

**MAHARASHTRA STATE BOARD OF VOCATIONAL EXAMINATIONS, MUMBAI 51.**

1	Name of Syllabus	C.C.in PAPER AND PRINTING TECHNOLOGY (406201)																																																													
2	Max. No's of Student	25 students.																																																													
3	Duration	1 YEAR																																																													
4	Type	Full Time																																																													
5	No Of Days / Week	6 Days																																																													
6	No Of Hours /Days	7 Hrs																																																													
7	Space Required	Workshop = 1000 Sq feet Class Room = 200 Sq feet TOTAL = 1200 Sq feet																																																													
8	Entry Qualification	S.S.C.																																																													
9	Objective Of Syllabus/ introduction	• To develop professional competence in the field of small industries • To train the students to acquire skills employment & self employment																																																													
10	Employment Opportunity	In the field self employment																																																													
11	Teacher's Qualification	Diploma / Certificate in concern field.																																																													
12	Training System	Training System Per Week <table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>12 Hours</td><td>30 Hours</td><td>42 Hours</td></tr></table>						Theory	Practical	Total	12 Hours	30 Hours	42 Hours																																																		
Theory	Practical	Total																																																													
12 Hours	30 Hours	42 Hours																																																													
13	Exam. System	<table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Mini. Marks</th></tr><tr><td>1</td><td>40620111</td><td>Printing Technology</td><td>TH-I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>40620112</td><td>Pulping and bleaching technology</td><td>TH-II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>40620113</td><td>Instrumentation in paper and printing technology</td><td>TH-III</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>4</td><td>40620121</td><td>Printing tech</td><td>PR-I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>5</td><td>40620122</td><td>Pulping and bleaching technology</td><td>PR-II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>6</td><td>40620123</td><td>Instrumentation in paper and printing technology</td><td>PR-III</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>255</td></tr></table>						Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks	1	40620111	Printing Technology	TH-I	3 hrs.	100	35	2	40620112	Pulping and bleaching technology	TH-II	3 hrs.	100	35	3	40620113	Instrumentation in paper and printing technology	TH-III	3 hrs.	100	35	4	40620121	Printing tech	PR-I	3 hrs.	100	50	5	40620122	Pulping and bleaching technology	PR-II	3 hrs.	100	50	6	40620123	Instrumentation in paper and printing technology	PR-III	3 hrs.	100	50			Total			600	255
Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks																																																									
1	40620111	Printing Technology	TH-I	3 hrs.	100	35																																																									
2	40620112	Pulping and bleaching technology	TH-II	3 hrs.	100	35																																																									
3	40620113	Instrumentation in paper and printing technology	TH-III	3 hrs.	100	35																																																									
4	40620121	Printing tech	PR-I	3 hrs.	100	50																																																									
5	40620122	Pulping and bleaching technology	PR-II	3 hrs.	100	50																																																									
6	40620123	Instrumentation in paper and printing technology	PR-III	3 hrs.	100	50																																																									
		Total			600	255																																																									

## THEORY PAPER – I - PRINTING TECHNOLOGY

Sr.No.	TOPICS
1	Letter assembly – A short history of printing, an introduction to typographic design, introduction to letter press printing machines, introduction to digital type setting, monotype, linotype, letter assembly by hand composition, proofing, proof correction practice
2	Lithography – lithography planning, registration system from film to plate and plate to machine, different type of lithographic plates, direct and indirect printing methods , ink and water balance in lithography
3	Flexo, gravure, screen printing – flexographic principle, materials and process , gravure systems, gravure ink and their properties, screen printing materials and processes
4	Material testing – standard tests , sampling technique. IGT printability testing, dry point performance test, film printing tests.
5	Printing machine – principle of working of flat bed machines, sheet feed offset machines, sheet feed rotary machines, web machines, gravure machines, flexo machines, printing on surfaces other than papers
6	Ink technology – raw materials of printing ink , pigments and dyestuffs , oils, solvents, resin, plasticizers, driers, waxes, surfactants etc.
7	Light sources – perceptions of colours, additive and subtractive methods, colour triangle, colour standards. optical properties of printing materials, colour measurement theory, colour matching.

## THEORY PAPER – II - PULPING AND BLEACHING TECHNOLOGY

Sr.No.	TOPICS
1	Introduction – definition of pulping as a fiber separation process, introduction to major constituents of lingo cellulosic pulping, different pulping processes like chemical pulping , pulping of non wood raw materials
2	Raw material preparation – brief study of debarking , chipping and chip screening, operation procedures and safeguards for chippers and chip screens
3	Pulping equipments – different types of digesters , rotary and stationary , spherical , cylindrical, direct and indirect heating
4	Alkamine pulping – description of soda and kraft pulping processes, digester room operation, chip filling, liquor charging , time to temperature , time at temperature, liquor circulation and maintenance bath ratio, digester relief and blow , simple calculation on pulp yield chemical requirement. Introduction to continuous pulping of non wood, continuous pulping of non woody raw materials like bagasse and straws
5	Semi chemical pulping – introduction to common semi chemical pulping processes, CMP and CTMP process , equipments used, their operation maintenance and safeguards
6	Bleaching of pulp – fundamentals of pulp bleaching, important of bleaching agents, their advantages and disadvantages, brightness as a measure of pulp bleaching , development of flow sheet for important bleaching sequence with emphasis on operational measures equipments used, storage and handling and safety of chlorine and chlorine based bleaching agents, introduction to chlorine free bleaching

### **THEORY PAPER – III - INSTRUMENTATION IN PAPER AND PRINTING TECHNOLOGY**

<b>Sr.No.</b>	<b>TOPICS</b>
1	Measurements of industrial parameters – study of industrial instruments and devices for measurements of industrial parameters like temperature , pressure,flow and level
2	Measurement devices – working of pressure gauge / vaccum gauge , volumetric flow measurement, massflow measurement, working of rotameter, venture meter, pitot tube, V notch and square notch, temp. measurement, level measurement, pH measurement online
3	Measurement devices in paper industry – on line consistency measurements and regulations , online moisture , basis weight, brightness measurements

### **PRACTICAL PAPER – I - PRINTING TECHNOLOGY**

<b>Sr.No.</b>	<b>TOPICS</b>
1	Letter assembly – Practicals on typographic design, introduction to letter press printing machines, introduction to digital type setting, monotype, linotype, letter assembly by hand composition, proofing, proof correction practice
2	Practicals on Lithography – lithography planning, registration system from film to plate and plate to machine, different type of lithographic plates, direct and indirect printing methods , ink and water balance in lithography
3	Practicals on Flexo, gravure, screen printing – flexographic principle, materials and process , gravure systems, gravure ink and their properties,screen printing materials and processes
4	Practicals on Material testing – standard tests , sampling technique. IGT printability testing, dry point performance test, film printing tests.
5	Practicals on Printing machine – principle of working of flat bed machines, sheet feed offset machines, sheet feed rotary machines, web machines, gravure machines, flexo machines, printing on surfaces other than papers
6	Practicals on Ink technology – raw materials of printing ink , pigments and dyestuffs , oils, solvents, resin, plasticizers, driers, waxes, surfactants etc.
7	Practicals on Light sources – perceptions of colours ,additive and subtractive methods, colour triangle, colour standards.optical properties of printing materials, colour measurement theory, colour matching.

## PRACTICAL PAPER – II - PULPING AND BLEACHING TECHNOLOGY

Sr.No.	TOPICS
1	Practicals on Introduction – definition of pulping as a fiber separation process, introduction to major constituents of lingo cellulosic pulping, different pulping processes like chemical pulping , pulping of non wood raw materials
2	Practicals on Raw material preparation – brief study of debarking , chipping and chip screening, operation procedures and safeguards for chippers and chip screens
3	Practicals on Pulping equipments – different types of digesters , rotary and stationary , spherical , cylindrical, direct and indirect heating
4	Practicals on Alkamine pulping – description of soda and kraft pulping processes, digester room operation, chip filling, liquor charging , time to temperature , time at temperature, liquor circulation and maintenance bath ratio, digester relief and blow , simple calculation on pulp yield chemical requirement.introduction to continuous pulping of non wood, continuous pulping of non woody raw materials like bagasse and straws
5	Practicals on Semi chemical pulping – introduction to common semi chemical pulping processes, CMP and CTMP process , equipments used, their operation maintenance and safeguards
6	Practicals on Bleaching of pulp – fundamentals of pulp bleaching, important of bleaching agents, their advantages and disadvantages, brightness as a measure of pulp bleaching , development of flow sheet for important bleaching sequence with emphasis on operational measures equipments used, storage and handling and safety of chlorine and chlorine based bleaching agents, introduction to chlorine free bleaching

## PRACTICAL PAPER – III - INSTRUMENTATION IN PAPER AND PRINTING TECHNOLOGY

Sr.No.	TOPICS
1	Practicals on Measurements of industrial parameters – study of industrial instruments and devices for measurements of industrial parameters like temperature , pressure,flow and level.
2	Practicals on Measurement devices – working of pressure gauge / vaccum gauge , volumetric flow measurement, massflow measurement, working of rotameter, venture meter, pitot tube, V notch and square notch, temp. measurement, level measurement, pH measurement online
3	Practicals on Measurement devices in paper industry – on line consistency measurements and regulations , online moisture , basis weight, brightness measurements

\*\*\*\*\*