring, comparing.	Discussion, preparation of mask, multi colour paste-up, reverse, surprint.	Redmasking, film, razor blade, knife multicolour paste-up flat, cellotape, red tape, reference books, internet.	Mask, multicolour, pasted flat, reverse, surprint, subject diary.	Mark, multicolour pasted flat etc., skill	2 hrs.

Unit 4

Computer Image Generation

Introduction

Most type images used for printing are generated with the aid of Computers. In the printing industry, computer-aided imaging devices are often referred to as composing or composition systems. The Page composition remained completely manual process until 1980. Now a days computers are available that can generate graphics in the form of line art and half tones as well as text. Intention of this unit is to provide general understanding about how composition system operate and to learn some of the functions that they can perform.

Curriculum objectives

1. Understand major components of computer system and identify the characteristics of hardware and software through discussion and by demonstrating computers.
2. To classify computers according to their size and memory through observation, identification and discussion.
3. To understand the data representation in memory of computers through discussion and practical.
4. To list out the components of typical computer composition system based on the function it performs through reference and discussion.
5. Understand different methods of providing input to a computer composition system, through observation, identification discussion and practice.
6. To understand various storage devices of a computer through demonstration and discussion.
7. To familiarize code-syntax and menu driven composition through comparison and discussion.

8. To familiarize important DTP packages and understand composition procedures through discussion, demonstration, practical.
9. To understand various output devices of computer composition system through discussion, demonstration and practice.
10. To get an awareness about internet application, e-mail, fasci-mail, EDI, talk, write, web applicaiotn, web browser etc. through discussion, demonstration and practice.
11. To familiarize parts of a book and style of setting through discussion and demonstration.
12. To understand commonly used method of casting off and page measures for book work through discussion, working out problems.

Syllabus

Components of a computer system:-memory, CPU, Input/output devices. Computer composition system:- Input (OCR , ICR, scanners) Information storage, editing, composition, output. Information storage:- Magnetic tapes, magnetic disc, compact disc. Editing:- type setting commands, code- syntax, menu driven system. Composition:- justification, hyphenation, automatic hyphenation and justification. Composition software, automatic page make up, text and graphics integration, page display.

Output devices:-dot-matrix, strike-on printers, Line printers, Inkjet printers, Laser printers.

Microcomputer applications, DTP system

- 35 hrs.

4.1 Major Components of Computer System

Activity:- General discussion

Pre requisites

Knowledge of Computer acquired from high school level, practical experience, reference books

Discussion points

- Core of the system
- How to enter data and images into the computer .
- How do you get results of the processing.
- Prepare a list of hardware and software.
- Identify the differences between hardware and software.

Consolidation

Memory of computer (primary memory RAM and ROM, secondary memory) CPU, Input and output devices. Hardware and software (application and system softwares.)

Identify application soft ware and system software.

4.2 Classifications of Computer

Activity: Group discussion

Recall what exactly the learner studied about the classification of computers in high school level.

Discussion points

- Systems suitable for personal use.
- Systems suitable for business organizations
- Systems that can support hundreds of users
- Systems for weather forecasting and air craft design.

Consolidation

Micro computers, Mini computers, Main frame, super computer and their features.

4.3 Data Representation

Activity :Group discussion

Discussion Points

- What is data.
- Off and On state of electrical electronics component.
- Binary system.
- Reason for using binary numbers.
- What is alphanumeric code.

Consolidation

BIT, BYTE , KB, MB, GB, TB, ASCII

Make a table showing the numerical relation of BIT ,BYTE, KB, MB, GB and TB

4.4 Components of Computer Composition System

Activity : Discussion, practice

(Learners have already acquainted with the components of a computer system.)

Discussion point

- Major components of computer system
- Traditional composition process
- Development in composing and advantages
- Steps involved in computer composing

Through chart presentation, teacher supplement necessary information of components of computer composition system

Consolidation

Input, information storage, editing, composition, out put.

(Give matter for type setting practice by which they understand components of computer composition.)

4.5 Input Devices

Activity :-discussion

Discussion points

- Identify input device
- What are the input devices identified by the learner?

- Prepare a list
- Present the list

Consolidation

KEY BOARD, OCR, ICR, SCANNERS,
TELE COMMUNICATION SYSTEM

4.6 Storage Devices

Activity:-Group discussion

(Learners are familiar with various storage devices related with computer and other electronic system in their day today life.)

Discussion points

- Make a list of various storage devices.
- What are the characteristics of each device.
- Identify the device that can hold more information.
- Advantages and disadvantages of each devices.

Consolidation

Magnetic tape, Magnetic disc(floppy disc and hard disc),

Optical disc storage(CD Rom and DVD Rom), Magneto optical disc

4.7 Code-Syntax and Menu Driven Composition System

Activity – Comparison

- Change of point size on a traditional computer composition system

- Change of point size in menu operated composition system

Compare the above and understand facts

4.7.1 Activity – group discussion

Discussion points

- Rules of typography and grammar in spoken language .
- What does it mean if find (PT 12) or(LL 36) before the commencement of a line or word in traditional computer composition.
- The role of mouse.
- WYSIWYG Programme.
- Advantages of menu driven composition system.
- Editing process in composition.

Consolidation

Editing process of Computer composition

Code-syntax and GUI based composition

4.8 DTP Packages and Composition Process

Activity: Group discussion and Practice

Discussion point

- DTP Packages
- Procedures undergone while type setting
- Observe various publications and identify the composition process undergone.

Consolidation

Important DTP Packages especially page maker. Composition process such as hyphenation, justification, leading, kerning, tracking, paragraphing etc...

Practice

Type setting of a matter as it is in text book and understands composition process.

4.9 Output Devices

Activity: Demonstration and discussion

Demonstrate the working principle of available output devices.

Discussion points:

- Output device
- Hard copy and soft copy
- Impact printers and non- impact printers
- Image resolution

Consolidation

Dot matrix printer, Line printer, Daisywheel printer, Inkjet printer and laser printer

Advantages of laser printer

Assignment : computer composition system

4.10 Internet Application

Activity: demonstration discussion

Demonstrate internet applications and to aware influence of internet in communication

Discussion points

- E mail & E mail address
- Sending and receiving Email
- Internet browsing
- Role of modem

Consolidation

Internet application

4.11 Parts of Book

Activity: demonstration discussion

Discussion points

- Preliminary matter of book
- Text or body matter
- Conveying information through each parts of book
- Style of setting

Consolidation

Half title, advertisement ,frontispiece, title page printers imprint, dedication, preface, contents, list of illustrations, acknowledgement, introduction , subtitle list of abbreviations, erratum, text pages, appendices, authors note, glossary, bibliography, index, colophon.

4.12 Casting Off

Activity : Comparison and solving problem

Steps

- Calculation of number of words or characters in the whole type script.

Teacher's Sourcebook VHSE - XI • Printing Technology

- Calculation of number of characters in one printed page.
- The comparison of the content of the type script folio with the printed page.
- Assessing the number of printed pages of a given manuscript.

Consolidation

Practical method, word average method, character counting method.

UNIT ANALYSIS
4 - COMPUTER IMAGE GENERATION

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To understand major components of computer system and identify the characteristics of hardware and software.	Memory, Central processing unit, Input/output devices	Observing, Identifying, Communicating	Presentation of computer and discussion	Computer, Charts, reference books, internet	Subject diary.	Awareness of computer and understanding of facts	2 hrs.
2.	To classify computers according to their size and memory.	Classification of computer and its application	Observing, Communicating, classifying, analysing	Group discussion	Charts, reference books, Internet search	Subject-diary	Process skill	3 hrs.
3.	To understand the data representation in memory of computers.	Data representation in memory	Numerical relation, time space relation	Group discussion	Reference book, internet	Subject diary, table	Participation in discussion	3 hrs.
4.	To list out the components of typical computer composition system based on the function it performs.	Input, information storage, Editing, Composition and output	Observing Communicating, comparing, Analysing	Discussion, Practice	Reference book, internet	Chart	Reports on discussion, Participation in discussion	3 hrs.
5.	Understand different methods of providing input to a computer composition system	Typical input device for Computer composition	Identifying and communicating	Discussion, Practice	Reference Book, Internet Search	Subject Dairy	Reports on discussion	3 hrs.

Teacher's Sourcebook VHSE - XI • Printing Technology

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
6.	To understand various storage devices of a computer.	Magnetic tape, Magnetic disc (floppy, hard disc), Compactdisc, DVD	Observing, Identifying, and analysing, communicating.	Group discussion	Illustration or samples of Floppy Magnetic Tape, CD, DVD and Hard disc	Reports on discussion	Process skills	3 hrs.
7.	To familiarize code-syntax and menu driven composition.	Code - syntax, Menu Driven System GUI Programme, WYSIWIG Programme	Comparing, Observating, Identifying	Comparison and discussion	Computer chart	Subject dairy	Understanding of facts	4 hrs.
8.	To familiarize important DTP packages and understand composition procedures	Page maker and other DTP Packages Composition Process	Observing, Identifying and experiment	Discussion and experiment	Computer and Internet search	Reports on discussion	Performing experiment, process skills	4 hrs.
9.	To understand various output devices of computer composition system	Impact and Non impact Printers, advantages of Laser printers	Observing, Identifying, communicating, comparing, analysing	Demonstration and discussion, practice	Printer	Subject dairy	Reports on discussion, Participation, assignment	2 hrs.

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
10.	To make an awareness about internet application, e-mail, fasci-mail, EDI, Talk write, web application, Web browser etc.	Internet, e-mail, fasci-mail, EDI, Talk write, web application, Web browser etc.	Communicating Observing, and Identifying Comparing, Analysing	Demonstration & discussion	Computer and Internet connection, models	Subject dairy	Participation In discussion Understanding of facts	4 hrs.
11.	To familiarize parts of a book and style of setting.	Sequence of arrangements followed to make up of a book	Observing, Identifying, visualizing	Demonstration	Models, Reference books	Subject dairy	Reports on discussion	2 hrs.
12.	To understand commonly used method of casting off and page measures for book work	Casting off Commonly used methods of casting off	Measuring, Observing and Identifying	Discussion Solving problems	Books and models	Reports on discussion.	Solution of problems	2 hrs.

Unit 5

Colour Separation

Introduction

Nearly three centuries after Gutenberg, most printing was done in a single colour – black. By the nineteenth century, colour plates and inserts in books were becoming more common, although it was only flat colour (Recall the three types of colour printing: flat colour, fake colour and process colour.) By the beginning of this century, printers and photographers clearly understood the colour separation process, and they are using “colour photographs” as originals for printing in a wide number of publications. Books or magazines with great number of process colour, prints are available today at every news stand, book store, or grocery store.

It is no longer sufficient that a page merely carry several colours. Now the goal is to eliminate printing defects, such as poor fit, inaccurate colour balance, or insufficient ink density, and to produce a perfect colour reproduction, matching

or enhancing the quality of the colour original.

Within the last decade there have been major advances in colour separation, colour correction, and colour reproduction technology. The purpose of this chapter is to introduce the basic concepts of colour separation, discuss the significant use of scanners, and explore the potential of colour correction and colour editing.

Issac Newton demonstrated the hues of the visible spectrum by passing a light through a glass prism. He not only produced a rainbow of colour but passed the rainbow through a second prism and reconstructed the original beam of light. Newton therefore proved that colour is in the light and what we see as white light is really a mixture of all colours.

This chapter deals with process colour photography, colour filters, screen angles, masking, electronic colour separation, achromatic separation, image setter, automatic and online processor.

The facilitator adopts strategies like group discussions, demonstrations, chart presentation.

Curriculum Objectives

- To learn the process colour photography, additive and subtractive colour theories through discussion and demonstration.
- To understand the colour filters through discussion chart and demonstration.
- To familiarize screen angles, process colour separation through discussion and demonstration.
- To understand the purpose of mask through discussion and demonstration.
- To familiarize the primary steps in electronic colour separation including scanning, analysing and modification storage, image editing and exposure through discussion and demonstration.
- To familiarize traditional electronic separation and achromatic separation through discussion and demonstration.
- To familiarize image setter, automatic and online processor through discussion, chart and demonstration.

Syllabus

Process colour photography, additive and subtractive colour theory, colour filters, screen angles, masking, steps in electronic colour separation, scanning, modification, storage, image

editing, and exposure, traditional electronic separation and achromatic separation, image setter, automatic and online processor. - 20 hrs

5.1 Process colour photography, additive and subtractive colour theory.

Activity: Discussion, presenting colour spectrum, prism, primary colour printing, ink, colour filters, magnifying glass, scanned negatives and positives, screen angle detector, visual aids and observation of their features.

Discussion points

- What is light?
- What is colour?
- What is additive and subtractive colour theory?
- What is process colour photography?

Consolidation

Definition of light, colour.

Additive and subtractive colour theory.

Process colour photography.

Product : Result of mixed colour, subject diary.

5.2 Colour filters

Activity: Discussion, demonstration with colour filters, charts and to observe its working procedure.

Discussion points

- What is colour filter?
- How the four colour filters work?

Consolidation:

Colour filters

Product : Subject diary.

5.3 Screen angles used in colour separation

Activity : Discussion, demonstration with scanned colour separated positives and negatives with magnifying glass, screen angle detector and to observe its usage and features.

Discussion Points

- Why are the colours separated in different angles in colour separation?
- What do you mean by screen angles?
- How do you check screen angle?
- What are the different screen angles?

Consolidation

Screen angles used in process colour separation.

Subject diary

5.4 Purpose of mask in colour reproduction.

Activity : Discussion, demonstration with masks or samples of positives and negatives and observe the purpose of mask.

Discussion Points

- What is mask?
- What is the purpose of mask in colour reproduction?

Consolidation

Purpose of masking in colour reproduction.

Product : Subject diary

5.5 The primary steps in electronic colour separation, scanning, analysis and modification, storage, image editing and exposure.

Activity : Demonstration, discussion presentation with scanned colour separated positives and negatives with visual aids and to observe.

Discussion Points

- What are the steps in electronic colour separation?
- What is electronic colour scanning?
- What do you mean by analysis and modification?
- What do you mean by storage and image editing?
- What do you mean by exposure?

Consolidation

Steps in electronic colour separation.

Electronic colour scanning.

Analysis and modification.

Storage and image editing

Exposure

Product : Subject diary

5.6 Traditional electronic separation and achromatic separation.

Activity : Discussion, demonstration using charts, scanned four colour separated positives and negatives and observe its features.

Discussion Points

- What is traditional electronic separation?
- What is achromatic separation?

Consolidation

Traditional electronic separation.

Achromatic separation.

Product : Subject diary.

5.7 Image setter, automatic and online processor.

Activity : Presentation of charts, diagrams and visual aids and observe.

Discussion Points

- What is image setter?
- What is automatic and online film processor?

Consolidation

Image setter

Automatic and online film processor.

Product : Subject diary.

UNIT ANALYSIS 5 - COLOUR SEPARATION

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To learn the process colour photography, additive and subtractive colour theory.	Definition of light, colour additive and subtractive.	Observing, recording, classifying, analysing, inferring.	Discussion, demonstration, experiment.	Colour spectrum, printing inks (yellow, magenta, cyan, black), Charts, reference book, internet.	Result of mixed colour. Subject diary.	Theories of light, colour, process colour, photography.	3 hrs.
2.	To understand colour filters.	Theory of colour filters.	Observing, comparing, analysing	Discussion, filter chart presentation.	Colour filters, charts, reference books, internet.	Subject-diary	Theory of colour filters.	2 hrs.
3.	To familiarize screen angles in process colour separation.	Screen angles used in colour separation.	Observing, analysing, measuring, predicting.	Discussion, demonstration	Magnifying glass, four colour separated positives of photographs, screen angle detector.	Subject diary.	Screen angles in colour separation	4 hrs.
4.	To understand purpose of mask.	Masking.	Observing, classifying, analysing.	Discussion, demonstration.	Four colour separated positives and negatives reference books internet.	Subject diary.	Masking.	3 hrs.

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
5.	To familiarise the primary steps in electronic colour separation including scanning, analysis and modification storage, image editing and exposure.	Electronic colour separation, scanning, analysis, modification, storage image, editing, exposures.	Observing, classifying, analysing, measuring.	Discussion, chart presentation.	Chart, four colour separated positives and negatives reference books, internet.	Subject diary	Electronic colour separation, scanning etc.	3 hrs.
6.	To familiarise traditional electronic colour separation and achromatic separation.	Traditional electronic and achromatic separation.	Observing, comparing, analysing.	Discussion chart demonstration.	Chart, four colour scanned positives, negatives, reference books, internet.	Subject diary	Traditional electronic and achromatic separation.	3 hrs.
7.	To familiarise image setter, automatic and on line processor.	Learn the image setter, automatic and on-line processor.	Observing analysing space time relation measuring.	Discussion, visual aids.	Chart, diagram, reference books, internet.	Subject diary	Image setter, automatic and on-line processor.	2 hrs.

Unit 6

Image Assembly Stripping and Proofing

Introduction

Stripping refers to the process of preparing and positioning a piece of film for exposure to a printing plate. The stripper could use a variety of techniques. One of the most common methods was to manufacture the film from existing materials in the dark room. The process started with the careful cleaning of a sheet of glass. The glass was then polished with a soft rag and a powder called 'French chalk'. Next substructure of rubber solution or egg albumen solution was poured on the glass, followed by a layer of rubber and naphtha. The final layer was a light sensitive stripping emulsion. While the emulsion is wet, the plate is rushed to the camera and an exposure of the image made. The plate is then taken to the developing area and processed. The wet plate is then taken back to the stripper, and it is immersed in an acetic acid. Even though wet strippers would probably not recognize the materials used today. It would take little retraining for them to function

at a modern light table. The task of positioning film images remains the same, and they would probably be accepted because they would still be called 'Strippers'.

Curriculum Objectives

- To understand the purpose of stripping and proofing in printing process through discussion, preparation and demonstration.
- To recognize the equipments and supplies (materials) used in stripping and proofing through discussion, presentation, demonstration.
- To learn various methods of imposition schemes up to 16 pages, through discussion, layout preparation, demonstration.
- To understand the basic stripping steps through discussion and samples.
- To familiarize several methods of multi-flat registration that include common edge, snap

- fitter and dowel punch and register pins through discussion samples, preparation and demonstration.
- To understand the basic methods of preparing single colour proof through discussion, samples, preparation and demonstration.
 - To familiarize the techniques of preparing both opaque and transparent colour proofs through discussion sample, preparation and demonstration.

Syllabus

Purpose of stripping, proofing in the printing process, tools equipments, and supplies (materials) used in stripping and proofing, various methods of imposition schemes, basic of stripping steps, multi-flat registration that include common edge, snap fitter and dowel, punch and register pins, methods of preparing single colour proof, techniques of preparing both opaque and transparent colour proofs. - 17 hrs.

6.1 Stripping and Proofing

Activity : Group discussion, demonstration using stripped flat and proofing machine. Prepare a stripped flat, use progressive proof to understand the purpose of stripping and proofing.

Discussion Points

- Stripping
- Proofing

- Proof
- Purpose of stripping
- Purpose of proofing
- Progressive proof, its role in printing
- Different types of proofing methods
- Digital proofing?

Consolidation

Stripping and proofing.

Product : Stripped flat, progressive proof, subject diary..

6.2 Tools, materials (supplies) and equipments used in stripping and proofing.

Activity : Group discussion, demonstration, presentation of tools, materials (supplies), equipments and machineries used for stripping and proofing, observe and identify.

Discussion points

- Tools, materials (supplies), equipments, machineries required.

Consolidation.

Tools, materials (supplies), equipments and machineries.

Product : Subject diary.

6.3 Imposition

Activity : Group discussion, presentation of charts, observation, preparation of layout.

Discussion Points

- Imposition
- Different types of imposition schemes
- Importance of imposition
- Draw an imposition scheme up to 16 pages.

Consolidation

Imposition

Product : Imposition layout, subject diary.

6.4 Basic stripping steps

Activity : Group discussion, presentation of stripped flat by preparation.

Discussion Points

- Basic stripping steps.

Consolidation

Stripping.

Product : Stripped flat, subject diary.

6.5 Multi-flat registration, common edge, snap fitter and dowel, punch and register pins.

Activity : Group discussion, preparation and demonstration of multi flat registration with common edge, snap filter and dowel punch and register pins and observe.

Discussion Points

- Multi-flat registration
- Necessity of multi-flat registration

- Common edge method of registration
- Snap-fitter and dowel registration
- Punch and register pins

Consolidation

Multi flat registration.

Product : Registered multi colour flat, subject diary.

6.6 Basic methods of preparing single colour proof.

Activity : Group discussion, preparation and demonstration of single colour proof and observe.

Discussion points

- Proof
- Single colour proofing
- Different types of single colour proofing

Consolidation

Preparation of single colour proof.

Product : Single colour proof, subject diary.

6.7 Techniques of preparing both opaque and transparent colour proofs.

Activity : Group discussion, preparation and demonstration of opaque and transparent colour proofs and observe.

Discussion points:

- Opaque proof
- Transparent proof
- Digital proofing

Consolidation

Opaque and transparent colour proofs.

Product : Colour proofs and subject diary.

UNIT ANALYSIS 6 IMAGE ASSEMBLY, STRIPPING AND PROOFING

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To understand purpose of stripping, proofing in the printing process.	Stripping, proofing.	Observing, comparing, analysing, predicting.	Discussion, demonstration	Stripped flat progressive proof chart, reference book	Stripped flat progressive proof, subject diary.	Subject diary.	3 hrs.
2.	To recognise the equipments and supplies (materials) used in stripping and proofing.	Equipments supplies used in (materials) stripping proofing.	Observing, classifying, analysing, communicating.	Demonstration, discussion.	Tools, materials, reference books, internet	Subject-diary	Equipments and supplies, subject diary.	2 hrs.
3.	To learn various methods of imposition schemes upto 16 pages.	Imposition schemes.	Observing, analysing, classifying, measuring.	Discussion, layout preparation, demonstration.	Charts, Folded sections, Reference books	Layout, subject diary, Folded section.	Imposition schemes, subject diary.	3 hrs.
4.	To understand the basic stripping steps.	Basic stripping steps.	Observing, analysing, classifying, measuring.	Discussion, demonstration.	Stripped flat, reference books.	Subject diary.	Basic stripping steps, subject diary.	3 hrs.
5.	To familiarise several methods of multiflat registration that included common edge, snap fitter and dowel, punch and register pins.	Methods of multiflat registration.	Observing, analysing, classifying, measuring, problem solving.	Discussion, preparation of multiflat registration.	Tools materials, equipments, reference books.	Multi registered flat, subject diary.	Multi registered flat, subject diary.	2 hrs.

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
6.	To understand the basic methods of preparing single colour proof.	Method of preparing single colour proof.	Observing, analysing	Discussion, preparation	Diagram, sample, chart, reference books, internet	Single colour proof, subject diary.	Single colour proof.	2 hrs.
7.	To familiarise the techniques of preparing both opaque and transparent colour proofs.	Idea of preparing opaque and transparent colour proofs.	Observing, analysing, classifying, comparing	Demonstration, preparation	Diagram, sample, chart, reference books	Opaque and transparent colour proof, subject diary.	Opaque and transparent colour proof, subject diary.	2 hrs.

Unit 7

Offset Plate Making

The preparation and printing of most modern metal plates used in offset printing is based on the original concepts of stone printing developed by Aloys Senefelder nearly two hundred years ago. Most proofing materials and plates contain photoemulsion surfaces, which are exposed to light to form an image. During plate making, light passing through a transparent image carrier, such as a film negative or film positive, strikes the plate or proofing material emulsion. The areas effected by the light become the image or the non image areas depending upon the type of photo emulsion used on the proofing or plate material. Most proofing materials and offset plates can be exposed in the same type of exposure unit.

Whether they are used for plate making alone or proofing or day light handling film exposures. Most exposure systems are referred to as plate makers. The simplest sort of exposure system is made up of a vacuum frame with high intensity light source. Some plate makers have the vacuum

frame and light source set with in cabinet. Other design have the frame and lights on rolling stand that can be moved closer or further apart, or use an overhead light source. The vacuum frame holds the film or flat in contact with the proofing material, film or plate. The light source provides the light needed for exposure film or plate.

Curriculum Objectives

- To understand exposure unit or printing down frame through discussion and visual aids.
- To understand actinic light and its action on plate emulsion through discussion, demonstration and experiment.
- To understand how a sensitivity guide can be used to calibrate a plate maker through discussion, demonstration and experiment.
- To understand the characteristics of an offset printing plate through discussion and demonstration.

- To understand the term 'grain' through discussion, presentation of sample and experiment.
 - To familiarise the different types of plates like wipe-on, deep etch, pre-sensitised, photopolymer, diffusion transfer, electrostatic, projection, through discussion, demonstration, assignment.
 - To familiarise the latest developments in plate making like laser exposure system, step and repeat, plate processor automatic and online Computer To Plate (CTP), direct imaging (DI) computer to press through discussion, demonstration and presentation of chart.
- Exposure factor.

Consolidation

Exposure unit.

Product : Subject diary.

7.2 Actinic light

Activities : Discussion, based on the knowledge acquired (spectrum of light), demonstration, preparation of plate through experiment.

Discussion points

- Why fast exposing of plates is not possible by day light?
- Why special light source is used for exposing?

Consolidation

Combination of blue, ultraviolet rays.

Product – Plate, subject diary.

7.3 Calibration of an offset plate exposure.

Activity – Discussion.

Discussion Point

- Intensity of light.
- Necessity of limitation of exposure time.

Consolidation

Exposure time for plates.

Syllabus

Equipment for proofing and plating, offset printing plates, PS plates, wipe on process, special purpose offset plates and plate making system. Diffusion transfer plate, electrostatic plate, projection plates, poly-master, step and repeat plate making system, computer to plate (CTP), plate processor, automatic and online.

- 18 hrs.

7.1 Printing down frame

Activity : Demonstration of equipment

- Working principle.
- Light source.
- Design feature.

Product : Subject diary.

7.4 Characteristics of an offset plates

Activity – Discussion

Discussion Points

- Basic metal.
- Graining.
- Oxidation
- Sensitivity
- Coating thickness.

Consolidation

Basic material, nature of graining, coated (sensitive) material and anodisation of plate.

Product – Subject diary.

7.5 Surface graining

Activity : Presentation and experiments.

- Present an uncoated plates.
- Pour water on both sides.
- Compare both sides.
- Identify the difference.
- Observe non-glazed side with a magnifying glass.
- Difference is noted.

Consolidation

Surface graining of the plate for water receptivity mechanical and chemical graining.

Product : Subject diary.

UNIT ANALYSIS 7 - OFFSET PLATE MAKING

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To understand exposure unit or printing down frame.	Exposure units.	Discussion, space time, relation, measuring, control of variables.	Picture of equipments, demonstration, learning aid.	Process plate, negative and positive films, visual aids, exposure meter, reference books.	Subject diary.	Exposure unit	2 hrs.
2.	To understand the power of actinic light and its action on plate emulsion.	Actinic light and its effect on sensitive plate.	Observing spacetime, relation, measuring, comparing.	Discussion, demonstration, experiment.	Different light sources, chart, technical brochure, exposed and unexposed plate. Reference books	Subject-dairy, exposed plate.	Plate exposure	3 hrs.
3.	To understand how a sensitivity, guide can be used to calibrate a plate maker.	Light effect on plate coating.	Observing discussing, measuring, space time, relation, control of variables.	Discussion, comparison, demonstration, experiment.	Sensitivity guide, processed plate. Reference books	Processed plate	Plate exposure	3 hrs.
4.	To understand the characteristics of a offset printing plate	Characteristics of offset plate.	Observing, analysing, measuring, space time relation, control of variables.	Discussion, demonstration, comparison.	Processed plate, technical leaflets. Reference books	Subject diary.	Characteristics of palte.	3 hrs.

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
5.	To understand the term 'grain'.	'grain.'	Observing, identifying.	Presentation of sample	Used offset plate, different types of offset plate.	Subject diary.	Grains	3 hrs.
6.	To familiarise different types of plates like wipe-on, pre sensitised, deep etch, photo polymer, diffusion transfer, electro static, projection.	Different types of offset plates.	Observing, analysing, measuring, control of variables, space time, relation inference.	Discussion, demonstration, assignment.	All types of plate.	Subject diary.	Types of plate.	2 hrs.
7.	To familiarise latest developments in plate making like laser exposure system, step and repeat, plate processor automatic and on-line, Computer to Plate (CTP), Direct Imaging (DI) Computer to Press	Latest developments of plate exposures, processors, automatic and on line CTP, DI.	Analysing, measuring, control of variables, space time, relation, inference.	Discussion, demonstration	Charts, reference books, internet.	Subject diary.	Latest development	2 hrs.

Unit 8

Printing presses

Introduction

Introduction

A printing press is a machine that transfers an image from some sort of plate or image carrier to a substrate, such as paper. It is important to understand that every printing press is built from four basic units like feeder, registration, printing and delivery.

In this unit, the development of printing presses and operation of the four basic units are discussed. Much of this discussion will centre around the system used on offset presses, as offset printing is the printing method most used industrially. A brief look at press development will help you to understand the operation of a modern offset press.

Curriculum Objectives

- To understand the four units that makeup any printing press through discussion, chart and demonstration.

- To familiarize the principle of offset printing through discussion, presentation.
- To understand cylinder configuration and different units of offset machine through discussion, chart, demonstration.
- To understand the operation of the feeder unit, registration unit, printing unit, inking unit, dampening unit, delivery unit of an offset press through discussion, chart, demonstration.
- To understand about web offset machine through discussion, chart, demonstration.

Syllabus

Four press units, press developments, offset principle, classifying offset presses, cylinder configuration.

Offset press operation, feeder unit, registration unit, printing unit, inking unit, damping unit, delivery unit. Web offset machine. - 15 hrs.

8.1 Four units of printing press.

Activity : Discussion, chart presentation.

- Introduce the basic four units of a printing press through discussion.
- Understand the units with the help of chart.
- Let the learner aware the four basic units.

Discussion points

- Feeder unit working.
- Registration unit working.
- Printing unit working.
- Delivery unit working.

Consolidation point

Four units of printing press.

Product – subject diary.

8.2 Principle of offset printing

Activity : Discussion chart presentation.

- Basic principle of offset printing – water and oil don't mix together.
- Chart is presented to identify the surface separation.

Discussion points:

- Alois Senefelder the inventor of this process.
- Non image area receives water – hydrophilic nature.
- Image area receives ink – oleophilic nature.

Consolidation point

Basic principle of offset printing

Oleophilic and hydrophilic nature.

Product – Subject diary.

8.3 Cylinder Configuration

Activity : Discussion, charts presentation, lab demonstration.

- Discussing cylinder configuration.
- Three cylinder configuration.
- Two cylinder configuration. (The plate and impression functions are combined on a main cylinder with twice the circumference of the blanket cylinder.

Chart presentation

- Lab demonstration to learn cylinder configuration.

Discussion points

- Plate cylinder and its parts.
- Blanket cylinder and its parts.
- Impression cylinder and its parts.

Consolidation point:

Different cylinder configuration.

Product – Subject diary

8.4 Operation of different units

Activity – Discussion, chart presentation, lab demonstration and assignments, visual aids.

Discussion points

- Operation of feeder unit.
- Register unit.
- Printing unit.
- Inking unit – features – characteristics.
- Damping unit – features – characteristics.
- Delivery unit.

Consolidation point

Functions of different units.

Product – subject diary.

8.5 Web offset machine

Activity : Discussion, chart presentation, visual aids, field visit.

Discussion points

- Parts of web offset machine.

Consolidation point

Parts of web offset machine.

Product – Subject dairy.

UNIT ANALYSIS 8 - PRINTING PRESS INTRODUCTION

Sl. No.	Curriculum Objectives	Concepts/Ideas	Process Skills	Activities	Learning materials	Product	Evaluation	Time
1.	To understand the Four units that make-up any printing press.	Four units that make-up any printing press.	Observing, analysing, communicating.	Discussion, Demonstration	Chart, Machine, Reference book, internet	Subject diary.	Four basic units.	3 hrs.
2.	To familiarise the principle of offset printing.	Basic principle of offset printing.	Observing, Analysing.	Discussion	Chart, Reference books	Subject-diary	Basic principles	2 hrs.
3.	To understand cylinder configuration and different units of offset machine.	Cylinder, fonfiguration and different units of offset machine.	Observing analysing, communicating.	Discussion, chart presentation	Charts, machine, reference books, internet	Subject diary.	Cylinder configuration, different units of offset machine.	3 hrs.
4.	To understand the operation of the feeder unit, registration unit, printing unit, inking unit, dampening unit, delivery unit of an offset press.	Operation of feeder unit registration, unit, printing unit, inking unit, damping unit, delivery unit of an offset machine.	Observing, analysing, communicating.	Discussion, chart presentation, demonstration, assignment.	Charts, machine, reference books, internet	Subject diary.	Operation of various units, Assignment.	4 hrs.
5.	To understand about web offset machine.	Web offset machine.	Observing, analysing	Discussion, chart, field visit presentation, and visual aids.	Charts, machine, reference books, internet	Subject diary, field visit diary.	Web offset machine	3 hrs.

PART III
SAMPLE QUESTIONS

Sample Questions

Unit 1

The Printing Industry

- I. What is the sequence of steps that all printers follow regardless of the printing process they are using. Explain the purpose of each of the steps in the printing sequence for offset/planographic process.

Hints : The printing industry has long consisted of shops identified with a particular process. More recently, it is common for a printing establishment to use a variety of printing processes. Regardless of the printing process used, there is a sequence of steps that all printing follows. Following are a few of the steps and the purposes. They are to be explained in detail.

- Image design – Image is designed to meet the need.
- Image assembly – Image converted into

films are placed in the proper printing order.

- Image transfer – The image must be printed on to a receiver material.
- Finishing – The last steps which combines the printed materials into a final finished form. - 15 score

- II. What kind of printing services do trade shops provide for the Printing Industry?

Hints: Some shops provide services only to the printing trade. These are called trade shops. Not all printing and packaging units can afford to own and operate all the equipment necessary to meet their total production requirements. Hence, they have no other alternative, but to depend upon trade shops to fulfill their quick production needs.

- 4 Score

Unit 2

Design concerns for Printing

- I. Thumb nails, roughs, comprehensives, mechanical and dummies are all used during image design. Discuss the purpose and preparation of each on a typical printing assignment which you yourself may assume as the work for reproduction on hand.

Hints : The basic task is to produce an image that will communicate the desired message to the intended audience. The steps that graphic artists have traditionally followed to accomplish this task consist of the following.

1. Preparing a set of thumb nail sketches.
2. Preparing rough layouts based on the preliminary thumb nail sketches.
3. Preparing a comprehensive layout.
4. Preparing a final layout or mechanical.

To illustrate this process you may follow the above steps on a typical printing assignment. Assume that you have been contracted to produce an announcement of a local printing association meeting. - 15 score

- II. Copy fit 15 lines of type written copy containing 840 words. The copy is to be set in 10 point type, which will average 2.62 characters per pica. The copy is to be set 10/12 on a 20 pica line measure. How much space the type written copy will occupy after it is type set.

Hints: Find the total number of characters in a line

- $(20 \times 2.62 = 52.40$ character in a line.)
There after find out the total number of type set lines.
- $(840 / 53 = 17$ lines
Depth of 17 lines = 17 ems
Page dimension = 20×17 ems

- 4 Score

Unit 3

Layout and Paste-up

- I. When are register marks used? What is the purpose of register in each stage?

Hints: On single colour process, one colour of a multi colour job is printed first. The paper is then returned to the press, and another colour is printed. The second and subsequent colours print precisely over those from the first. - 15 Score

- II. What is a reverse ? A surprint? How they are created on a printing plate.

Hint : Many jobs require the use of reverse or surprints to create a special image or effect. Recognizable the image is created in the absence of a printed image on the printing plate by using film positive, film negative and a screen tint.

An image is printed over another image especially to print dark type over a light area of a half tone. - 4 Score

Unit 4

Computer Image Generation

I. What is the advantage of automatic page make up with text and graphics integration.

Hints: Advanced composition system feature software for automatic page make-up. With page make up software, a compositor can cause the computer to compose a file or make all of the decisions that a layout artist would make during paste-up. This includes both text and graphics are integrated on a type set page. In addition to this, several other software are provided to perform many typographical functions/operations. Mention the use of these softwares. - 15 Score

II. What are the advantages and disadvantages of a desktop composition system?

Hints: Micro computer based composition system have become known as 'desk top composition' or 'desk top publishing' systems. Advanced composition software for desktop systems can perform all of the functions a larger system is likely to offer. They are generally much slower than larger systems. - 4 Scores

Unit 5

Colour Separation

I. What are the three purposes of masking in colour separation?

Hints: Tone correction, colour correction and sharpness enhancements are to be attained in colour reproduction. Now a days electronic colour scanner is doing the masking step electronically. A computer can be programmed to adjust the final separated digital images before they are output on to film or printing plates. The purposes to be explained. - 4 Score

II. What are the three general methods of making colour separations? Briefly introduce the basic steps involved in each method.

Hints: Direct and indirect screen photographic methods were followed before the introduction of electronic colour separation by scanner. Colour separation is the process of separating the hues of a continuous – tone colour original into four negatives to prepare the printing colours. In conventional method colour filters are used. Colour masks are produced. Each half tone negative is made in a single step by exposing a sandwich consisting of the mask, half tone screen and film through the appropriate filter.

In electronic colour separation, colour densities of the original are electronically measured and those measurements are stored

as digital information in computer memory, manipulates or alters the digital data to obtain the best printing results. - 15 Score

Unit 6

Image Assembly

- I. Draw the imposition scheme for 16 page section to be worked as sheet work, starting from page 65.

Hints : Imposition refers to the placement of images in the correct position on the printing plate so they will be printed in the desired location on the final printed sheet.

Two printing plates are used in sheet-wise imposition. One printing plate is used to print on one side of a press sheet. A second plate, containing different information, is made the sheets are turned over and are printed on the other side from the second plate. - 4 Score

- II. What are the two basic approaches of multi-flat stripping for process colour work?

Hints: The most accurate method of positioning multiple flats is to use some type of master image stripped into a master flat as a guide for all subsequent images and flats. There are two basic approaches: Blue line flats and single master flat. Negatives are generally used to assemble the blue line flat.

The most common registration technique for colour negative stripping is the use of a single master flat as a guide for all other flats in the

job. For flat colour, the master flat is generally the one that carries the greatest amount of detail.

Four colour stripping with a master flat may be explained. - 15 Score

Unit 7

Offset Plate Making

- I. How do presensitized surface plates differ from wipe-on plates, and what are the advantages of presensitized plates?

Hints: Pre-sensitized surface plate is a refinement of the early attempts to sensitize a lithographic stone with a photo graphic emulsion in the wipe-on metal surface plate. An emulsion is coated onto a pregrained plate immediately prior to plate exposure. Negative and positive films are used in plate making. Wipe on plates are exposed through a film negative and processed by one of two methods.

The gum solution serves the dual function of removing any unexposed emulsion and making the non-printing area water-receptive. The second solution is then rubbed over the entire plate and the plate is washed.

Presensitized surface plates – emulsion surface ready coated on the metal base. After exposure the plates are processed with ease. This can be used for high quality long run work.

Almost all presensitized emulsion coating materials used today are of a light sensitive

mixture. The primary ingredient is nitrogen which is released during exposure. The plate is processed by additive and subtractive methods.

Negative – acting presensitized emulsions are exposed by light passing through the open or the image areas of a film negative. After exposure, the exposed emulsion is removed by wiping it with a special developer. The developing action is halted by a fixing agent and then a solution is applied. This adheres to the image areas. - 15 Score

II. What is the advantage of electrostatic plates?

Hints : The process of making electrostatic transfer plates is based on the concept of xerographic image reproduction. The basic procedure involves the formation of an image by light striking a photo responsive surface that has been charged with static electricity. Selenium and zinc oxide components are used. During exposure positive charge is lost in the non-image areas. Resin powder is used to dust the image area. - 4 Score

Unit 8

Printing Press – Introduction

I. How is registration controlled on a sheet-fed offset press.

Hints: Registration is the process of controlling and directing the sheet as it enters the printing unit. The goal of registration is to ensure absolute consistency of image position on every sheet printed.

Typical registration systems, devices provided in the registration board, squaring the paper to the plate cylinder, functions of side lay and its working principles, actual operation of registration is performed just before it enters the printing unit. Basically there are two types of sheet-fed automatic registration systems. “Three point guides” and “rotary” or “roller guides”; functions of these registration systems to be explained in detail. - 15 Scores

II. Why must adjustment be made to control impression? How is impression pressure controlled in an offset printing machine:

Hints : The gap between the blanket cylinder and the impression cylinder effects the final image quality. The pressure of impression must be just sufficient to transfer a dense ink image. Adding and removing impression sheets and their effect in printing, cam adjustment, simple screw adjustment and its effect etc. to be detailed. - 4 Scores