

LEARNING OUTCOME BASED VOCATIONAL CURRICULUM

CLASS 11 & 12

**SECTOR:
MEDIA &
ENTERTAINMENT**

JOB ROLE

ASSISTANT OFFSET PRINTING OPERATOR

(QUALIFICATION PACK: REF. ID. MES/ASAP/Q005)



State Council of Educational Research & Training (SCERT) Kerala

(Department of General Education, Government of Kerala)

Vidhya Bhavan, Poojappura, Thiruvananthapuram



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www.scert.kerala.gov.in

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April 2021

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FOREWORD

A collaborative initiative for developing learning outcome based vocational curriculum and courseware aimed at integrating both vocational and general qualifications has been implemented by the State Council of Educational Research and Training (SCERT) Kerala and the PSSCIVE Bhopal. This is intended to open up pathways of career progression for students and the SCERT Kerala is developing curricula under the project as an integral part of Vocationalisation of Education under Samagra Shiksha, approved by the Government of Kerala. Decisive improvement in the teaching-learning process and working competencies through learning outcomes that have been judiciously embedded in the vocational subject is expected to be the major impact that will be brought about by the learning outcome based vocational curriculum.

It is a matter of great pleasure to introduce this learning outcome based vocational curriculum as part of the vocational training package for the job role of Assistant Offset Printing Operator (MES/ASAP/Q005). The curriculum has been developed for the higher secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

The key aim of the curriculum will be to provide children with employability and vocational skills that would in turn aid occupational mobility and lifelong learning. A major transformation in the teaching process is also aimed at, which will be brought about through interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences.

The curriculum has been meticulously developed and judiciously reviewed by a group of experts and their much-valued contributions are immensely acknowledged. The imminent utility of the curriculum will without doubt, be adjudged by the qualitative improvement that it brings about in teaching-learning. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about further enhancement and augmentation to this document.

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ACKNOWLEDGEMENTS

We are grateful to the Director, National Council of Educational Research & Training (NCERT) and Prof. Rajesh PKhambayat, Ph.D., Joint Director, PSSCIVE Bhopal for their support and guidance. We also acknowledge the contributions of the officials at the Technical Support Group of *Samagra Shiksha*, MHRD, National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC), Media and Entertainment Skill Council of India (MESCI) and ASAP Kerala for their support and cooperation.

We are extremely thankful to Dr. RVG Menon, Chairperson, High Power Committee for the implementation of NSQF in Kerala, Dr. Sukesh Kumar, Former Principal, Government Engineering College Palakkad and Sri. G S Unnikrishnan Nair, Former Director State Agricultural Management and Extension Training Institute (SAMETI), Thiruvananthapuram for their mentorship in the process of developing this document. The contributions made by Dr. Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC), PSSCIVE Bhopal in development of the curriculum are duly acknowledged.

We are grateful to the experts for their earnest efforts and contributions in the development of this learning outcome based vocational curriculum. Their names are acknowledged in the list of contributors.

We are grateful to the Vocational Higher Secondary wing of the Directorate of General Education (DGE) Kerala for extending the support to develop this curriculum document on time by providing the service of its teaching staff.

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1. COURSE OVERVIEW

COURSE TITLE: ASSISTANT OFFSET PRINTING OPERATOR

GENERAL OBJECTIVES

Assistant Offset Printing Operator is a course based on Printing industry. This industry is composed of thousands of companies that produce textbooks, newspaper, magazines, packaging and many other printed products. Printing industry has an immense technological growth. Disruption in electronics and computer technologies have completely changed the industry. Printing institutions need workers who can use computer software and other equipment and should have solid understanding of the entire production process. Of the different printing methods in this industry; the most dominated printing is the Offset Printing process. This course aims to make the students skilled in various aspects of offset printing like;

- to understand the main steps in print production workflow
- to comprehend the process of CTP.
- to explain the basic principle of Offset printing
- to demonstrate the offset machines and its components.
- to manage the safety and health while doing offset operations.
- to describe the basic steps for setting up and operating an offset press
- to demonstrate the common press maintenance steps.
- to identify and solve various problems arises during printing.
- to list and describe basic print finishing operations
- to differentiate among various types of binding
- to describe various packaging methods
- to list out different electrical, mechanical, electronics and pneumatic parts of an offset machine.

COURSE OUTCOMES

On completion of the course, students should be able to;

- apply effective oral and written communication skills to interact with people and customers;
- identify the principal components of a computer system.
- demonstrate the basic skills of using computer.
- demonstrate self-management skills.
- demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities.
- demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection.

- develop an awareness about the history of printing
- list out the main steps in print production workflow
- differentiate among the various conventional printing process
- identify the various NIP printing process and its advantages
- differentiate among various colours used in printing
- handle colour separation techniques
- design a page using page layout and image editing software
- explain the process of CTP.
- to explain the basic principle of Offset printing
- differentiate the offset machines and its components.
- manage the safety and health while doing offset operations.
- perform Jogging, loading of paper on pile board and mounting of plate
- perform the cleaning of plates, blanket cylinders, and inking rollers.
- develop skill in proper maintenance and care of the machine components.
- differentiate among various substrates, ink and chemicals used in printing
- describe basic steps for setting up and operating an offset press
- demonstrate the common press maintenance steps.
- demonstrate printing jobs on a sheet fed offset machine
- describe basic components and functioning of a web offset
- identify and solve various problems arises during printing.
- demonstrate different quality control devices
- list and describe basic print finishing operations
- differentiate among various types of binding and explain their application
- explain the scope of packaging
- describe various packaging methods
- list out different electrical, mechanical, electronics and pneumatic parts of an offset machine.

COURSE REQUIREMENTS

The learner should have the basic knowledge of science.

COURSE DURATION: 600 hrs

Class 11	300 hrs
Class 12	300 hrs
Total	600 hrs

2. SCHEME OF UNITS

The unit-wise distribution of hours and scores for Class 11 is as follows:

CLASS 11			
	Units	No. of Hours for Theory and Practical = 300	Max. Scores for Theory and Practical =100
Part A	Employability Skills		
1.	Communication Skills – III	25	10
2.	Self-management Skills – III	25	
3.	Information and Communication Technology Skills – III	20	
4.	Entrepreneurial Skills – III	25	
5.	Green Skills – III	15	
	Total	110	10
Part B	Vocational Skills		
6.	Unit 1: Introduction to Printing	18	
7.	Unit 2: Various Printing Processes	18	
8.	Unit 3: Colours in Printing	12	
9.	Unit 4: Image Carrier preparation in Offset	30	
10.	Unit 5: Technology of Offset Printing	34	
11.	Unit 6: Safety and Green Printing	15	
12.	Unit 7: Make ready and Working of a Sheet-fed Offset Press	38	
	Total	165	40
Part C	Practical Work		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	10	35
Part D	Project Work/Field Visit/ OJT		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	15	15
	Grand Total	300	100

The unit-wise distribution of hours and scores for Class 12 is as follows:

CLASS 12			
	Units	No. of Hours for Theory and Practical =300	Max. scores for Theory and Practical = 100
Part A	Employability Skills		
1.	Communication Skills – IV	25	10
2.	Self-management Skills – IV	25	
3.	Information and Communication Technology Skills – IV	20	
4.	Entrepreneurial Skills – IV	25	
5.	Green Skills – IV	15	
	Total	110	10
Part B	Vocational Skills		
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7.	Unit 2: Offset Operation	40	
8.	Unit 3: Web Offset Press	28	
9.	Unit 4: Troubleshooting and Quality Control	26	
10.	Unit 5: Finishing and Binding Operations	32	
11.	Unit 6: Package Printing	12	
12.	Unit 7: Basic Engineering	7	
	Total	165	40
Part C	Practical Work		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	10	35
Part D	Project Work/Field Visit/OJT		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	15	15
	Grand Total	300	100

3. LEARNING OUTCOME BASED ACTIVITIES

Classroom, Laboratory/workshop and field are the key spots where teaching and learning take place. Classroom and laboratory-based teaching and learning facilitate knowledge creation whereas field visits open venues for free interaction with experts and also helps acquaint learners with

various tools, materials, equipment procedures and operations in the workplace. While considering these intensified ways of knowledge acquisition, emphasis should also be laid on the occupational safety, health and hygiene of the participants.

Classroom activities

Classroom activities are mainly interactive lecture sessions, followed by discussions and doubt clarifications. Classes are handled by trained vocational teachers and this is considered as an integral part of the course. The most attractive feature of the class is that the classes are in tune with the outcome-based curriculum. Teaching learning processes are well planned and implemented. Teaching learning materials such as audio-visual materials, colour slides, charts, diagrams, models, exhibits, handouts, on-line teaching materials etc., have been incorporated in accordance with the topic and this may help the teachers to impart the content in an effective manner.

Practical work in Laboratory / Workshop

Practical work is usually performed to enhance the skills of the learners which are indeed essential for them to become specialized technicians. Practical sessions may include hands on training, simulation training, role-play, case-based studies and exercises. Equipment and other appliances are available for use in abundance. Trained personnel teach and exercise specialized techniques. Practical classes involving laboratory/workshop are well planned with tools, equipment, materials and also other skill acquisition activities. Vocational teachers should submit the plan of laboratory/workshop work in advance to the head of the institution and get it sanctioned prior to use.

Field visits/ Educational Tour

Field visit is one of the ways and means of learning outside the classroom. It promotes knowledge acquisition by giving opportunity to learners to interact with renowned experts and to make observations of the activities performed by them. An observation check list may help the students to ensure the collection of required information and its analysis for further use. This may be developed with the help of vocational teachers who are in charge of outdoor learning activities. All the field visits are well planned by taking into consideration of the learning requirements, distance to travel, time, health and hygiene. The Principal and teachers should plan to implement at least three field visits within a year by making all necessary arrangements.

Virtual Field Visits, Expert Interactions and Practical Activities

With the rapid potentials offered by information technology in digital classrooms, the extent of virtual field visits, online expert interactions and online demonstrations cum practical activities can be worked out. It may be helpful amid the current Covid 19 pandemic scenario. A State level cluster

of teachers and experts in the concerned subject can be pooled together for the purpose. The guidelines for such activities can be issued by the concerned SCERTs.

Suggested Topics for Expert Interaction

1. Print production workflow
2. Image carrier preparation
3. Printing Material Science
4. Pre-press operations
5. Computer to Plate
6. Safety and Green printing
7. Modern offset machines
8. Digital Printing
9. Web offset
10. Trouble shooting in printing
11. Print finishing operations
12. Packaging Industry

4. ASSESSMENT AND CERTIFICATION

The National Skill Qualification Framework (NSQF) is based on outcomes rather than inputs referred by the National Occupation Standards (NOSs). Learning outcomes, as per the NSQF level descriptors, include the Process, Professional Knowledge, Professional Skills, Core Skills and Responsibility. Knowledge in the job of a learner shall be the basis of assessment. It would also be considered if the learning program undertaken by the learner has delivered the required output. Certification is based on required standards so that the learner and the employer could come to know about the competency attained in the vocational subject/ course. In order to make the assessment reliable, valid, flexible, convenient, cost effective, fair and transparent standardised assessment tools are to be used. Technology assisted assessment process is in vogue now.

Knowledge Assessment (Theory)

Knowledge Assessment usually includes two components – Internal Assessment and External Assessment. External assessment includes theory examination conducted by the concerned examination Boards. Tools for assessment contain components for testing the application of knowledge. Knowledge testing can be performed by making use of either objective or short answer type paper-based test. Source of the questions should be the content of the curriculum.

Written Test

A group, comprising of academicians, experts from existing vocational subject experts / teachers, subject experts from University/ College or from the industry prepare theory question paper for the vocational subjects. A panel of experts for question paper setting and conducting examination should be formed by the respective central / state boards. Written tests allow the learners to demonstrate that they have acquired the necessary knowledge and skill in the given topics.

The blue print for the question paper may be as follows:

Duration: 3 hrs

Maximum scores:50

No. of Questions					
	Typology of Question	Very Short Answer (1 Score)	Short Answer (2 Scores)	Long Answer (3 Scores)	Scores
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	3	3	3	18
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	4	3	19
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, provide an example, or solve a problem)	0	2	1	07
4.	High Order Thinking Skills – (Analysis and Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	2	0	04
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	Total	5x1=5	12x2=24	7x3=21	50 (24 questions)

Skill Assessment (Practical)

Skill assessment should be done by considering the practical demonstration of skills by the candidate. It is assessed by making use of a competency checklist prepared by experts. The competency checklist should be developed as per the National Occupation Standards (NOSs). This should be in tune with the qualification pack for the Job Role to ensure necessary consistency in the quality of assessment across different sectors and institutions. As per the performance criteria defined in the National Occupation Standards, the students have to demonstrate their competencies in front of the examiners. Assessment will indicate whether they are competent or incompetent. The assessors assessing the skills of the students should possess enough industrial experience and should have undergone a rigorous training in assessment principles and practices. The Sector Skill Councils (SSCs) should ensure that the assessors are given the required training on the assessment of competencies.

The demonstration of knowledge and skill in performing a task of the learners, is the purpose of the practical examination. This include practical examination where hands on experience will be displayed and a viva voce. A team of two evaluators, one a subject teacher and the other an expert from the relevant industry certified by the relevant Board or SSCs concerned can conduct practical examination as well as viva voce.

Project Work

Project is an efficient strategy to assess the practical skills acquired along a certain timeline. Project is chosen and given to candidates only on the basis of their capabilities, because it needs specific skills. It is performed step by step and the first and foremost step is classroom discussion and selection of the topic for the project. After fixing the topic and objectives, the methodology of the project work should be decided during the classroom discussions. Monitoring and evaluation should be done at each stage. Proper feedback shall be provided to the learners for improvement and innovation. Field visits can be organized as part of the project work. The data collected may be used for presentations and report writing. Accuracy of the data is to be ensured. The entire project work is maintained as a practical work file or as student's portfolio.

Student Portfolio

It is a document that supports the candidate claim of competencies acquired as a part of the teaching learning process. The student portfolio is a compilation of project reports, articles, photos of products prepared by the student.

Viva Voce

Viva voce provides chance to each candidate to demonstrate communication skills and content knowledge. It is a way of obtaining feedback on the student's experience, learning, project work

and field visit. Audio visual recording of the whole procedure can be done for future reference and documentation. A Board, including external examiners, is constituted as per the norms which in turn should be suitably adapted to the specific requirement of the vocational subjects.

The central/state examination board for secondary education and the respective Sector Skill Councils can certify the competencies of the learner upon the successful completion of the course.

5. UNIT CONTENTS

CLASS 11

Part A: Employability Skills

Sl.No.	Units	Duration(hrs)
1.	Communication Skills- III	25
2.	Self-management Skills – III	25
3.	Information and Communication Technology Skills - III	20
4.	Entrepreneurial Skills – III	25
5.	Green Skills – III	15
	Total	110

Unit 1: Communication Skill– III

Expected learning Outcomes	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate knowledge of various methods of communication	<ul style="list-style-type: none"> ➤ Methods of communication • Verbal • Non-verbal • Visual 	<ul style="list-style-type: none"> • Writing pros and cons of written, verbal and non-verbal communication • Listing do's and don'ts for avoiding common body language mistakes 	05
2. Identify specific communication styles	<ul style="list-style-type: none"> • Communication styles- assertive, aggressive, passive-aggressive, submissive, etc. 	<ul style="list-style-type: none"> • Observing and sharing communication styles of friends, teachers and family members and adapting the best practices • Roleplays on communication styles. 	10
3. Demonstrate basic writing skills	<ul style="list-style-type: none"> ➤ Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph 	<ul style="list-style-type: none"> • Demonstration and practice of writing sentences and paragraphs on topics related to the subject 	10
Total			25

Unit 2: Self-Management – III			
Expected learning Outcomes	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate impressive appearance and grooming	<ul style="list-style-type: none"> Describe the importance of dressing appropriately, looking decent and positive body language Describe the term grooming Prepare a personal grooming checklist Describe the techniques of self- exploration 	<ul style="list-style-type: none"> Demonstration of impressive appearance and groomed personality Demonstration of the ability to self- explore 	10
2. Demonstrate team work skills	<ul style="list-style-type: none"> Describe the important factors that influence in team building Describe factors influencing team work 	<ul style="list-style-type: none"> Group discussion on qualities of a good team Group discussion on strategies that are adopted for team building and team work 	10
3. Apply time management strategies and techniques	<ul style="list-style-type: none"> Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks. 	<ul style="list-style-type: none"> Game on time management Checklist preparation To-do-list preparation 	05
Total			25

Unit 3: Information and Communication Technology - III			
Expected learning Outcomes	Theory (08 hrs)	Practical (12 hrs)	Duration (20 hrs)
1. Create a document on word processor	<ul style="list-style-type: none"> Introduction to word processing. Software packages for word processing. Opening and exiting the word processor. Creating a document 	<ul style="list-style-type: none"> ➤ Demonstration and practice of the following: <ul style="list-style-type: none"> Listing the features of word processing Listing the software packages for word processing Opening and exit the word processor Creating a document 	10
2. Edit, save and print a document in word processor	<ul style="list-style-type: none"> Editing text Wrapping and aligning the text Font size, type and face Header and Footer Auto correct 	<ul style="list-style-type: none"> ➤ Demonstration and practising the following: <ul style="list-style-type: none"> Editing the text Word wrapping and alignment 	10

<ul style="list-style-type: none"> • Numbering and bullet • Creating table • Find and replace • Page numbering • Printing document • Saving a document in various formats 	<ul style="list-style-type: none"> • Changing font type, size and face • Inserting header and footer • Removing header and footer • Using autocorrect option • Insert page numbers and bullet • Save and print a document 	
Total		20

Unit 4: Entrepreneurial Skills – III			
Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the significance of entrepreneurial values and attitude	<ul style="list-style-type: none"> • Values in general and entrepreneurial values • Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work 	<ul style="list-style-type: none"> • Listing of entrepreneurial values by the students. • Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur • Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments 	10
2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	<ul style="list-style-type: none"> • Attitudes in general and entrepreneurial attitudes • Using imagination/ intuition • Tendency to take moderate risk • Enjoying freedom of expression and action • Looking for economic opportunities • Believing that we can change the environment • Analyzing situation and planning action • Involving in activity 	<ul style="list-style-type: none"> • Preparing a list of factors that influence attitude in general and entrepreneurial attitude • Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test • Preparing a short write-up on “who am I” • Take up a product and suggest how its features can be improved • Group activity for suggesting brand names, names of enterprises, etc. 	15
Total			25

Unit 5: Green Skills – III			
Expected Learning Outcome	Theory (07 hrs)	Practical (08 hrs)	Duration (15 hrs)
1. Describe importance of main sector of green economy	<ul style="list-style-type: none"> Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management Policy initiatives for greening economy in India 	<ul style="list-style-type: none"> Preparing a poster on any one of the sectors of green economy Writing a two-page essay on important initiatives taken in India for promoting green economy 	08
2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	<ul style="list-style-type: none"> Stakeholders in green economy Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries 	<ul style="list-style-type: none"> Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries 	07
Total			15

PART B: VOCATIONAL SKILLS

Unit No.	Units	Duration (hrs)
1.	Unit 1: Introduction to Printing	18
2.	Unit 2: Various Printing Processes	18
3.	Unit 3: Colours in Printing	12
4.	Unit 4: Image Carrier Preparation in Offset	30
5.	Unit 5: Technology of Offset Printing	34
6.	Unit 6. Safety and Green Printing	15
7.	Unit 7. Make Ready and Working of a Sheet-fed Offset Press	38
Total		165

Unit 1: Introduction to Printing			
Expected Learning Outcome	Theory (14 hrs)	Practical (4 hrs)	Duration (18 hrs)
1. Explain the origin, development and history of printing	<ul style="list-style-type: none"> Definition of printing, Image carrier, ink, substrate, printing press Brief history of printing Contributions of Guttenberg, Senifeilder and Irra Rubel to printing 		2
2. List and describe the different steps in print production work-flow	<ul style="list-style-type: none"> Creative work Creative production . Industrial Production - pre-press, press, post-press Logistics 	<ul style="list-style-type: none"> To go through a sample production process 	8
3. Identify various	<ul style="list-style-type: none"> Books 	<ul style="list-style-type: none"> Identify 	4

print media products	<ul style="list-style-type: none"> • Periodicals • Brochures • Posters and dangler • Various packaging products 	and collect various print media products	
4. Describe the structure of each printing organization	<ul style="list-style-type: none"> • Organizational structure of a printing company • Division of Printing Industry • Commercial printing • Digital, • Newspaper and periodicals • Other printed media • Packaging and functional printing such Flexo and screen printing 		4
Total			18

Unit 2: Various Printing Processes

Expected Learning Outcome	Theory (8 hrs)	Practical (10hrs)	Duration (18 hrs)
1. List major printing processes and explain the differences among them	<ul style="list-style-type: none"> • Classification of Printing - Conventional Printing and Non-Impact printing • Relief, Intaglio, Planography and Screen Printing 	<ul style="list-style-type: none"> • Compare the different image carriers of the printing processes 	8
2. Identify the major Non-Impact Printing (NIP) processes	<ul style="list-style-type: none"> • Ink-jet • Dye sublimation • Ionography • Electrophotography • Magnetography 	<ul style="list-style-type: none"> • Comparing various products printed using different NIP processes. 	6
3. List out the advantages and applications of NIP	<ul style="list-style-type: none"> • Advantages, applications and dis-advantages of NIP 		4
Total			18

Unit 3: Colours in Printing

Expected Learning Outcome	Theory (4 hrs)	Practical (8hrs)	Duration (12 hrs)
1. Explain basic colour theory	<ul style="list-style-type: none"> • Primary colours • Secondary colours • Colour psychology 		3
2. Differentiate among various colour modes in printing.	<ul style="list-style-type: none"> • CMYK, RGB, LAB • Monotone, Duotone, triton, Quadra tone, Hexa chrome 	<ul style="list-style-type: none"> • Conversion of Colour modes of a photograph in different software. 	3
3. Demonstrate the colour separation process	<ul style="list-style-type: none"> • Colour filters • Scanners • Colour correction 	<ul style="list-style-type: none"> • Colour separation of an original using scanner 	6
Total			12

Unit 4: Image Carrier Preparation in Offset			
Expected Learning Outcome	Theory (10 hrs)	Practical (20hrs)	Duration (30 hrs)
1. Explain layouts and imposition methods used for printing	<ul style="list-style-type: none"> Layout preparation Imposition and types of imposition Electronic imposition and its advantages Resolution RIPing colour separation for output. 	<ul style="list-style-type: none"> Layout preparation using Photoshop and CorelDraw Imposition using Photoshop and CorelDraw Data file creation RIPing and colour separation using pre-press software. 	12
2. Describe the characteristics of an Offset plates and its preparation methods	<ul style="list-style-type: none"> Structure of offset plates Types of offset plates Coating materials of plate 	<ul style="list-style-type: none"> Identify the metal used in offset plates. Assessing the various samples of offset plates. 	7
3. Demonstrate the operation of a printing down frame	<ul style="list-style-type: none"> Functioning of a printing down frame Expose and develop a PS plate. Calibration method in plate making 	<ul style="list-style-type: none"> Operating printing down frame Exposing plate Developing plates Use of various chemicals in the plate making room Application of gum and image removers on the plate 	5
4. Explain the CTP process of plate preparation.	<ul style="list-style-type: none"> Components of CTP Technology of CTP Imaging methods of CTP Quality control in CTP Direct on press plates Green impacts 	<ul style="list-style-type: none"> Plate loading on CTP machine CTP Plate developing Storage Use of various chemicals in CTP developing. 	6
Total			30

Unit 5: Technology of Offset Printing			
Expected Learning Outcome	Theory (10 hrs)	Practical (24 hrs)	Duration (34 hrs)
1. Explain the basic principle of Offset printing	<ul style="list-style-type: none"> Basic principle of offset. Working principle of offset Hydrophilic and oleophilic properties Process colours for printing 	<ul style="list-style-type: none"> Differentiate oleophilic and hydrophilic nature of an offset plate List out the process colours used for printing. 	5
2. List out the press development stages in printing	<ul style="list-style-type: none"> Platen press Flatbed cylinder press Rotary press 		2
3. Differentiate among offset presses	<ul style="list-style-type: none"> Sheetfed offset Web offset 	<ul style="list-style-type: none"> Demonstrate the working of sheet fed offset press and 	4

	<ul style="list-style-type: none"> • Waterless offset • Hybrid technology press • Digital offset • Perfecting press 	compare it with other printing processes	
4. Identify the different units of an offset press	<ul style="list-style-type: none"> • Feeding Unit • Registration unit • Printing units • Coating unit • delivery unit • Press console 	<ul style="list-style-type: none"> • Operating different units of a sheetfed press 	18
5. Differentiate among various press configuration	<ul style="list-style-type: none"> • 3-cylinders and two cylinder • Blanket to blanket • Common Impression cylinders 	<ul style="list-style-type: none"> • Demonstration of 3-cylinder configuration and compare it with other configurations 	5
Total			34

Unit 6: Safety and Green Printing

Expected Learning Outcome	Theory (5 hrs)	Practical (10 hrs)	Duration (15 hrs)
1. Explain the safety regulations related to offset printing	<ul style="list-style-type: none"> • Introduction • Describe the importance of Safety in offset printing • Specified hazard areas in Offset printing • Safety audit 	<ul style="list-style-type: none"> • Enlist various types of hazard areas in Offset printing • To operate various safety devices 	4
2. Identify Safety guards in Offset printing press	<ul style="list-style-type: none"> • Safety guards required in Offset printing press • Safety measures for operating a cutting machine and other electronic devices 	<ul style="list-style-type: none"> • Identification of various Safety guards and button used in an Offset press • Enlist of various equipment used in an Offset press for Safety 	2
3. Demonstrate the personal protective devices and the safety precautions that are to be taken during work at press	<ul style="list-style-type: none"> • Importance of personal protective devices used in offset Printing. • Selection of personal protective devices 	<ul style="list-style-type: none"> • Identification of personal protective devices • Demonstration of the use of personal protective devices • Demonstration of first-aid kit and its application 	3
4. Differentiate the classification of fire and Choose appropriate fire extinguishers	<ul style="list-style-type: none"> • The different classifications of fires affected in a press. • Procedure of use of appropriate fire Extinguishers 	<ul style="list-style-type: none"> • Identify the possible circumstances of fire in a printing lab. • Explain the uses of fire extinguishers 	4
5. Describe the importance of Green printing	<ul style="list-style-type: none"> • Recycled paper • Chlorine free paper • Wood free paper 	<ul style="list-style-type: none"> • Sample collection of recycled paper 	2

	<ul style="list-style-type: none"> • Acid free paper • Organic ink • Chemistry free plate • Recycled plate • Soft proofs • Renewable energy 		
Total			15

Unit 7: Make Ready and Working of a Sheet-fed Offset Press

Expected Learning Outcome	Theory (5 hrs)	Practical (10 hrs)	Duration (15 hrs)
1. Perform the make ready operations	<ul style="list-style-type: none"> • Press lubrication • Inking and dampening unit preparation • attaching the pate • Feeding the paper 	<ul style="list-style-type: none"> • Oiling the press • Perform the make ready operations 	8
2. Demonstrate the working of feeder unit	<ul style="list-style-type: none"> • Feeding unit • Air suction setting • Pile height setting 	<ul style="list-style-type: none"> • Setting the feeder unit • Paper jogging • Blower controlling • Sucker air controlling • Pile board operation • Adding paper to the pile 	5
3. Perform the adjustments in registration unit	<ul style="list-style-type: none"> • Adjusting the registration system • Lay adjustment • Runner settings 	<ul style="list-style-type: none"> • Inching and rotating cylinders • Parts of cylinder • Running the printing unit 	6
Total			15

CLASS 12

Part A: Employability Skills

Sl.No.	Units	Duration (hrs)
1.	Communication Skills- IV	25
2.	Self-management Skills - IV	25
3.	Information and Communication Technology Skills - IV	20
4.	Entrepreneurial Skills - IV	25
5.	Green Skills - IV	15
Total		110

Unit 1: Communication Skills - IV

Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the steps to active listening skills	<ul style="list-style-type: none"> • Importance of active listening at workplace • Steps to active listening 	<ul style="list-style-type: none"> • Demonstration of the key aspects of becoming active listener • Preparing posters of steps for active listening 	10

2. Demonstrate basic writing skills	<ul style="list-style-type: none"> ➤ Writing skills to the following: <ul style="list-style-type: none"> • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph 	<ul style="list-style-type: none"> • Demonstration and practice of writing sentences and paragraphs on topics related to the subject 	15
Total			25

Unit 2: Self-Management Skills – IV

Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Describe the various factors influencing self-motivation	<ul style="list-style-type: none"> • Finding and listing motives (needs and desires); • Finding sources of motivation and inspiration (music, books, activities); expansive thoughts; living fully in the present moment; dreaming big 	<ul style="list-style-type: none"> • Group discussion on identifying needs and desire • Discussion on sources of motivation and inspiration 	10
2. Describe the basic personality traits, types and disorders	<ul style="list-style-type: none"> • Describe the meaning of personality • Describe how personality influence others • Describe basic personality traits • Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive 	<ul style="list-style-type: none"> • Demonstrate the knowledge of different personality types 	15
Total			25

Unit 3: Information and Communication Technology Skills - IV

Expected Learning Outcome	Theory (06 hrs)	Practical (14 hrs)	Duration (20 hrs)
1. Perform tabulation using spreadsheet application	<ul style="list-style-type: none"> • Introduction to spreadsheet application • Spreadsheet applications • Creating a new worksheet • Opening workbook and entering text • Resizing fonts and 	<ul style="list-style-type: none"> ➤ Demonstration and practice on the following: <ul style="list-style-type: none"> • Introduction to the spreadsheet application • Listing the spreadsheet applications • Creating a new 	10

	<p>styles</p> <ul style="list-style-type: none"> • Copying and moving • Filter and sorting • Formulas and functions • Password protection. • Printing a spreadsheet. • Saving a spreadsheet in various formats. 	<p>worksheet</p> <ul style="list-style-type: none"> • Opening the workbook and enter text • Resizing fonts and styles • Copying and move the cell data • Sorting and Filter the data • Applying elementary formulas and functions • Protecting the spreadsheet with password • Printing a spreadsheet • Saving the spreadsheet in various formats. 	
2. Prepare presentation using presentation application	<ul style="list-style-type: none"> • Introduction to presentation • Software packages for presentation • Creating a new presentation • Adding a slide • Deleting a slide • Entering and editing text • Formatting text • Inserting clipart and images • Slide layout • Saving a presentation • Printing a presentation document. 	<ul style="list-style-type: none"> ➤ Demonstration and practice on the following: <ul style="list-style-type: none"> • Listing the software packages for presentation • Explaining the features of presentation • Creating a new presentation • Adding a slide to presentation. • Deleting a slide • Entering and edit text • Formatting text • Inserting clipart and images • Sliding layout • Saving a presentation • Printing a presentation document 	10
Total			20

Unit 4: Entrepreneurial Skills - IV

Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Identify the general and entrepreneurial behavioural competencies	<ul style="list-style-type: none"> • Barriers to becoming entrepreneur • Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, 	<ul style="list-style-type: none"> • Administering self-rating questionnaire and score responses on each of the competencies • Collect small story/ anecdote of prominent successful 	10

	organizational skills, stress management, valuing service and diversity	entrepreneurs <ul style="list-style-type: none"> Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies Preparation of competencies profile of students 	
2. Demonstrate the knowledge of self-assessment of behavioural competencies	<ul style="list-style-type: none"> Entrepreneurial competencies in particular: self-confidence, initiative, seeing and acting on opportunities, concern for quality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building 	<ul style="list-style-type: none"> Games and exercises on changing entrepreneurial behaviour and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity 	15
Total			25

Unit 5: Green Skills - IV

Expected Learning Outcome	Theory (05 hrs)	Practical (10 hrs)	Duration (15 hrs)
1. Identify the role and importance of green jobs in different sectors	<ul style="list-style-type: none"> Role of green jobs in toxin-free homes, Green organic gardening, public transport and energy conservation, Green jobs in water conservation Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes, Green jobs in green tourism Green jobs in building and construction Green jobs in appropriate technology Role of green jobs in Improving energy and raw materials use Role of green jobs in limiting greenhouse gas emissions Role of green jobs minimizing waste and pollution Role of green jobs in protecting and restoring ecosystems Role of green jobs in support 	<ul style="list-style-type: none"> Listing of green jobs and preparation of posters on green job profiles Prepare posters on green jobs. 	15

	adaptation to the effects of climate change		
Total			15

Part B–Vocational Skills

Sl.No.	Units	Duration(hrs)
1.	Unit 1: Printing Materials	20
2.	Unit 2: Offset Operation	40
3.	Unit 3 Web Offset Press	28
4.	Unit 4: Trouble shooting and Quality Control	26
5.	Unit 5: Finishing and Binding Operations	32
6	Unit 6: Package Printing	12
7.	Unit 7: Basic Engineering	7
Total		165

Unit 1: Printing Materials

Expected Learning Outcome	Theory (10 hrs)	Practical (10 hrs)	Duration (20 hrs)
1. Explain various physical properties of paper	<ul style="list-style-type: none"> • Paper making process • Physical properties of paper • Warehousing of paper 	<ul style="list-style-type: none"> • Grain direction test • Moisture content test, • Curl test, gloss test 	5
2. Classify different types of paper	<ul style="list-style-type: none"> • Classification based on structure • Classification based on thickness • Classification based on use 	<ul style="list-style-type: none"> • Measuring the GSM of the given paper • Paper sample collection 	5
3. Explain different paper sizes and terms related to paper	<ul style="list-style-type: none"> • International paper sizes • Conventional paper sizes • Ream, GSM, M-weight, Basis weight 	<ul style="list-style-type: none"> • Collection of paper with different sizes • Calculating basis weight and M-weight 	3
4. List out and Explain basic ingredients of ink	<ul style="list-style-type: none"> • Ingredients of ink • Properties of ink • Types of ink • Ink drying methods 	<ul style="list-style-type: none"> • Ink mixing process • Ink testing methods 	4
5. Identify different chemicals used in printing	<ul style="list-style-type: none"> • Dampening solution • Other press room chemicals 	<ul style="list-style-type: none"> • pH and conductivity testing of dampening solution • Dampening solution preparations • Use of different chemicals in printing 	3
Total			20

Unit 2: Offset Operation			
Expected Learning Outcome	Theory (10 hrs)	Practical (30 hrs)	Duration (40 hrs)
1. Demonstrate the working of feeding unit and registration unit		<ul style="list-style-type: none"> • Adjustment in the feeding unit with different size and thickness of paper • Perform registration unit adjustments 	8
2. Demonstrate the setting up of the printing, inking, dampening and delivery units		<ul style="list-style-type: none"> • Attaching and removing of plates • Blanket fixing • Gripper adjustments • Dampening sleeve attaching • Delivery gripper adjustments 	14
3. Explain Multi-colour printing and sequence of colour printing	<ul style="list-style-type: none"> • Multi- colour printing • Automation in printing • Sequence of colour 	<ul style="list-style-type: none"> • Multi-colour Printing in any two colour sequences 	8
4. Apply adjustments regarding cylinder and roller pressure		<ul style="list-style-type: none"> • Roller pressure adjustments • Cylinder pressure adjustments • Roller to cylinder pressure 	10
Total			40

Unit 3 :Web Offset Press			
Expected Learning Outcome	Theory (12 hrs)	Practical (16 hrs)	Duration (28 hrs)
1. Explain basic components of web offset machine	<ul style="list-style-type: none"> • In feed • Printing • Out feed • Press console 	Field visit	7
2. Explain the purpose and operation of splicers	<ul style="list-style-type: none"> • Types of splicers • Operation of a splicer 		7
3. Explain the common methods for achieving registration in web offset presses	<ul style="list-style-type: none"> • Image alignment • Registration and web alignment 		7
4. Differentiate among various inline finishing operation	<ul style="list-style-type: none"> • Combination folders • In-line stitching and trimming • Other inline finishing operations 		7
Total			28

Unit 4: Trouble shooting and Quality Control			
Expected Learning Outcome	Theory (10 hrs)	Practical (16 hrs)	Duration (26 Hrs)
1. Identify different paper related problems	<ul style="list-style-type: none"> • Electrostatic charge on paper • Crease formation • Picking 	<ul style="list-style-type: none"> • Identify different paper problem and their remedy 	5
2. Identify different ink related problems	<ul style="list-style-type: none"> • Emulsification • Slow ink drying • Hickies • Piling 	<ul style="list-style-type: none"> • Identify different ink problem and their remedy 	5
3 Identify different printing problems	<ul style="list-style-type: none"> • Set off • Scum • Mis-registration • Mottling • Plate ware • Tinting 	<ul style="list-style-type: none"> • Identify different printing problem and their remedy 	6
4 Identify different blanket and roller problems	<ul style="list-style-type: none"> • Glazing • Swelling • Paper sticking 	<ul style="list-style-type: none"> • Identify different blanket problems and their remedy 	4
5 Explain various Quality control devices	<ul style="list-style-type: none"> • Plate image scanner • Colour bar • Star target • Dot gain scale • Grey scale patch • Register marks • Densitometer • Spectro photo meter • Magnifying glass • Colour viewer 	<ul style="list-style-type: none"> • Handling of different quality control devices in printing 	6
Total			26

Unit 5: Finishing and Binding Operations			
Expected Learning Outcome	Theory (12 hrs)	Practical (20 hrs)	Duration (32 hrs)
1. Identify different types of folding	<ul style="list-style-type: none"> • Buckle folding • Knife Folding 	<ul style="list-style-type: none"> • Practice different methods of manual folding 	3
2. Demonstrate the operation of cutting machine	<ul style="list-style-type: none"> - Parts of cutting machine - Different types of cutting machines 	<ul style="list-style-type: none"> • Operate and make adjustments in guillotine/automatic cutting machine 	5
3. Explain different finishing operations	<ul style="list-style-type: none"> • Lamination • Die cutting • Embossing • Foil stamping • Perforation • Creasing & 	<ul style="list-style-type: none"> • sample collection of various embossed images, foil stamped materials • Operate perforation machine 	6

	Scoring		
4. Explain various types of binding	<ul style="list-style-type: none"> • Classification of binding • Styles of binding 	<ul style="list-style-type: none"> • Practice the binding methods such as case binding, mechanical binding (spiral & plastic comb binding) 	8
5. List the different steps involved in binding	<ul style="list-style-type: none"> ➤ Various materials used for binding ➤ Steps in binding <ul style="list-style-type: none"> • Warehousing • Forwarding • Covering • Finishing ➤ Different sewing methods ➤ Different types of end papers 		10
Total			32

Unit 6: Package Printing			
Expected Learning Outcome	Theory (6 hrs)	Practical (6 hrs)	Duration (12 hrs)
1. Explain the importance of packaging	<ul style="list-style-type: none"> • Functions of packaging 		2
2. Differentiate among various packaging materials	<ul style="list-style-type: none"> • Metals • Glass • Plastic • Paper • Mono Cartons & Corrugated boards • Special Package 		3
3. List out the methods for preparing a packaging Die	<ul style="list-style-type: none"> • Parts of a die • Preparation of a die 	<ul style="list-style-type: none"> • Draw the diagram of different die cutting tools 	4
4. Classify cartons based on its style.	<ul style="list-style-type: none"> • Four panel style box • Sreihgt tuck end • Reverse tuck end • Snaplock bottom • Automatic Lock bottom • Tray Style • Seal end • Setup box 	<ul style="list-style-type: none"> • Prepare carton boxes in different styles 	3
Total			12

Unit 7: Basic Engineering			
Expected Learning Outcome	Theory	Practical	Duration (7 hrs)
1. Recognize various mechanical, electrical and electronic parts of an offset machine	<ul style="list-style-type: none"> • Motor • Transformer • Resistor • Capacitor • Diode • Transistor • IC • Gears • Chain • Sprocket • Bearings 	<ul style="list-style-type: none"> • Identify various mechanical, electrical, electronic and pneumatic parts in an offset press 	2
2. Identify pneumatic parts of an offset press	<ul style="list-style-type: none"> • Compressor • Hydraulic pump 		3
3. Develop awareness in Robotics in Printing Industry	<ul style="list-style-type: none"> • Robotics in printing and binding machineries • Advantages of robotics in Printing Industry 		2
Total			7

6. ORGANISATION OF FIELD VISITS/ON-THE-JOB TRAINING

In first year, at least 3 field visits/educational tours should be organized for the students to expose them to the activities in the workplace. Visit a nearby printing press and observe the following:

Types of printed products produced there, type of machine, the print production work-flow, different departments, Store, go down, Packing Yard, pre-press activities, press operation, ink and dampening solution storage and preparation, post press activities like cutting and other finishing operations. During the visit, students should obtain the following information from the owner or the supervisor of the nursery:

1. various print media products
2. Print production workflow
3. Pre-press works
4. Plate making process
5. CTP machine
6. Offset press operation
7. Post press works
8. Total functioning of printing firm

Suggested field visit centres

1. Leading newspaper companies

2. Commercial presses
3. Packaging firms
4. Government presses

On the job training of at least 80 hours is to be organised by the institution to provide hands-on training

7. LIST OF EQUIPMENT AND MATERIALS

- a) A well-equipped laboratory should be ensured to impart quality skill work to opted students. Well-structured and equipped laboratory will enhance the quality of practical works.
- b) The tools, equipment and materials required for training are quite expensive, therefore; only basic tools, equipment and accessories should be procured by the Institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience. Desk top computers, a single colour offset printing machine and a plate exposing machine may be available for training at every institution.

Equipment	
1	Offset Printing machine
2	Automatic cutting machine
3	CtP machine
4	Paper gsm weighing machine
5	pH meter
6	Conductivity meter
7	Magnifying glass
8	Densitometer
9	Colour swatch book
10	Roller stand
11	Spanner set
12	Allen key set
13	Printing Down frame
14	Plate making sink
Computer lab	
1	Desktop computers
2	Digital colour laser Printers A3
Software	
1	Image editing

2	Drawing software
	<u>Consumables</u>
1	Blanket
2	Fountain solution
3	Plate developer
4	Litho Gum
5	Roller wash
6	Blanket wash
7	Image remover
8	Sponge
9	Bearing
10	Bearing
11	Cutting knife
12	Cutting sticks
13	Dampening roller cover
14	PS plate
15	Process colour ink
23	Cut colour inks
17	Cello tape
18	uncoated Paper
19	Coated paper
20	Toner for colour laser
21	Ink pallet knife
22	Machine oil
23	Phosphoric acid
24	Plate cleaner
25	Grease
26	Cotton waste
27	Coconut oil
28	Kerosene oil
29	Cleaning powder
30	Ink tack reducer
31	Astroline sheet

8. LIST OF CONTRIBUTORS

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