Government Institute of Printing Technology
(Academically Autonomous Institute of Government of Maharashtra)
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Curriculum

Three Years Full Time Diploma in Printing Technology

Implementation Year 2016-17

Course: English Code: M101

Course & Teaching scheme GIPT 2016-17	TH	PR	Credits	Paper	TH Mks	UT Mks	Total Mks	PR Mks	OR Mks	TW Mks	Total	Total
Level				Hrs	Max	Max	Max	Max	Max	Max	Mks	Subjects
Foundation	18	8	26	[5]	400	100	500	60	0	40	600	6

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	00	02	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

As a language of communication and a medium of learning for technical subjects, basic skills like grammar, its usage, verbal communication and writing skills are covered. It will help to revise and develop language skills of the students and help them to become proficient in English.

Chapter	Name of the Topic	Hours	Marks
1.0	**Application of Grammar**	**07**	**16**
1.1	Parts of speech	02	04
1.2	Tense	02	04
1.3	Voice – Active and Passive	02	04
1.4	Articles	01	04
2.0	**Clauses**	**05**	**12**
2.1	Adverb Clauses	02	04

2.2	Adjective Clauses	02	04
2.3	Noun Clauses	01	04
3.0	**Types of sentences**	**05**	**12**
3.1	Types of sentences	01	02
3.2	Transformation of sentences	02	04
3.3	Synthesis of sentences	01	04
3.4	Condition (If, Unless)	01	02
4.0	**Comprehension**	**05**	**12**
4.1	Introduction	03	06
4.2	Examples	02	06
5.0	**Punctuation and the uses of capitals**	**05**	**12**
5.1	Various types of punctuation marks	02	04
5.2	Uses of Capitals	02	04
5.3	Parenthesis & Italics	01	04
6.0	**Word format**	**05**	**16**
6.1	Nouns ending ‘tion’ er,ity,logy,meter, metry etc.	2	4
6.2	Common rules in technical English	01	04
6.3	Prefixes and Sufixes	01	04
6.4	Adjectives ending al,ic,ical,ar,ary ing,ive etc	01	04
	Total	**32**	**80**

References:

No.	Title of book	Author	Publication
01	Yuvakbharati English Std. XI & XII	Govt. Publications	Govt. Publications HSC Board Maharashtra.
02	Dictionary	Orient Longman	New Delhi.
03	English	Pal and Suri	

Course: Communication Skill Code: M102

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	00	02	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

As an extension of the course in English, the emphasis here is on communication skill, assay & report writing, and business correspondence. It will develop necessary skills required for running an organization with proper application of language and communication skills and develop entrepreneurial qualities

Chapter	Topic	Hours	Marks
1.0	**Verbal and non Verbal Communication**	**07**	**16**
1.1	Elements of communication	02	04
1.2	Principles of effective communication	02	04
1.3	Developing effective messages	02	04
1.4	Charts and maps, diagrams and pie charts	01	04
2.0	**Five Skills of Good Writing**	**05**	**16**
2.1	Audience: Thinking of your Reader.	02	04
2.2	Organization.	01	02
2.3	Style	01	04
2.4	Flow	01	02
2.5	Accuracy.	01	04
3.0	**Technical Writing**	**05**	**12**
3.1	Project Report	02	04

3.2	Tenders	01	04
3.3	Notice and Memorandum	02	04
4.0	**Paragraph Writing.**	**05**	**12**
4.1	Introduction	01	02
4.2	Principles	01	02
4.3	Examples	01	04
4.4	Writing of single paragraphs	02	04
5.0	**Writing Essays**	**05**	**12**
5.1	Essays – Narrative, Descriptive, Reflective, Imaginative		
	(100 words X 2 Essays)		
6.0	**Comprehension & Summaries**	**05**	**12**
6.1	Comprehension	02	06
6.2	Methods of Summary writing.	01	02
6.3	Examples of Summary writing	02	04
	Total	**32**	**80**

Reference Books :

No	Title of Book	Author	Publisher's Name
01	Communication In English For Technical Students	Orient	New Delhi
02	Yuvakbharati English Std. XI & XII.	Higher Secondary Board.	Govt. Publications
03	Communication Skill	Pal and Suri	

Course: Basic Science Code: M103

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	00	04	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

Basic knowledge of physical and chemical properties of material used in printing industry, classification in measuring devices, physical and chemical processes are covered under this subject. It will form scientific basis for understanding various chemical formulas and technological applications in Printing Technology.

Chapter	Topic	Hours	Marks
1.0	**Unit and Measurements**	**10**	**12**
1.1	Definition of unit and types of unit MKS , CGS and SI units, Conversion of units		
1.2	Requirement of standard unit need for units for measurements		
1.3	Fundamental and derived quantities - definition and examples		
1.4	Accuracy, Precision: Definition Definition of Error and types of errors – systematic, instrumentals random errors absolute, relative and percentage.		
2.0	**Force, Motion and Energy**	**14**	**16**
2.1	Definition and SI units of Linear motion, Motion, speed and velocity, acceleration, retardation.		
2.2	Definition and SI unit of force, centripetal and centrifugal force, Newton’s laws of motion, derivation F=ma		
2.3	Work, Power, Energy – Definition, Equation and SI unit, Laws of conservation of energy		

	Simple numerical		
3.0	**Modern Physics**	**10**	**12**
3.1	Definition of Reflection, Refraction, Polarization and Diffraction		
3.2	LASER – Definition, Characteristics / Properties, Applications		
4.0	**Properties of matter - Liquids**	**08**	**12**
4.1	Surface tension, cohesive and adhesive force - Definition		
4.2	Angle of contact – Definition, its significance, Rise of liquid in capillary tube		
4.3	Viscosity – Definition, Significance in Printing Technology, Newton's law of viscosity, Stoke's law		
5.0	**Acids and Alkali**	**10**	**16**
5.1	Arrhenius concepts of acids and bases, Its limitations		
5.2	Strong and weak acid and base, Lewis concept of acid and base		
5.3	Definition of p^H and p^{OH} , p^H scale.		
6.0	**Electrochemistry**	**12**	**12**
6.1	Definition and difference between Atom and Ion, electrolyte, ionization. Arrhenius theory of Ionization (Electrolytic dissociation)		
6.2	Definition - Weak and Strong electrolytes and examples,		
	Definition of electrolysis, types of electrolysis - Electrolysis of sodium chloride solution using platinum electrode & copper sulphate solution using copper electrode		
6.3	Faraday's 1^{st} and 2^{nd} law of electrolysis, numerical		
6.4	Electroplating – process, purposes and application		
	Total	**64**	**80**

Reference Books :

No	Title of Book	Author	Publication
01	Basic Physics	Pranjal P. Chavan	Tech- Max, Pune
02	Engineering Chemistry	Mr. Jain & Jain	Dhanpat Rai & Sons
03	Applied Physics	Prof. Manikpure	S. Chand

Course: Basic Engineering Code: M104

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale:

Engineering basics are essential for printing technology students. This course intends to impart knowledge of mechanical and electrical concepts related to printing technology.

Chapter	Topic	Hours	Marks
1.0	**Mechanical drives**	**13**	**20**
1.1	Power transmission and need of mechanical drives	02	04
1.2	Methods of drives - group drive or common drive and individual drive; their advantages and disadvantages	03	04
1.3	Different types of mechanical drives used for power transmission like couplings, belts, ropes, chains, clutches and gears.	03	04
1.4	Study of the different characteristics of gear drives-circular path, addendum, dedendum, pith circle, velocity ratio.	03	04
1.5	Introduction to cams and followers, their types and applications.	02	04
2.0	**Friction Theory**	**08**	**12**
2.1	Definition of friction. Types of friction-static, kinetic, rolling.	02	04
2.2	Coefficient of friction, angle of repose. Laws of static & kinetic friction.	02	04
2.3	Definition and function of lubricant, Different types of lubrication- fluid film, boundary, extreme-pressure Classification of lubricants - liquid, semi-solid, solid	04	04

3.0	**Hydraulics**	**14**	**12**
3.1	Definition of hydraulics, underlying principle-Pascal's law.	05	04
3.2	Understanding the basic terms used in hydraulics such as work, horse power, mechanical advantage	05	04
3.3	Applications of Hydraulics in printing technology, advantages and disadvantages of hydraulic system	04	04
4.0	**Pneumatic**	**09**	**12**
4.1	Definition of pneumatic, underlying principles- Boyle's law, Charle's law	05	04
4.2	Definition of compressor, types of compressor - single acting, double acting, rotary	02	04
4.3	Compressed air system - centralized and decentralized	02	04
5.0	**Electrical Principles**	**11**	**12**
5.1	Understanding the basic terms used in electrical engineering such as voltage, current, resistance, resistivity, Conductance, conductivity, work, power, and energy etc.	04	04
5.2	Relation between voltage, current and resistance: Ohm's law	03	04
5.3	Study of good conductors, bad conductors, insulators, Leakage current and insulation resistance	04	04
6.0	**Simple D.C.Circuit analysis**	**09**	**12**
6.1	Meaning of the analysis of electrical circuit. Nature of voltage and current in circuit (graphical representation)	03	04
6.3	Study of Kirchoff's current and voltage law, D.C.series and parallel circuits and their applications.	03	04
6.4	Study of star delta and delta star transformations and their application in the simplification of D.C. circuits	03	04
	Total	**64**	**80**

No	Practical
01	To study Ohm's law.
02	To study characteristics of voltage and current in series and parallel circuits.
03	To determine the co-efficient of static friction.
04	Demonstration of different lubricating system used on printing machines.
05	Study of different types of gears.
06	Calculation of velocity ratio in worm and worm-wheel.
07	Study of different types of shaft and couplings.
08	Study of vernier caliper and micrometer screw gauge.
09	Study of different types of accessories used for domestic wiring, Earthing
10	Study of staircase wiring.
11	To study star and delta circuits
12	Measurements using multi meter.

References:

No.	**Title of Book**	**Author**	**Publication**
01	Elements of mechanical and electrical technology	Karmarkar	PVG Publication
02	Elements of mechanical and electrical technology	Ghan, Kale, Mali, Thatte	

Course: Introduction to Computer **Code: M105**

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	00	00	00	#30	00	$20

= External, $= Internal Assessment

Rationale:

This course deals with the basics of computers. After the completion of this course, a student can understand different parts of the computer and their functions, various input, output & storage devices, operating systems, decimal system and connectivity through the Internet.

Chapter	Name of the Topic	Hours	Marks
1.0	**Introduction to computer and Operating systems**	**07**	**00**
1.1	About computers, Application		
1.2	Advantages Processing of Computer		
1.3	PC, Macintosh, Linux		
2.0	**Software**	**05**	**00**
2.1	System software		
2.2	Application software		
2.3	virus, anti virus		
3.0	**Basic Input , Output and Storage Devices and Networking**	**05**	**00**
3.1	Keyboard, Mouse, CD, Scanner , USB, Memory card, Monitor, Hard disk, cloud, Printer - Ink jet printer, Laser printer		
3.2	Networking LAN - Bus, Star and Ring toplogy		
4.0	**Introduction to Cyber security**	**05**	**00**
4.1	Broad meaning of Cyber Security, its aspects - Hardware and		

	Software		
4.2	Password - Setting, Securing		
4.3	Piracy - meaning, disadvantages, legal actions		
5.0	**Use of Social Media**	**05**	**00**
5.1	Various social media		
5.2	Cyber laws governing social media		
5.3	Legal actions for misuse of social media		
5.4	Digital India Mission		
6.0	**Internet**	**05**	**00**
6.1	Introduction,		
6.2	Advantages and application		
6.3	Type of connection Dial up connection, Direct Access Connection		
6.4	TCP/IP address, domain name, E-mail, E-commerce		
	Total	**32**	**00**

No.	**Practical**
01	Study of computer - parts and function
02	Study of System software.
03	Understanding of windows
04	Understanding of application software
05	Working of Macintosh.
06	Working with Paint.
07	Working with Note Pad.

08	Working with Word.
09	Working with Excel.
10	Working with Power Point.
11	Study of Internet Explorer.
12	Study of open source software

References:

No.	Title of Book	Author	Publication
01	Ms-Office	Bittu Kumar	V & S Publisher
02	Fundamentals Of Computer	Raja Raman	Printlce- Hall India
03	MS-CIT	MKCL	MKCL Maharashtra

Course: Printers' Mathematics **Code: M106**

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	00	04	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

Mathematics is used at various levels in the process of Printing, which include, calculation of Paper & Ink consumption, costing & estimating of Pre-press, Press and Post-press operations. All these processes require precision functioning, which can be carried out if mathematical calculations are known.

Chapter	Topic	Hours	Marks
10.	**Ratio and Proportion**	**12**	**16**
1.1	Direct Proportion,		
1.2	Indirect Proportion		
1.3	Time and Work		
1.4	Time and Distance		
2.0	**Interest**	**10**	**12**
2.1	Simple interest		
2.2	Compound interest		
3.0	**Area, Volume, Surface Area**	**12**	**16**
3.1	Cube, Cylinder, Cone, Pyramid, Sphere		
3.2	Area of irregular figure – Trapezoid rule, Simpson's one-third rule		
4.0	**Percentage, Profit and Loss**	**10**	**12**
4.1	Express percentage as a fraction, Express fraction as a percentage		
4.2	Depreciation		
4.3	Cost price, selling price, profit, loss – simple numericals		
5.0	**Data Interpretation**	**10**	**12**

5.1	Bar graph		
5.2	Pie chart		
5.3	Line graph		
6.0	**Basics of Statistics - Grouped and Ungrouped data**	**10**	**12**
6.1	Mean		
6.2	Mode		
6.3	Medium		
	Total	**64**	**80**

Reference Books

No.	**Title of Book**	**Author**	**Publication**
01	Quantitative Aptitude	R.S. Agarwal	S. Chand
02	Applied Mathematics	S.P. Deshpande	PVG Prakashan,

Course: Text Setting Code: M201

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	00	00	00	#30	00	$20

= External, $= Internal Assessment

Rationale:

Text and graphics are two important parts of printing. Typography and text formatting methods come under the title of Letter Assembly. As a part of print production, the evolution of typesetting methods from metal types to digital fonts should be studied, so that the basics of typography, type style, spacing and formatting the pages can be learnt with proper perspective. It is equally important to study the problems of printing regional language, type setting in bilingual environment, as a large segment of printing industry is related to regional language publishing. The aim of this is to create a proper attitude towards handling computer software for print production.

Chapter	Topic	Hours	Marks
10.	**Role of Letter Assembly in Printing**	**06**	
1.1	Brief history of development in typesetting from Gutenberg to DTP (Desk top Publishing)		
1.2	Study of various stages of copy preparation.		
1.3	Comparison and features of Hot Metal and Cold types		
2.0	**Review Of Systems And Its Relevance To Present System**	**04**	
2.1	Study of advantages and limitations of Hand composing techniques used in type setting.		
2.2	Study of advantages and limitations of Linotype & Monotype casting techniques used in type setting.		
2.3	Study of definition, types and application areas of Phototypesetting techniques.		
3.0	**Typographic Principles.**	**06**	
3.1	Study of typographic elements Understanding mechanical or founder's type, face of types, parts of types, types of strokes and serifs, terminations. Font style and size of type, text and display faces.		
3.2	Dimensional attributes of a type such as x-height, ascender, descanter and base line. Study of expanded, normal and condensed type.		
3.3	Definition of legibility and readability. Study of factors governing legibility and readability. Study of editing and proofreading of text copy. Study of different proofreading marks.		
4.0	**Typographic Measurement.**	**04**	
4.1	Need of typographic measurement, different units such as point, em, en and pica. Inch equivalent of point, em, en and pica units. Examples based on typographic measurements. Definition and unit		

	of set, measure and gauge of a page or lay-out. Definition of verso and recto format of a layout.		
4.2	Definition of casting-off and copy fitting method of typesetting approaches. Advantages and limitation of casting-off and copy fitting approaches.		
4.3	Examples of type setting calculation based on casting-off and copy fitting		
5.0	**Formatting Page Layout**	**04**	
5.1	Paragraph style - indention, Tabs, alignment, leading		
5.2	Character style - font, style, size, spacing		
5.3	Study of graphic terminology associated with page. page layout - Running heads, column guides, page numbering, margins		
5.4	Formatting graphics with the text in columns and tables.		
5.5	Proofing and Proof Reading.		
5.6	Study of graphic terminology associated with page. and different Imposition schemes. Need and setting of headers and footers.		
6.0	**Font Technology**	**04**	
6.1	Type Technology, hot metal - Punch and matrices, casting, type of metals		
6.2	Type Design - Analog, Artwork, templates, punches and matrices and Digital - Stored & modified digitally, analog output on printers.		
6.3	Hardware & Software - Microsoft, Aldus, Adobe, Format designing software, Postscript and TIFF.		
6.4	Bitmap and Vector font formats, True font, Resolution, Output devices - Postscript, RIP Font scaling and Rasterization.		
6.5	Study of advantages and applications of PostScript Type! And True Type fonts.		
7.0	**Regional Language Scripts.**	**04**	
7.1	Regional Language scripts - an overview in comparison with Roman script – in relation to Devnagari.		
7.2	Problems of Regional scripts - Non linear, Phonetic script, number of characters non-availability of software's etc		
7.3	Software available for Devnagari and its use. Bi-lingual type		

	formats.		
	Total	**32**	

Practical

No	Practical
01	Choosing measurement system and setting up of rulers and working with non printing guides.
02	Creating and applying layout grids, numbering pages, rearranging pages, and creating headers and footers.
03	Setting of text: selecting text, text object, and importing text.
04	Placing text on the page, threading text blocks, threading text frames, and adjusting text objects.
05	Text formatting: using the control palette to format the text, formatting characters, paragraphs, setting indent and tabs, adding space above and below the paragraph.
07	Using different paragraph styles: body text, captions, hanging indent, table head.
08	Using tracking and kerning types, hyphenation and justification methods.
09	Setting word and letter spacing and aligning paragraph.
10	Leading adjusting the space between lines of text, deciding line breaks within paragraphs.
11	Preparation of layout and setting of visiting card and letterhead.
12	Preparation of layout and setting of book work page and column and tabular text matter.

Reference Books:

No	**Title of Book**	**Author**	**Publisher**
01	Composing & Typography	B. D. Mendiratta	
02	Printing In A Digital World	David Bergsland	Delmar Publishers, U.S.
03	Font Technology – Description & Tools	Peter Karow	Springer V New York

Course: Basic Pre-press Code: M202

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks

04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale:

This subject contains concepts about colour, graphic reproduction and properties materials related with pre-press, construction and working of quality control instruments.

Chapter	Topic	Hours	Marks
1.0	**Colour Basics**	**14**	**16**
1.1	Definition - Colour, Visible spectrum, Wavelength, Frequency, Ultraviolet light, Infrared light	07	8
1.2	Additive & Subtractive colour theory & their applications	07	8
2.0	**Original For Graphic Reproduction**	**10**	**16**
2.1	Original - Definition, Classification, Factors governing selection of the graphic original.	03	06
2.2	Required physical and optical properties / characteristics of different types of graphic originals	03	06
2.3	Magnification and terminology of magnification of originals. Simple numerical problems based on magnification.	04	04
3.0	**Recording Media**	**10**	**12**
3.1	Required characteristics and different types of media used in graphic reproduction	05	08
3.2	Digital recording media such as SD card, memory stick and other digital storage media	05	04
4.0	**Equipments used in Reproduction Photography**	**10**	**12**
4.1	Formulae and relationship between different quantities of lens such as focal length, depth of focus, depth of field, power etc. Simple numerical problems related to image formation using lens. Lens aberrations and flare	05	06
4.2	Digital Camera - Working principle, Construction, applications, advantages, limitations. Introduction to different photo sensors	05	06

	(CCD, CMOS) used in digital camera. Resolution of digital camera. Comparison between digital photography and conventional photography.		
5.0	**Screening (Half tone Dot Formation) Techniques**	**10**	**12**
5.1	Resolution, relationship between dpi, ppi and lpi. An introduction to electronic dot generation and its advantages. Screen angles	05	04
5.2	AM and FM Screening - working principle, advantages and limitations of FM (Frequency modulated) screening technique and AM (amplitude modulation) Characteristics of hybrid screening technique I.e.combination of AM and FM screening.	05	08
6.0	**Densitometry and dot shapes**	**10**	**12**
6.1	Need and advantages of densitometry	04	04
6.2	Definition of opacity and optical density	04	04
6.3	Densitometer - Working principle, construction, applications, types of densitometers.	02	04
	Total	**64**	**80**

No	Practical
01	Introduction to Pre-press
02	Use of digital camera
03	Study of AM screening samples
04	Study of FM screening samples
05	Study of resolution, dpi, lpi, ppi
06	Study of lens types, focal length, image formation
	Skill Test I

07	Study of screening techniques, screen angle, dot shapes
08	Collecting different types of originals
09	Demonstration of Additive and Subtractive colour theory
10	Use of different recording media
11	Use of densitometer
12	Study of different photo sensors (CCD, CMOS)
	Skill Test II
13	Revision
14	Revision

References:

No.	Title of Book	Author	Publication
01	Color & Its Reproduction	Field	GATF
02	Basic Of Sensitometry	L. Lobel, M. Dubois	Focal Press Ltd. London

Course: Binding and Finishing Code: M203

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale:

Binding is required to protect as well as to enhance the appearance of the printed product. This subject is required for students to understand various binding techniques depending upon the need of the product. In today's state of art print houses, most of the finishing operations are carried out using machines, the working and principle of these machines is also a part of the course. Hot foil stamping, numbering, perforating, embossing, die cutting, are the various finishing processes a student should know in order to understand how these processes increase the utility and beauty of the product.

Chapter	Topic	Hours	Marks
1.0	**Introduction**	**2**	**4**
1.1	'Binding ' and 'Finishing' - Definition, Purpose, Applications, Binder's aids/marks		
2.0	**Materials**	**18**	**20**
2.1	**Paper**- British standard and ISO paper sizes. Multiples and subdivisions of a given size. Advantages and Limitations of different measurement standards. Units for number of paper- ream, quire, gross.	3	4
2.2	**Adhesives** - Types and their working - Animal glue, Starch and dextrine, Emulsions, Hotmelt, Polyurathane Reactive (PUR) Hotmelt Principles of adhesion - Mechanical, Chemical. Terms related to Adhesives - Adhesive, Recyclability, Coating weight, Cure, Heat seal, Heat set, Paste, Peel, Plasticizer, Pressure sensitive, PUR, Radio frequency or High frequency, Solid content, Thermoplastic / Thermoset, Thixotropy	8	8

	Choice of correct adhesive		
2.3	Study of different properties and applications of board	3	4
2.4	Study of properties and applications of different types of Securing materials-Thread, wire; Selection based on application, gauge of wire, thread strength and cost	4	4
3.0	**Cutting Machines**	**12**	**14**
3.1	Single knife guillotine machine- Construction and working	6	8
3.2	Three Knife Trimmer- Construction and working	6	6
4.0	**Folding and Gathering Operations**	12	14
4.1	Knife folding; Buckle folding, Combination folding- Principle, Construction & Working.	8	10
4.2	Gathering machines - Construction and working	4	4
5.0	**Adhesive / Perfect Binding Machine, Book Binding**	10	14
5.1	Major parts & their functions, safety devices, application, Evaluation of Adhesive bound books, Page-pull and flex test and International standards	6	8
5.2	Book sewing machine, Case making machine - Construction and working	4	6
6.0	**Finishing operations**	10	14
6.1	Purpose, Application, Construction and working of machines for following operations - Lamination - cold/hot Die cutting (Punching) - Half cut, Full/Through cut, Punch Out Line, Types of dies - Flat/Rotary, Base material for punches and types of blade Foil stamping - Foil structure Inline Finishing - Slitting, Trimming, Tipping, Perforation,		

	Creasing, Varnishing / Coating .		
	Total	**64**	**80**

No.	Practical
01	Introduction to Binder's Tools, Hand folding method advantages and limitations, List of operations performed in binding & finishing Pre-forwarding, Forwarding, Finishing
02	Making Quarter Bound Cut Flush Turn-In Book.
03	Making Tear-Off Pad, Pocket Diary, Counter Foil, Office file
04	Making Half Bound Book, Study of Boarding methods- pasting down, split, drawn in work, cut flush, extra square, ASTI (all sides turned in).
05	Loose leaf binding - Wire-o-wire, spiral, comb binding
06	Collecting samples of Finishing operations Laminating, Blocking, Numbering, Perforation, Creasing, Die cutting, Edge decoration, Index cutting, Foil stamping, graining, varnishing.
07	Study of Case binding,
08	Covering materials- Binding cloth, Mull cloth, rexine, leather
09	Rebinding of a Given Book.
10	Demonstration of Perfect Binding Machine

Reference Books:

No.	**Title of Book**	**Author**	**Publisher's Name**
1	Binding & Finishing	Geoff & Potter	Blue Print
2	Finishing Processes in Printing	A.G. Martin	Focal Press Ltd.
3	Book Binding with Adhesives	Tony Clark	Welbound

Course: Printing Processes - I Code: M204

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	02	40	10	#30	00	$20

= External, $= Internal Assessment

Rationale:

This course aims at creating a foundation among entry-level students. It introduces common concepts frequently used in the printing industry such as design, image carrier, various printing techniques and finishing processes. After completion of this course, a student can understand the flow of a printing job, its important raw materials as well as the merits of the processes.

Chapter	Name of the Topic	Hours	Marks
1.0	**Printing Technology**	**7**	**8**
1.1	Definition, application, advantages and limitations of print media.	02	02
1.2	General work-flow of printing process I.e.Prepress,press,Post-press	01	02
1.3	Functions of prepress, press post-press	01	02
1.4	Names of conventional printing processes	01	02
1.5	Classification of Printing industry - Newspaper,commercial, digital, Name of leading organization	02	00
2.0	**Basic terms**	**5**	**8**

2.1	Original (artwork) types, Definition and purpose of Layout	01	02
2.2	Methods of Impression- Plane to Plane,Plane to Round, Round to Round, Nip/Area of contact	02	02
2.3	Substrates- Absorbent , Non-Absorbent, Names of substrates	01	02
2.4	Ink- components and their purpose , Name of Drying methods	01	02
3.0	**Litho offset image carriers**	**5**	**8**
3.1	Plate making Base materials, need for graining, counter etching.	01	02
3.2	Light sources - Names, Wavelengths, Function	01	02
3.3	Types of plates-P.S.Plate - negative and positive working	01	02
3.4	Plate making materials,chemicals, printing down frame.	02	02
4.0	**Lithographic offset machines**	**5**	**8**
4.1	Sheet fed machine units- feeding, inking, damping, printing and delivery unit	02	03
4.2	Definition of perfecting Web machine-Difference between sheet fed & web fed	02	03
4.3	Configuration - Blanket to Blanket, Common impression cylinder,stack,Inline Limitations of offset process Water less offset concept	01	02
5.0	**Binding**	**5**	**4**
5.1	Different types of binding-side sewing/stitching,centre, Sewing/stitching,Perfect Binding Raw materials,Thread, Past, Gum, Cloth.	5	4
6.0	**Basic materials, machines and Names of Manufacturers**	**5**	**4**
6.1	Manufacturing companies (Indian and International) of Digital camera, Graphic software, Plates & chemicals, Digital Printers, Printing machines	02	02
6.2	Paper and boards - ISO A series paper sizes, Units of measurements- Ream, Quire, Gross. Ink - Basic ingredients and their function	03	02

	Total	**32**	**40**

No.	Practical
01	Introduction to components of Printing Technology
02	Collecting samples of original and comparison
03	Litho offset plate making
04	Methods of Impression- Plane to Plane,Plane to Round, Round to Round
	Skill Test I
07	Litho offset printing machine - major units
08	Litho offset printing machine - Printing demonstration
09	Introduction to tools, machines, products in binding
10	Preparation of tear-off pad.
	Skill Test II
13	Revision
14	Revision

References:

No.	**Title of Book**	**Author**	**Publication**
01	Handbook of Printing Processes	Stevenson	GATF
02	Printing Technology	Adam Faux	Delmar
03	Introduction to Printing and Finishing		PIRA

Course: Printing Processes II Code: M205

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	02	40	10	#30	00	$20

= External, $= Internal Assessment

Rationale: This course aims at creating a foundation among entry-level students. It introduces common concepts related to various printing techniques. After completion of this course, a student can understand the flow of a printing job, its important raw materials as well as the merits of the processes of any particular job.

Chapter	Topic	Hours	Marks
1.0	**Relief Printing Processes - Letterpress, Flexography**	**05**	**08**
1.1	Working Principle, Advantages, Limitations, Applications of Letterpress and Flexography	02	03
1.2	Types of Image Carrier for Letterpress, Flexography -Type, Block, Nyloplate, Rubber Plate, Photopolymer Plate - General Characteristics	02	03
1.3	Machine types - Inline, Stack and Common Impression Cylinder - General Characteristics	01	02
2.0	**Gravure**	**06**	**08**
2.1	Working Principle, Advantages, Limitations, Applications	03	04
2.2	Process workflow of image carrier preparation by electromechanical engraving,	03	04
3.0	**Screen Printing**	**05**	**08**
3.1	Working Principle, Advantages, Limitations, Applications Image Carrier - Screen Making - Stencil-Direct,Indirect		04
3.2	Purpose and characteristics of - cloth, clamp, screen stretching, squeegee, frame	01	04

4.0	**Digital printing**	**06**	**08**
4.1	Working Principle, Advantages, Limitations, Applications of Electrophotography and Inkjet digital printing process	06	08
5.0	**Graphic soft wares**	**05**	**04**
5.1	Names, purpose, applications, Introduction to RIP	05	04
6.0	**ISO & British Standard Paper sizes**	**05**	**04**
6.1	Concept of ISO paper sizes, Subdivisions and Multiples, advantages, limitations, A, B, C series sizes and their applications, Basic British paper sizes		
	Total	**32**	**40**

No	Practical
01	Screen Printing - Direct Method
02	Screen Printing - Indirect Method
03	Flexography - Demonstration of Sheet photopolymer plate making
04	Flexography - Demonstration of Printing
05	Gravure - Demonstration of Printing
06	Flexography and Gravure - Collection of samples and comparison
	Skill Test I
07	Digital Printing - Demonstration of Laser Printing
08	Digital Printing - Demonstration of Inkjet Printing
09	Demonstration of any two graphic software

10	Collection of Paper samples and comparison
11	Multiples and Subdivisions of ISO and British Paper Sizes
12	Comparison of major printing processes using samples
	Skill Test II
13	Revision
14	Revision

References:

No.	Title of Book	Author	Publication
01	Gravure Printing Primer		GATF
02	Flexography Printing Primer		GATF
03	Screen Printing Primer		GATF
04	Digital Printing primer		GATF

Course: Graphic Design Code: M206

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
00	04	04	00	00	00	#30	00	$20

= External, $= Internal Assessment

Rationale:

The knowledge of Computers and software is not enough. Its application in creating a good design is important. This course deals with electronic ways of page making, designing and imposing techniques. The emphasis is given on practice of software packages related to the printing industry and creative use of the tools available with aesthetic sense.

No.	Practical
01	Introduction to the software used in packaging industry for designing of label and carton.
02	Preparation of different carton layouts using Graphic Design software and special software developed for packaging industry.
03	Introduction of Apple Macintosh
04	Introduction of Esko Graphics Software
05	About Dieline or Keyline
06	Introduction of ArtiosCAD
07	Introduction of Adobe Graphic Design software
08	File Conversion (Ard to Ai)
09	Carton Design in Adobe Graphic Design software
10	About Bleed, Folding and Trim Marks, Registration Color
11	Design Carton (Print and Manual Cutting)
12	Introduction & Installation of Graphic Design software.
13	Type Specimen Sheet- Font Size / Type / Leading variations
14	An introduction to toolbars & menu bars available in different Graphic Design software software.

15	Set the same text in different styles showing emphasis, rhythm, balance (Symmetrical and asymmetrical), Unity, Harmony and Variety.
16	Prepare a letterhead, visiting card, Envelope, adopting and using the same design and trademark.
17	Design of Press Advertisement / Poster / Layout grid for magazine
18	Artwork of a four-color job. Cutting and register marks, bleed, color key etc. Different File format.

Reference books:

No	**Title of Book**	**Author**	**Publication**
01	Electronic Composition	A. Holmes	

Course: Printing Material Science Code: M207

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale:

Each printing process has a number of variables. Their properties should be understood through scientific analysis in order to get maximum utility. This course is incorporated to give knowledge about materials used in different printing processes and their properties.

Chapter	Topic	Hours	Marks
1.0	**Paper Making**	**18**	**20**
1.1	Cellulose fibers, different sources of cellulose fibers, fiber structure	03	02
1.2	Introduction to paper manufacturing. Study of stock preparation -beating and refining of the pulp., Types of pulp and different methods. Study of different non fibrous additives added to the pulp during different stages, Imparting watermark	03	06
1.3	Study of working principle and construction of paper manufacturing process; Study of working principle types and applications of calendaring, coating, conditioning, sizing, other finishing processes; Board Manufacturing process	10	08
1.4	Introduction to recycled paper, its advantages and overview of manufacturing process, FSC, Green Printing	02	04
2.0	**Paper properties.**	**12**	**16**
2.1	Appearance Properties - Brightness, Whiteness, Gloss, Opacity	3	4
2.2	Chemical composition related properties - Moisture contents and RH, Light fastness, pH: Acidity, Alkalinity	2	2
2.3	Structural Properties - Dimensional stability, Grain direction, Basis weight & grammage, Caliper and bulk	3	4
2.4	Surface properties - Ink absorbency, Printability, Smoothness,	1	2
2.5	Mechanical Properties - Bursting strength, Folding Endurance, Tearing strength	3	4
3.0	**Speciality paper**	**04**	**08**
3.1	General Properties of Food grade paper, tissue paper, cigarette paper,security paper, writing paper, calcium based paper, blotting paper	03	06

3.2	Factors affecting cost of paper	01	02
4.0	**Basics of Printing Inks.**	**14**	**16**
4.1	Ink terminology - pH, Viscosity, Thixotropy, Length, Tack, Water in Ink emulsion and Ink in Water emulsion	02	04
4.2	Ingredients of Ink Pigment - Function, properties and types (Organic, Inorganic, White, Black pigment)	04	04
4.3	Vehicles - Function, properties and types (Drying vehicles, Non Drying vehicles) Resins - Function, properties and types (Natural resins, Synthetic Resins)	04	04
4.4	Solvents - Hydrocarbons, Aliphatic, Alcohols Additives - Plasticizers, Waxes, wetting agents, Anti set off compounds, Reducers, Driers - Liquid driers, Paste driers, Inhibitors, Accelerators	04	04
5.0	**Ink Manufacturing and end properties of ink**	**08**	**10**
5.1	Ink Mfg. Liquid Ink Manufacture –Mixing & milling - ball mill, Paste Ink Manufacture –Mixing & milling - three roll mill	04	06
5.2	End use properties - Rub and scuff resistance, Adhesion flexibility block resistance, Skid & product resistance, Light fastness, heat seal resistance, Opacity, Gloss	04	04
6.0	**Inks used for different printing process and Ink drying methods**	**08**	**10**
6.1	Offset inks - General formulation, properties Gravure inks - General formulation, properties Flexographic inks - General formulation, properties Screen Inks - General formulation, properties Speciality inks - Toners, Ink jet inks, magnetic inks, OCR inks, Scratch off inks, water washable inks, Water sensitive inks, Invisible inks, Thermochromic ink.	04	06

6.2	Ink drying methods: Absorption, oxidation & polymerization, evaporation, precipitation, heat set, cold set, radiation drying i.e. ultra violet curable and electron beam curable	04	04
	Total	**64**	**80**

No	Practical
01	Measurement of GSM/ substance of paper and paperboard.
02	Measurement of caliper of paper and paperboard. Also measure bulk
03	Check the grain direction of the paper
04	Measurement of coefficient of friction of paper and paperboard.
05	Measurement of tearing strength of paper and paperboard.
06	Measurement of tensile strength of paper and paperboard.
07	Measurement of bursting strength and burst factor of paper and paperboard.
08	Measurement of gloss and brightness of paper and paperboard.
09	Measurement of opacity of paper and paperboard.
10	Measurement of water absorbency of paper and paperboard.
11	Measurement of relative humidity of different departments of press.
12	Measurement of viscosity of liquid and paste inks.

References:

No	**Title of Book**	**Author**	**Publication**
01	Printing Materials: Science and Technology	Bob Thompson	PIRA International
02	Handbook of Pulp and Paper Technology	Kenneth W. Britt	CBS Publisher
03	Materials in Printing Processes	L.C. Young	Focal Press

Course: Design & Artwork Code: M208

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
00	04	04	00	00	00	#30	00	$20

= External, $= Internal Assessment

Rationale:

The principles of design and typesetting are forming the basis of established modern graphic reproduction processes. Therefore it is of importance for the student of printing technology to learn and understand the various design principles.

Practical

No	Practical
01	Drawing various typefaces along with their dimensional attributes such as x-height, ascender and descended lines.
02	Graphic designing for display type (at least two) job.
03	Application and study of design principles making different types of graphic designs.
04	Preparation of color wheel and scheme and symbol for a given graphic product.
05	Preparation of thumbnail, rough layout, house style specimen and dummy for a given graphic product.
06	Presentation of collection of various printed products Newspaper, magazine advertisements.
07	Presentation of collection of various printed products Visiting Card, Letter head, Cash memo.
08	Preparation of Imposition scheme for 4, 8, and 16 pages of a given size and form in a full sheet work style.
09	Preparation of Imposition scheme for 4, 8, and 16 pages of a given size and form in a half sheet work style.
10	Demonstration of visiting card, letterhead ,classified advertisements and imposition using Illustrator software.

Reference Books -

No	Author	Title	Publisher
1	H. S. Warford	Design for Print Production	JE. Reeve Fowkes
2	B. D. Mendiratta	Composing and Typography	Printek Publications, New Delhi

Course: Image Carrier Plano Code: M209

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	02	40	10	#30	00	$20

= External, $= Internal Assessment

Rationale:

Offset is still the leading technology of all the printing processes. This course will impart an extensive knowledge of all the elements of image carrier making for the offset process. Imposition schemes, image assembly, various methods of plate making & their proper application, study of useful characteristics of metals, various quality control aids, etc. are the main elements of this course which will enable the student to handle all the necessary operations related to the image carrier.

Chapter	Topic	Hours	Marks
1.0	**Introduction to Lithographic Image Carrier**	**6**	**6**
1.1	Study of Alois Senefelder's invention of lithography and study of lithographic principle. Types of plates (classification of plates) analog and digital		
1.2	Imposition - Definition, Purpose, Schemes		
2.0	**Base Materials and Coating of Lithographic Image Carrier**	**8**	**10**
2.1	Ideal chemical and physical properties of different types of base used for lithographic image carrier, Study of surface treatments such as graining, anodizing counter etching		
2.2	Study of chemical and physical properties and general contents of coatings used in PS / CtP lithographic plates and their imaging requirements.		
3.0	**Other Raw Materials Used in Lithographic Image Carrier making**	**8**	**12**
3.1	Study of chemical and physical properties and general contents of pretreatment and processing chemicals such as developer, gum-arabic, plate finisher, lacquer used in lithographic image		

	carrier making.		
3.2	Photographic positive and negatives and their ideal optical and physical requirements for different plate making techniques.		
3.3	Study of different quality control objective tests such as transmission density, temperature, relative humidity, specific gravity, pH performed on different types of chemicals used in lithographic image carrier making.		
4.0	**CtP, P.S. and Waterless plates**	**10**	**12**
4.1	Study of construction, working principle, spectral emission characteristics and limitations of light sources or illuminants such as metal halide, LASER.		
4.2	PS Positive/ Negative plates - Characteristics, workflow CtP plates - Characteristics, workflow, requirements of input for CtP, Use of software for CtP (for different imposition schemes and binding styles) CtP machine, Auto plate processor - construction and working		
4.3	Study of construction and working principle of image carrier used for waterless lithography.		
	Total	**32**	**40**

No.	Practical
1	Study of different types, construction, working principle, and limitations of whirler, printing down frame, step-and-repeat machine used in lithographic offset image carrier making.
2	Study of factors reinforcing ideal lithographic image carrier making environment such as room layout, illumination, ventilation, flooring, air conditioning, temperature, coloring and humidity, etc.
3	Ideal requirements of storage conditions for raw materials used lithographic image carrier making. Study of different storage methods, equipment used for material handling. Study of concepts such as dark reaction, continuous reaction, shelf life, and pot life.
4	Study of different methods used to know sensitometric properties of different light

	sensitive chemistries and their exposure time standardization.
5	To Draw Single page layout.
6	To Draw 4-page half sheet work.
7	To Draw 8-page sheet work, 8-page half sheet work and turn.
8	8-page half sheet work and tumble.
9	To Draw work & twist layout.
10	To make 4 colour positive/negative pasting.
11	Preparation of plate by- P.S. positive, P.S. negative.
12	For P.S. plates- Study of variation of exposure on dot formation and processing time- under and over exposed and correctly exposed on the plate by half tone positive.
13	Study of quality control aids - screen angle tester, screen ruling tester

Reference Book

No.	**Title of Book**	**Author**	**Publisher's Name**
01.	Manual For Film Planning & Plate Making		Gatehouse & Roper- Film Planning
02.	Lithographer’s Manual		
03.	Offset Lithographic Plate Making	R.Reed	GATF
04.	Chemistry Of Lithography		GATF

Course: Print Material Handling And Maintenance Code: M210

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	00	04	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

This subject contains concepts about material handling and maintenance management related to printing industry. It is required to help the diploma holder to efficiently handle the pre & post production material movement and qualitative maintenance to reduce wastage and downtime of machines.

Chapter	Topic	Hours	Marks
1.0	**Material Handling - Pallets, In Plant Vehicles, Pallet storage**	**16**	**20**
1.1	Type of pallets, Materials used to construct Pallets, Pallet Recycling, Pallet Associations, Rental Pallets, Wire containers		
1.2	Pallet Truck, Walkie stacker, Counterbalanced walkie stacker, Straddle walkie stacker		
1.3	Pallet storage Racks, Storage Rack classification, Selective pallet storage Racks		
1.4	Automated Materials handling Automatic Guided and self Guided vehicles Roll handling with and AGV (Automated Guided Vehicles) Pallet handling with an AGV (Automated Guided Vehicles)		
2.0	**Lubrication and Bearings**	**12**	**16**

2.1	Lubrication - Functions Types of lubricants - Petroleum, Animal and vegetable, Grease, Graphite Lubrication Principles - Control of friction- wear, Temperature, Removal of contaminants, Damper shock, Seal formation Characteristics of lubricants- Wetting ability, Surface Tension, Viscosity, Adhesion Conventional Test for Lubricants- Viscosity, Pour Point, Flash and Fire point, Emulsification and de- emulsification Lubricant Program- Equipment survey, lubrication chart		
2.2	Bearing - Selection, Load life failure speed, Accuracy Dirt and Dust, Misalignment and deflection, Lubrication, Damping capacity, Availability, Ease of Replacement, Temperature corrosion. Sliding Bearing - Journal Bearing, Ball Bearing, Needle Bearing, Bearing Failure, Advantages of Bearings.		
3.0	**Warehouse**	**10**	**12**
3.1	Ware house floor, ceiling, walls, Windows, Doors and sky light		
3.2	Heating and Air Conditioning, Fire Protection, Lighting		
3.3	Operational Procedures - Ware housing Sheetfed Paper, Inspections, Storage Method, Mill Skids, Controlling Inventory of small quantities of Paper		
3.4	Ware house Roll Papers, Inspections, Roll Clamp trucks, Storage of Roll Ware house layout, Determining Roll storage Capacity and space requirements, Matching Roll Diameter to Roll stand capacity, Minimizing Roll Damage, Stub Rolls, Rejected Rolls, Considerations for very High Roll storage		
4.0	**Equipment Purchasing**	**10**	**12**
4.1	Initial Cost, Cost of Installation, Printing equipment and design considerations, Personnel Training and Retraining		

5.0	**Maintenance Management**	**16**	**20**
5.1	Maintenance - Need for planned maintenance, Maintenance types - Contract / Preventive / Breakdown Maintenance. Advantages		
5.2	Total Productive Maintenance in Printing - Defining TPM, Need & Objectives, Benefits, Stages of implementing TPM in Printing, Tools in TPM – 5 Why, 4M, 5W1H Overall Equipment Efficiency- Definition, purpose and simple numerical		
5.3	Waste generation from Printing / Binding & Finishing Operations, Trash Disposal, Types of waste - Hazardous / Non-Hazardous		
	Total	**64**	**80**

References:

No.	Title of Book	Author	Publication
01	Material handling for the printers		GATF USA.
02	Production Management	MartandT. Telsang	S.Chand Publication, New Delhi, 2005
03	Industrial Engineering & Management,	O. P. Khanna	

Course: Color Essentials Code: M211

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale:

Color used for graphic reproduction has to be specific, measurable, standard and communicable among various devices. Understanding different attributes and characteristics of a color helps prepress technician to execute color separation work.

Chapter	**Topic**	**Hours**	**Marks**
1.0	**Colour**	**10**	**14**
1.1	Colour as an electromagnetic radiation , spectral properties such as line spectrum, continuous spectrum, Spectral - reflection, transmission & absorption. Concept & definition of color temperature. Comparison of color & light.	04	06
1.2	Additive and Subtractive color reproduction theories - characteristics, applications, advantages & limitations.	06	08
2.0	**Understanding color**	**06**	**08**
2.1	Physiological, psychological and photochemical processes of human color vision. Color sensing elements such as rods, cones, etc. of human color vision system.	02	04
2.2	Factors such as intensity and surrounding that control appearance of color. Study of effect such as adaption and metamerism as observed in color vision.	04	04
3.0	**Color specification and measurement**	**12**	**12**
3.1	Need for color specification, definition and standardization. Study of different approaches of physical color specification systems such as Munsell, Pantone etc. along with their working principle, advantages, applications and limitations.	04	04

3.2	Need of color measurement, Factors controlling color sensation i.e. spectral illumination, spectral reflection and Red, Green and Blue color matching function. Definition and characteristics of ideal viewer, illuminants. Device dependent / independent colour.	04	04
3.3	Definition and characteristics of tristimulus value of color. Method of calculation of tristimulus value of color.	04	04
4.0	**Study of color measuring instruments**	**12**	**18**
4.1	Study of working principle, advantages, applications & limitations of 3D i.e. solid color space such as CIELab, CIELuv.	04	06
4.2	Colourimeter, Densitometer, Spectrophotometer - Study of construction, working principle and applications Concept methods and applications of color difference measurement.	08	12
5.0	**Color Separation for Graphic Reproduction**	**12**	**16**
5.1	Concept of full color graphic original, requirements of ideal graphic reproduction of full color using subtractive theory of color reproduction.	04	04
5.2	Factors such as spectral properties of filter, half-tone printing process i.e. additivity and proportionality failure, spectral behavior of yellow, magenta and cyan colorants, optical properties of substrates controlling actual graphic reproduction process.	06	08
5.3	Attributes of process inks such as hue error, grayness, dot gain / loss and trapping percentage	02	04
6.0	**Color separation methods**	**12**	**12**
6.1	Study of causes and remedies moire defect. Need and various combinations of screen angles, dot shapes.	06	08
6.2	Details study of working principle and applications of color separation graphic aids such as color control patch and gray scale.	06	04
	Total	**64**	**80**

No	Practical
01	Study of optical effect- metamerism and identification of metameric pairs.
02	Study of optical effect- adaption and effect of surrounding on an appearance of color.
03	Study of construction and working of Densitometer
04	Plotting of a spectral reflection, opacity and density curve for a given values.
05	Measurement of attributes such as hue error, grayness and trapping % of process inks.
06	Color definition using physical color specification system such as Pantone.

Reference Books:

No	Title of Book	Author	Publisher's Name
1	Printing Materials Science & Technology	Bob Thompson	PIRA
2	Introduction to Prepress	Hugh Speirs	PIRA / BPIF
3	Colour Control in Lithography	Kevin Triton	PIRA
4	Handbook of Print Media	Helmut Kipphan	Heidelberg and Springer

Course: Development of Life Skills - I Code: M301

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
00	04	04	00	00	00	00	#20	$20

= External, $= Internal Assessment

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation, the responsibility of diploma holder is not unique. He will be a part of a team in the organization. Life skills will enhance his capabilities in the searching, assimilating information, managing the given task, handling people effectively, and solving challenging problems.

No.	Practicals
01.	Library Search: Visit your Institute's library and enlist the books available on the topic given by your teacher. Prepare a bibliography consisting of name of the author, title of the book, publication and place of publication.
02.	Enlist the magazines, periodicals and journals available in your library. Select any one of them and write down its content. Choose a topic for presentation.
03.	Attend a seminar or a guest lecture, listen it carefully and note down the important points and prepare a report of the same.
04.	Visit to any one place like historical / office / farms / development site, etc. and gather information through observation, print recourse and interviewing the people.
05.	Prepare your individual time table for a week List down your daily activities. Decide priorities to be given according to the urgency and importance of the activities. Find out your time wasters and mention the corrective measures.
06.	Collection of good thoughts, important data, etc.
07.	Find out the causes of your stress that leads tension or frustration. Provide the ways to avoid them or to reduce them.
08.	Undergo the demonstration on yoga and meditation and practice it. Write your own views, feelings and experiences on it.

Reference Books:

Sr. No.	Author	Title of the Book	Publisher
01.	Michael Hatton (Canada – India Project)	Presentation Skills	ISTE, New Delhi
02.	-	Stress Management Through Yoga and Meditation	Sterling Publishers Pvt. Ltd.
03.	Chakravarty, Ajanta	Time Management	Rupa and Company

Course: Development of Life Skills – II Code: M302

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
00	04	04	00	00	00	00	#20	$20

= External, $= Internal Assessment

Rationale:

In today's competitive world, the nature of organizations is changing at very rapid speed. In this situation the responsibility of diploma holder is not unique. He will be a part of a team in the organization. This subject will develop the student as an effective member of the team. Such skills will enhance his capabilities in the searching, assimilating information, managing the given task, handling people effectively and solving challenging problems.

No.	Practicals
01.	SWOT Analysis: Analyse yourself with respect to your strength and weakness, opportunities and threats. Following points will be useful in SWOT analysis:

	Your past experience, achievements, failures, feedback from others, etc.
02.	Undergo a test on reading skill / memory skill administrated by your teacher.
03.	Solve Puzzles.
04.	Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness, like importance of cleanness in slump areas, social activities, like giving clothes to the poor, etc. (One activity per group)
05.	Give presentation in a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.
06.	Watch / listen an informative session on social activities. Make a report on a topic of your interest using audio-visual aids. Make a report on the same.
07.	Conduct an interview of a personality and write a report on the same.
08.	Discuss a topic in a group and prepare minutes of discussion. Write a throrough description of the topic discussed.
09.	Arrange an exhibition, displaying flow-charts, posters, paper cutting, photograph, etc. on the topic given by your teacher.

Reference Books:

No.	**Title of the Book**	**Author**	**Publisher**
01.	Adam's Time Management	Marshall Cooks	Viva Books
02.	Body Language	Allen Pease	Sudha Publications Pvt. Ltd.
03.	Time Management	Chakravarty, Ajanta	Rupa and Company
04.	Working in Teams	Hardingham A.	Orient Longman

Course: Press Management Code: M401

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	00	04	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

To enhance entrepreneurial qualities, knowledge of management of available resources in an economical manner is important. The methodical study of principles of scientific management, layout objectives, and structure of printing industry can inculcate a disciplinary approach among students in dealing with workers. To develop one's own establishment, the student must understand the trade cycle, labor laws, and printers' laws.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Management**	**04**	**08**
1.1	Objectives and functions such as planning, organizing, directing, coordinating, motivating and controlling.		
2.0	**Structure of Organization**	**08**	**12**
2.1	A) Structure of large scale printing press B) Functions of sales, marketing, production, administration, stores departments	4	6
2.2	Different forms of business organizations- single owner, partner, joint stock and co-operative.	4	6
3.0	**Demand and Supply, Inventory**	**04**	**08**
3.1	Laws of demand, supply, diminishing utility, elasticity and equilibrium.	2	4
3.2	Inventory – Meaning, Types of Inventories, Inventory Control system	2	4

4.0	**Legal Aspects**	**08**	**12**
4.1	Industrial acts- factories act, Printer's act- copyright act	4	6
4.2	Trade unionism and leadership.	4	6
5.0	**Print Production Management**	**20**	**20**
5.1	Objectives of Production Management, Functions of print production department, Types of Production, Classification of Production systems, Production planning and control, Shop floor Management.	10	10
5.2	Quality Management – A) Fundamental concepts of Quality, Quality Cost, Specification of Quality, Quality Assurance B) Concepts of Six Sigma, Kaizen, 5S C) ISO standards for Printing processes, Paper, Ink - Objectives	10	10
6.0	**Statistical Print Process Control**	**20**	**20**
6.1	Objectives of SPC, Variations, Types of Variation, implementation of SPC	8	8
6.2	Control Charts and its types, Use of Control charts for print application, Control charts for variables, Control charts for attributes, Process capability	12	12
	Total	**64**	**80**

Reference Book:

No.	**Title of Book**	**Author**	**Publisher's Name**
01	Industrial Organization & Management	Bang & Sharma	VORA
02	Entrepreneurship Development	Bose	TATA / Mc Graw Hill
03	Printers' Laws	Saifuddin	

Course: Costing and Estimating Code: M402

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	00	04	03	80	20	00	00	00

= External, $= Internal Assessment

Rationale:

Costing and Estimating is an integral part of any Business. This course teaches a scientific approach towards costing of different printing elements. The student will understand how a precise value of a job can be determined, what factors should be considered while estimation, what is the upper limit on wastage, how indirect costs are to be allotted to different productive departments, etc.

Chapter	Name of the Topic	Hours	Marks
1.0	**Costing**	**20**	**24**
1.1	Definition, Different type of cost - fixed, variable, unit, and their examples from graphic arts industry, Different types of costing techniques/methods and their applications, Cost control system	7	8
1.2	Budget centers - cost recovery and service, Allocation of expenses, Comparison of actual and budget expenses. Factors affecting profitability, Pricing policy. Forecast of life of assets.	7	8
1.3	Hourly cost rate, machine cost rate and their applications Study of time rate and work rate system and their applications in costing	6	8
2.0	**Forms**	**08**	**12**
2.1	Statements - Summary of expenses, Work Instruction Ticket, Cost Sheet, Material requisition forms, Delivery and sales report Different types and applications of invoice		
3.0	**Estimating.**	**24**	**32**

3.1	Qualities and tools of estimator, Standard press routine and its advantages. Study of importance of sequence of various operations and estimation of time required for each operation	6	8
3.2	Estimation of paper-paper size (British & ISO), - Multiples and sub-divisions, Ream, Quire, Gross, wastage allowance. Weight of web & sheets, calculation of no. of pages, Ink consumption - SPANKS formula, Binding material calculation.	12	16
3.3	Factors in determination of rate for design, DTP, processing, binding and finishing, plate making and printing.	6	8
4.0	**Legal Aspects**	**12**	**12**
4.1	Disputes about delayed payments, Goods and Services Tax - provisions related to printing industry	4	4
4.2	Study of technical specifications in tender document, formats and conditions of tender documents.	8	8
	Total	**64**	**80**

Reference Books:

No.	Title of Book	Author	Publisher's Name
1	Costing & Estimating	B.D.Mendiratta	
2	Printer’s Costing	Ruggles	

Course: Entrepreneurship Development Code: M403

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	02	04	02	40	10	00	#20	$20

= External, $= Internal Assessment

Rationale:

In the face of rising unemployment and introduction of capital- intensive techniques of production in printing industries, the student of printing technology should have a basic theoretical training on self employment. The Governments both the Central and state do also endorse this idea as their activities in providing bank loans and other assistance to these as print self employed technologists have increased. This subject is therefore, very essential in the curriculum of Diploma course in Printing Technology. This will enable the students to plan for the establishment, to prepare project report, material management etc.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Entrepreneur**	4	8
1.1	Definition, qualities and functions of an entrepreneur		
1.2	Entrepreneurial , importance of entrepreneur		
2.0	**Means of Finance**	20	20
2.1 2.2 2.3	Micro and Small Scale Industry- definition, objectives, examples Central and State Government schemes for finance - Names, Objectives, Requirements Proforma of a project report on a small printing press. Proposal for bank loan establishing a press Location of Industry - Choice of site, factors influencing location		
3.0	**Material management**	8	12
3.1	Purchase - functions of purchase department,, methods of purchase,		

	Economic order quantity		
3.2	Stores : classification and codification of materials, physical stock verification, methods, inventory control function		
3.3	Sales and marketing related to printing industry, e commerce		
	Total	**32**	**40**

No	Practical
01	Starting a small- scale industry- objectives, feasibility report, project feasibility analysis, licenses, registration of small scale industries, enlistment as suppliers.
02	Contents of a project report - Meaning, Contents
03	Proforma of a project profile on a small printing press.
04	Scheme of assistance- financial assistance from various Government (Central and State) Agencies
05	Proposal for bank loan for establishing a press / studio and its extension.
06	Choice of site, factors influencing product and process layout
07	Visit to MIDC, report writing
08	Introduction to e-commerce, e marketing

Reference Book:

No.	**Title**	**Author**	**Publisher's Name**
01	Book and leaflets published by Directorate of Small Scale Industries		Govt. of Maharashtra
02	Industrial organization and management	P.T. Ghan	Pune Vidyarthi Griha
03	Dynamics of Entrepreneural Development and management	Vasant Desai	Himalaya House
04	Industrial Engineering and management	O. P. Khanna	

Course: Environmental Science & Disaster Management Code: M404

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	02	04	02	40	10	00	#20	$20

= External, $= Internal Assessment

Rationale:

It is necessary to study environmental issues to realize how human activities affect the environment and what could be possible remedies or precautions which need to be taken to protect the environment and management of disaster.

Chapter	Topic	Hours	Marks
1.0	**Nature of Environmental Studies**	12	16
1.1	A) Definition, Scope and Importance of Environmental Studies, Need to create awareness about environment in general public B) Natural Resources and Associated Problems - Definition and uses of natural resources, problems associated with these resources, their over exploitation, Alternate resources and their importance for environment Renewable and Non renewable resources C) Environmental Pollution - Definition, Classification, sources		
2.0	**Environmental, Health & Safety Guidelines for Printing Industry**	10	12
2.1	Emissions to air (VOC), Waste-water, Management of waste and hazardous materials in printing industry Occupational Health & Industrial Safety - Physical Hazards, Chemical Hazards and remedial measures		
3.0	**Disaster Management**	10	12
3.1	Disasters - Nature and Classification of Disasters, Hazards related		

	to Earthquakes, Tsunami, Cyclones, Floods, Drought, Landslides, Prevention and precautionary measures		
		32	**40**

No	Practical
01	List of various types of natural resources and problems due to over exploitation.eg. Forest, Fresh water, Minerals List of various conventional and non-conventional sources of energy, Distinguish between renewable and non renewable sources of energy, Importance of renewable energy.
02	Environmental Pollution And Its Control List down various factors which cause environmental pollution and list control measures. List various pollutants in Printing Industry & safety measures.
03	Hazards, Disasters And Mitigation Measures Understand various hazards & disasters, their effects and mitigation measures. Explain the causes for different types of disasters. List the effects of each type of disaster on human beings. List various preventive measures for disaster risk reduction. List various safety measures in printing industry and the need for safety audit - onsite and offsite safety audits to be done and formulation of emergency plans.

References:

No	**Author**	**Title of Book**	**Publication**
01	Anindita Basak	Environmental Studies	Pearson Education
02	R. Rajgopalan	Environmental Studiesfrom Crises to Cure	Oxford University Press
03	Dr. R.Daniels, Dr.J. Krishnaswamy	Environmental Studies	Wiley India
04	Gupta, Harsh K.	Disaster Management	Universities Press India Pvt. Ltd.

Websites -

http://www.hse.gov.uk/printing/index.htm

https://www.osha.gov/SLTC/printing_industry/index.html

Visits -

Large scale printing industry

Course: Gravure Printing Process Code: M501

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	00	#20	$20

= External, $= Internal Assessment

Rationale:

This course provides an understanding of the basics related to gravure image carriers and printing process. It covers concepts and deals with detailed study of all the variables, processes and technical advancements with limitations. The Gravure process is particularly important for packaging applications. The technical knowledge of gravure process helps students at the entry level of packaging field. This course will be particularly useful for students seeking a future in the packaging field.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Introduction**.	**08**	**08**
1.1	Gravure - working principle, applications, advantages and limitations; Comparison with other printing processes	4	04
1.2	Image processing for Gravure process - Different types of originals, films for Gravure, need for screen, special colors	4	04
2.0	**Cylinder materials and variable**	**18**	**20**
2.1	Electroplating - chemical and electrical variables such as electrolytes, immersion, current, voltage, temperature, distance.	4	6
2.2	Cylinder base - sleeve, integral shaft, specifications of cylinder Copper - properties, finishing, cutting, removal, testing, corrections, nickel plating. Chromium - plating, finishing, degreasing, polishing, testing Cylinder balancing methods	14	14
3.0	**Engraving methods**	**18**	**20**

3.1	Chemical engraving - cell configurations, different etching processes, merits, demerits	6	4
3.2	Electronic engraving - working principle, construction Screen angles, cell size, cell walls, engraving speeds, cylinder size, cutting tool, ink and substrate consideration.	6	8
3.3	Laser engraving - working principle, construction	6	8
4.0	**Doctor Blade**	**12**	**16**
4.1	Doctor blade - a) Assembly - angle, force, deflection, causes of wear b) Materials used for Doctor Blade Holder configurations - wiping and contact angles, pressure control, Doctor Blade Setting, Troubleshooting	3	4
4.2	Impression roller A) functions, materials and hardness B) Electrostatic Assist - construction, working principle	3	4
4.3	Gravure proofing machines	3	4
4.4	Drive Systems - Common Shaft (Single Line Shaft) & Electronic Line Shaft (ELS): Working principle, Advantages, Limitations, Applications	3	4
5.0	**Inks for Gravure**	**04**	**08**
5.1	Composition, Solvents, Properties		
6.0	**Troubleshooting**	**04**	**08**
6.1	Problem encountered in Gravure process, their causes and remedies.		
		64	**80**

No	Practical

01	Introduction to different parts of Gravure machine and their working
02	Setting of feeding unit
03	Setting of printing unit - doctor blade assembly, impression roller, registration control
04	Setting of delivery unit
05	Preparation of Gravure cylinder (various methods) - demonstrations
06	Study of Gravure cylinder proofing machine

References Book:

No.	Title of Book	Author	Publisher's Name
01	Gravure Process Technology	Gravure Association of America	GAA
02	Gravure Primer	GATF	GATF

Course: Flexographic Printing Process Code: M502

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale: This course provides an understanding of the basics related to flexographic image carriers and machines. It covers concepts, detailed processes, technical advancements and limitations. This course will be particularly useful for students seeking a future in packaging field.

Chapter	Topic	Hours	Marks
1.0	**Introduction**	**06**	**08**
1.1	Flexographic Printing Process - Characteristics, Working principle, advantages, limitations and applications	4	4
1.2	Comparison with other printing processes	2	4
2.0	**Image carrier**	**20**	**24**
2.1	Design consideration for flexographic reproduction, spectral requirements for flexography, Type of negative, screen ruling, screen angles, dot shapes, effect of thickness on elongation, shrinkage allowance, calculating image elongation	8	8
2.2	Photopolymer plate. Parts of flexographic plate - face, floor, shoulder, base, back, floor-depth A) Varieties of photopolymer - physical and chemical properties, shore hardness B) Plate Exposing and Developing unit - types of UV and types of exposure, Developing chemicals C) Liquid and sheet plates - Construction, stages in making, trouble-shooting, comparison and quality control D) Plate mounting equipment and systems, Metal backed plates, problems and remedies in plate mounting, plate mounting tapes	6	8

2.3	Computer to plate (CtP) - Block diagram, components, ideal system, resolution comparison between visible light and thermal ablation method, advantages of CtP system over conventional plate making methods. Plates for CtP flexo - laser engraved rubber rolls, integral mask system	6	8
3.0	**Printing Machines**	**20**	**24**
3.1	Principle types of printing machines - construction, application, advantages and limitations, problems in printing on different machines - Inline, Stack, Common impression cylinder (CIC)	14	12
3.2	Plate cylinder- construction, types - integral, demountable, sleeves and magnetic	2	4
3.3	Impression cylinder - construction, loading method - pneumatic or hydraulic, Tympan bar	2	4
3.4	Hybrid presses, sheetfed presses & their application, drying systems.	2	4
4.0	**Ink metering system**	**12**	**16**
4.1	Inking system - Need of ink metering, construction and working of: Standard two roll inking system, Two roll inking system with doctor blade, Reverse angle doctor blade system, Chambered doctor blade system Fountain roll- Function, type of roll coverings, shore hardness	6	8
4.2	Anilox Roll A) Specifications- cell wall, land, depth, opening, cell count, cell volume, cell angle, depth to opening ratio. B) Different types of engraving on anilox roll and methods of engraving, Considerations for choosing proper anilox roll.	6	8
5.0	**Substrates and Inks for flexography**	**06**	**08**
5.1	Commonly used absorbent and non-absorbent substrates - Names, General Properties, Corona treatment Water based, solvent based and U.V. inks- composition, properties and areas of applications, advantages and disadvantages.	3	4

5.2	Different end use requirements of flexographic products - ink adhesion, scratch, rub and block resistance, weather resistance, gloss, coefficient of friction test etc.	3	4
	Total	**64**	**80**

No.	Practical
01	Making of single color line blocks for letterpress printing process.
02	Making of half tone blocks for letterpress printing process.
03	Making of line and tone nylo plate for letter press printing.
04	Making of line and tone sheet photopolymer plate for flexo press printing.
05	Making of half tone liquid photopolymer plate
06	Demonstration of printing on flat bed cylinder machines.
07	Setting up of unwinder and rewinder units of web fed flexographic printing machine.
08	Setting up inking unit of web fed flexographic printing machine.
09	Setting up printing unit of web fed flexographic printing machine.
10	Single and multi color line or half-tone printing

Reference Books

No.	**Title of Book**	**Author**	**Publisher's Name**
01	Flexography : Principles & Practices	--	FTA
02	Flexography Primer	James Crouch	GATF

Course: Rigid Packaging Code: M503

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	00	$20

= External, $= Internal Assessment

Rationale:

Packaging is becoming one of the large segments of printing and related industry. This course intends to deal with additional knowledge of packaging requirements such as variety of substrates, finishing operations, conversion, etc.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Introduction**.	**16**	**16**
1.1	a) Packaging Functions – Primary - Preserve, Protect, Present Secondary - Inform, Identify, Sell, Marketing b) Challenges in packaging – Storage, Transportation, Chemical, Climatic, Biological. c) Classifications–Primary/Secondary/Tertiary, Unit/Intermediate/ Bulk	8	8
1.2	Purpose, Advantages and Types - Packaging Material - Paper Board, Plastics, Wood, Metals, Glass, Textile Cushioning Materials – Plastic sheets, fiber foam, sponge, grass Ancillary Materials	8	8
2.0	**Paper and Board used in packaging**	**12**	**16**
2.1	Boards - Type of Boards, properties and applications, Multiply boards, food grade boards, corrugated boards	3	4
2.2	Corrugated board - Corrugated board manufacturing process, types of flutes	3	4
2.3	Carton - Functions, types, applications, international standards for	3	4

	cartons such as FEFCO, ECMA Carton making – Carton designing – consideration while designing, information on carton Carton styles – STE, RTE, display carton, hanging , CB box making – box making machine		
2.4	Die making – punch making for single die, jigged die. Rotary Die making, Punching machine, carton making for Universal cartons, stitching machine, scoring machine, automatic gluing machine, types of glue applicators.	3	4
3.0	**Metals used in Packaging**	**12**	**16**
3.1	Metals used in packaging, advantages, applications, characteristics of – Aluminum, Stainless Steel, Galvanized Steel	6	8
3.2	Conversion of Metal – Cans - Three piece & Two piece Cans, Walled iron Cans - Welded & Seamless Cans. Tubes – Collapsible tube manufacturing process, Design, Advantages & Disadvantages of Metal Collapsible tubes, Aerosol Containers - Classification of Aerosols – Manufacturing process, Advantages & Disadvantages of Aerosols. Foils – Process and Properties. Quality check for metal containers and Can - anti-corrosion techniques, specifications, problems	6	8
4.0	**Glass used in Packaging**	**12**	**16**
4.1	Types of Glass bottle, making process, Raw materials, Properties, Advantages, Disadvantages, Applications	6	8
4.2	Manufacturing Process - Bottle manufacturing and post manufacturing Treatments. Quality control and Specifications	6	8
5.0	**Economy of Packaging**	**06**	**08**
5.1	Packaging Life cycle – Recovery, Recycle, Reuse concept in packaging Costing of Carton making, Printing Process, Inline Process costing, Use of software for package design		

6.0	**Test on Package**	**06**	**08**
6.1	Physical tests on package for transportation – physical damage, stack test, drop test, sealing strength, rolling test, crush resistance Water Vapour Transmission Rate		
	Total	**64**	**80**

No	Practical
01	Prepare a carton design for given products (Manual)
02	Prepare a carton design for given products using ESKO software (Introduction)
05	Measurement of Vibration strength of package.
06	Measurement of Drop strength of package.
07	Measurement of Compression strength of a corrugated container.
08	Measurement of Water Resistance Test of shipping container.
09	Ply Separation Test of solid or corrugated fiberboard.
10	Measurement of Crush resistance of corrugated container.

References Book

No	**Title of Book**	**Author**	**Publisher's Name**
1	Modern Packaging Films	S.H. Pinner	London Butter Worths
2	Structures and Forms in Paper Board Package Design	Haresh Pathak	Super Book House
3	A Handbook for Printing And Packaging Technology	Bishwanath Chakravarty	Galgotia

Course: Plano Sheetfed Printing Code: M504

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	#20	$20

= External, $= Internal Assessment

Rationale:

There are many different Offset presses in the market today with many minute operational differences. The purpose of this course is not to provide a general operational manual, but to deal with the fundamental understanding that will enable the student to run any offset duplicator or single and multi-color sheet-fed offset printing press after studying the manufacturer's operating manual.

This course covers the information necessary to run an offset press and to give important information on press trouble-shooting concerns.

Chapter	**Name of the Topic.**	**Hours**	**Marks**
1.0	**Introduction**	**06**	**08**
1.1	Lithographic offset , Dry offset / Waterless offset - working principle, Construction and design, perfecting, need, applications, advantages, limitations	3	4
1.2	Cylinder arrangement and working - single color / multi color.	3	4
2.0	**Feeding unit**	**12**	**16**
2.1	Feed board - different parts and functions Classification of feeder - single sheet, stream working principle need & functions of Two sheet detector, no sheet detector , pile height governor, side lay, front lay	6	8
2.2	Sheet transport control from pile board till front lay : Pneumatic and Mechanical	6	8
3.0	**Dampening system and inking system**	**20**	**24**

3.1	Dampening system - construction and working Functions Types of dampening system - Conventional, Brush, Flapper, Alcolour, Inker feed.	10	12
3.2	General composition of Dampening solution, pH, conductivity, water hardness		
3.3	Inking system - Construction and working, Theory of ink flow, Meaning of Ink-Water balance, Functions, characteristics of inking roller material	10	12
3.4	Ink setting for a) fountain with keys b) keyless ink fountain, Ink film thickness, Heat generation in inking system cause, effect, remedies		
4.0	**Printing unit and delivery unit**	**20**	**24**
4.1	Plate cylinder - Construction, Undercut, Cylinder gap, Plate clamps- Types, pin register system. Cylinder packing and printing pressure Cylinder gears : Comparison of spur and helical gears	4	4
4.2	Blanket cylinder - Construction, Undercut, Cylinder gap, functions, characteristics requirements, types of blanket - Compressible, non compressible and U.V.	4	6
4.3	Impression cylinder - Construction, Cylinder gap, Pressure setting, Sheet insertion system Grippers - Tumbler, swing arm	4	4
4.4	Metal Decorating presses - Construction, working, applications	4	6
4.5	Delivery unit - construction and working, function, Transfer cylinder, parts of delivery unit, introduction to external drying systems UV, EB, IR, Hot air & anti -set-off spray	4	4
5.0	**Problems**	**06**	**08**
5.1	Mis-register, Plate- blinding, Dot gain, Scum, Ink- Mottling, Set -off, Hickeys, Ghosting.	3	4
5.2	Purpose and Composition of Test Form - star target, colour control bar, slur guide, registration mark etc.	3	4

	Total	**64**	**80**

No	Practical
01	Lay setting for different types of imposition work.
02	Plate mounting.
03	Mounting of blanket with packing.
04	Gripper setting impression cylinder.
05	Setting of dampening roller.
06	Setting inking roller.
07	Make ready operations for multi color printing line and halftone printing.
08	Preventive maintenance.
09	Cleaning and wash up.
10	Setting joggers, skeleton wheels, delivery anti set -off spray.

References Book

No.	**Title of Book**	**Author**	**Publisher's Name**
01	Litho offset press operating	Lathan	GATF
02	Solving sheet fed offset problems		GATF Staff
03	Litho printing	Faux	Blue printing
04	Machine printing	Durrant	
05	Printing Technology	Adams, Faux	Delmar publication

Course: Project Work Code: M505

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	00	00	00	00	#50	$20

= External, $= Internal Assessment

Rationale:
Project work will help student to apply theoretical concepts in practice. The student will understand to select proper printing process, raw materials, software. He will be able to plan and execute a job within estimated budget. It will also improve team work, inter-personal skills and communication.

No.	Name of the Topic	Hours	Marks

		32	
1.1 1.2 1.3 1.4	Present trends in Printing Industry : Automation in Pre-press, Press, Post-press areas E-Commerce - Print on Demand, Logistics Workflow - Estimating for a job, Planning of various resources required for a job, Scheduling on machine, Actual Production and supervision, Post-press activities, Dispatch, Costing of job International, National and Regional Printing Organizations and their objectives Manufacturers of Raw Materials - National and International Promotional activities for printing industry - Exhibitions such as Drupa, Technical Seminars / Workshops Practical - Formation of the group of 6-8 students. Making presentation of the same well before the execution - Listing stages / operations in project alongwith time required, Selection of the text and image editing DTP software and decision of the finishing processes for the project. Selection of the printing process, Understanding the basic concepts and rationale behind the selection of the printing process. Selection of the range of substrates and inks and other variables. Costing of the raw materials required Selection of the project having single and multicolour printing constituting an output that resembles job works carried out in an industry. Project Report has to be properly bound.		
			70

Course: Press work Web Code: M506

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	00	#20	$20

= External, $= Internal Assessment

Rationale:

Web machine operation is required to be learnt in order to understand efficient working procedures. There is plenty of scope for skillful personnel in this branch of printing. This course imparts extensive knowledge about all the elements of web machines used in all the printing processes such as offset, flexography, gravure, as well as quality control procedures & auxiliary operations.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Introduction**.	**10**	**12**
1.1	Webfed printing - working principle, need, applications; Comparison with sheetfed machines, definition of cut-off, tabloid, broadsheet Configurations - Common Impression Cylinder (Satellite), Blanket to Blanket, Inline, Stack, Y, H		
2.0	**Infeed**	**14**	**20**
2.1	Reel stand - Single, multiple, revolving, Reel stand location: inline, perpendicular, basement Locking - expanding shaft, tilt lock, chuck systems.	04	06
2.2	Automatic splicers - need, types, working principle, construction, application A) Zero speed - festoon B) Flying splicer (match speed)	06	08
2.3	Web tension, Factors affecting web tension, tension control Dancer roller - need, types, working principle, construction,	04	06

	application		
3.0	**Dryer and Chill roller**	**10**	**12**
3.1	Dryer - Need, operations and types- Open flame, high velocity hot air, oven, radiation, combination	05	06
3.2	Chill roller - Need, operations and types Baffle plates, jacketed (Embedded), silicone application	05	06
4.0	**Folders and related ancillary equipments**	**10**	**12**
4.1	Need, types, working principle, construction, application and maintenance: Former, Jaw, Chopper, combination Collect cylinders, Conveyor mechanisms - Need, working		
5.0	**Image and web control**	**10**	**12**
5.1	Box tilt, compensator, fan out, color register systems	05	08
5.2	working principle and construction of Register control devices : Stroboscope, Video viewer	05	04
6.0	**Ancillary operations**	**10**	**12**
6.1	Slitting and trimming - blades, slot type, rotary scissors, hard on hard slitters, perforator, sprocket punching	05	08
6.2	Trouble shooting for web machines Out of round rolls, telescopic rolls, web - wrinkles, web- breaks, sagging of web in folder, fan out	05	04
	Total	**64**	**80**

No.	Practical
01.	Introduction to Web Press.

02.	Difference between sheet fed and web fed.
03.	Text form printing on two color machine.
04.	Web feeding study.
05.	Splicers and festoons on web
06.	Dampening system study with diagram.
07.	Inking systems on Web machine.
08.	Drying and chillers study.
09.	Printing on Web machine.
10.	Additional operations on web presses.
11.	Visit to Presses.
12.	Delivery unit of web press.
13.	Finishing operations on web machine.

References Books:

No.	Title of Book	Author	Publisher's Name
01.	Web press operating		GATF
02.	Web control	Durant	PIRA
03.	Handbook of Print media	H. Kipphan	Heidelberg
04.	Solving Web-fed press troubles		GATF

Course: Digital Printing Code: M507

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	00	#20	$20

= External, $= Internal Assessment

Rationale:

Digital Printing techniques are replacing conventional imaging technologies at faster rate. Output quality of the digital printing technique promises saving in turnaround time, cost incurred on account of manpower required, and effective use of raw materials. These techniques also offer easiest ways of printing with benefits such as just in time printing, lowest waste and distribute and printing approach. Thus understanding the concepts of digital printing, its scope is inevitable for sprints of career in printing technology.

Chapter	Name of the Topic	Hours	Marks
1.0	**Introduction to Digital Printing Technology**	**10**	**12**
1.1	Definition, advantages, limitations of digital printing technologies, Comparison of conventional and digital printing technologies.	04	04
1.2	Introduction to application areas of digital printing technology in graphic arts industry such as computer-to-film, computer-to-plate, computer-to-print, customization and direct marketing, Print-on-Demand (POD), variable data printing (VDP), distribute-and-print, remote publishing (Web2Print), wide-format printing, specialty applications (particularly of inkjet) like 3D printing, printing on microscopic items	06	08
2.0	**Toner Based Digital Printing System**	**14**	**18**
2.1	Study of working principle, types and examples of selenium material, organic photo conductors, charge generation materials and charge transport materials.	03	04
2.2	Study of working principle, types, requirements and general composition of developing medium i.e. liquid and dry toner used in electro photographic digital printing system.	03	04

2.3	Study of working principles, major stages of Electrophotography	04	06
2.4	Study of characteristics and applications of ion deposition, electrostatic and magnetographic toner based digital printing system.	04	04
3.0	**Non Toner Based digital printing system**	**12**	**16**
3.1	Study of working principle, types and applications of ink jet and thermal transfer digital printing systems.	8	12
3.2	Requirements of colouring medium (ink) and general composition used in inkjet digital printing system	4	4
4.0	**Large Format Printing**	**10**	**12**
4.1	List of digital printing technologies used in a large i.e. wide format digital printing, Applications Construction of general wide format printer and its technical specifications, Inline operations	05	08
4.2	Names and required properties of substrates used in large format digital printing systems, Troubles and remedies related to use of such substrates.	05	04
5.0	**Digital Proofing Systems**	**10**	**12**
5.1	Purpose, advantages of digital proofing system. Technologies used for digital proofing, hard proofing, soft proofing, halftone simulation (dot proofing), remote proofing, preflight, SWOP/GRACoL certification for proofing systems		
6.0	**Hardware and Software used in Digital Printing**	**08**	**10**
	Study of functions, types and comparison of different types of Raster Image Processor (RIP).	04	05
	Study of general technical specification such as memory, processor, etc, as required for different hardware and out put device. Study of factor affecting out put resolution in different digital printing device.	04	05
	Total	**64**	**80**

No.	Practical
01	Introduction to Digital Printing
02	Study of short run digital printers
03	Specifications of short run digital printer
04	Role of ICC profile in digital printing Workflow
05	Print on demand (POD) and Variable data printing (VDP)
06	Study of construction and working different types of Inkjet printers
07	Study of large format printers
08	Study of digital offset printer such as HP Indigo 3050
09	Introduction to PIP (Photo Imaging Plate)
10	Study of BID (Binary ink developer)
11	Setting up a reliable color (calibration, color management, test print and LUT)

Reference Book

No	**Author**	**Title**	**Publication**
1	Hugh Speirs	Introduction to Prepress	BPIF Publishing
2	Bob Thompson	Printing Materials: Science and Technology	PIRA International
3	Helmut Kipphan	Handbook of Print Media: Technologies and Production methods.	Heidelberg and Springer

Course: Electronic Color Correction Code: M508

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	#20	$20

= External, $= Internal Assessment

Rationale:

This course provides an understanding of the basics related to color scanners, color imaging systems, digital camera, computer-to-plate, computer-to-print and digital proofing. Greater emphasis is laid to understanding the reproduction process utilizing scanners, operating systems, digital cameras & digital proofing.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Basics of color reproduction**	**12**	**16**
1.1	A) Revision of color theories, Tristimulus method of color preparation, Human vision – Rods & cones B) Attributes of color – Hue, Value, Chroma	6	8
1.2	A) Study of Color separation, Color Correction, Screen angles, filters, Duo tone, spot colors, AM, FM & Hybrid screening techniques B) Raster Image Processing (RIP) - Purpose, Function, Types C) Errors of trichromatism, proportionality failure, additivity failure, Color correction tools such as under color removal (UCR), gray component replacement (GCR), under color addition (UCA), black component addition (BCA), unsharp masking (USM).	6	8
2.0	**Scanners**	**10**	**12**
2.1	Flat bed scanners - working principle, components of scanner. Factors affecting scan quality, Scanning Resolution, Bit depth of colour - Definition, bit depth of gray scale, multi-colour image	5	6
2.2	A) Image capture elements - Working principle, Applications, Advantages & Disadvantages of PMT, CCD, CMOS.	5	6

	B) White / Black point compensation - Meaning, purpose		
3.0	**Input and output**	**10**	**12**
3.1	Pixel, Resolution, Bitmap (Raster), Vector, RGB to CMYK, Handling Digital Text and Color Image Data	4	4
3.2	A) PostScript format, Page Description Language (PDL) B) PDF formats for printing industry C) Preflight - Purpose, Workflow, Data Transmission and Data Compression	6	8
4.0	**Colour Management**	**16**	**20**
4.1	A) Concept, Purpose, Workflow (Device dependent and Device independent colours), Advantages B) Color gamuts - definition, color gamuts of different processes, colour gamut mapping C) International color consortium (ICC), Four C's of color management, Test charts for different devices, Production of different color profiles D) Comparison of profiles, gamut mapping, Metamerisam-Definition, cause and effect; Rendering intent, perceptual rendering indent, Relative & Absolute colourimetric intent, saturation intent		
5.0	**Quality Assurance**	**16**	**20**
5.1	Spectrophotometer, Colourimeter, Densitometer - Working principle, Applications	6	8
5.2	Screen angle, Color correction requirements based on different printing processes, Maximum printable LPI for different printing processes, Substrates and LPI relation, CIP4	4	4
5.3	Numerical based on dpi, ppi, lpi, resizing, file size, colour deviation (Delta E), Dot Gain, Trapping, Hue Error	6	8
	Total	**64**	**80**

No.	Practical
01	Layer Basics.
02	Basic Pen tool Techniques and Paths.
03	Masks and Channels.
04	Retouching and editing.
05	Creating Special Effects.
06	Different types of file.
07	Preparing Images for Two color printing.
08	Color Separation, Screen Angles and screen.
09	Four color Separation.
10	Scanning using flat bed scanner and correction A) Using Densitometer B) Using color charts C) Using spectrophotometer, generating color gamut by using test chart.
11	Process for calibration of Monitor, Multi Colour Printer - Colour Management

Reference Book:

No	**Title of Book**	**Author**	**Publisher's Name**
01	Color Scanning & Imaging Systems	Gary S. Field	GATF
02	Photo Mechanics & Printing	Gorden & Monsen	
03	Color & Its Reproduction	Gary Field	GATF

Course: Flexible Packaging Code: M509

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
04	04	08	03	80	20	#30	#20	$20

= External, $= Internal Assessment

Rationale:

Packaging is becoming one of the large segments of printing and related industry. This course intends to deal with additional knowledge of packaging requirements such as variety of substrates, finishing operations, conversion, etc.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Introduction**	**12**	**16**
1.1	Introduction to Flexible packaging , Area of Applications		
1.2	Introduction to polymer, classification, type of polymerisation - Addition, Condensation; Thermoset/ Thermoplastic		
1.3	Additive in plastics antislip, antistatic, colorants, fillers, plasticizers		
1.4	General Properties, Applications of following polymers related to Packaging - Polyethylene (PE), Polypropylene (PP), Polyvinyl Chloride (PVC), Polycarbonate (PC), Polyamide (PA), Polystyrene (PS), Polycarbonate (PC), Polyurethane		
2.0	**Plastic converting Technology**	**18**	**20**
2.1	Plastic extrusion technology – Blown film extrusion – single layer and multi-layer film manufacturing process, die blow mouldings – split die, sheet extrusion process control		
2.2	Injection moulding – Meaning, bottle manufacturing		
2.3	Lamination Technology – Dry Lamination, Wet Lamination, Sealing technology – heat sealing methods, Types of sealers – wire, rod, band, conductive etc.		
2.4	Blister Pack Technology – use of materials, manufacturing		

	process, backing material for Blister		
2.5	Label application – label pasting; Closures, liners of closures		
3.0	**Special packaging**	**12**	**16**
3.1	Lamitubes - Structure of lamitube, Layers in laminate, plastic properties, manufacturing process, printing on lamitubes		
3.2	Aseptic packaging – concept, process, and sterilization processes, requirements of films		
3.3	Tetra pack – lamination processes, sterilization processes, pack forming on HFF and VFF machines.		
3.4	Bag in Box – process, Retort packaging, Packaging Requirements		
3.5	Pouch forming machines, filling machine, stand up pouches – materials used for pouches		
3.6	Shrink wrapping and Stretch wrapping machines, films for shrink /stretch wrapping, Applications		
4.0	**Food Packaging**	**12**	**16**
4.1	A) Requirements of package for food packaging. Sterilization process for containers, B) Preservation technologies and Package Requirements for food packaging- Dairy products, Carbonated soft drinks, Beverages, Bakery products, Alcoholic drinks, Meat products		
4.2	Physical, chemical properties of materials used for package, barrier properties of packaging material		
5.0	**Tools in Food Packaging**	**10**	**12**
5.1	Controlled Atmosphere Packaging Technology (CAP), Modified Atmosphere Packaging Technology (MAP) – Concept, Process, Advantages and disadvantages		
5.2	Intelligent and Active Packaging – Reacting material for CO2, Oxygen, Methane, Ethylene etc.		
5.3	Different types of Indicators and labels to asses' Shelf life of		

	Package		
5.4	Concept of Sustainable packaging – environmental aspects related to packaging, edible packaging.		
	Total	**64**	**80**

No	Practical
01	Sample collection of various food packages and writing technical report
02	Study of extrusion, injection moulding
03	Demonstration of FFS machine
04	Demonstration of Layer Separation of multi layer product
05	Thickness of Films
06	Observing Printing on products and writing technical report
07	Demonstration of Drop test
08	Demonstration of Stack test
09	Demonstration of Water Vapour Transmission Test
10	Demonstration of Printability test

References Book:

No.	**Title of Book**	**Author**	**Publisher's Name**
01	Plastics in Flexible Packaging	A. S. Athalye	Multi-Tech Publishing Co.
05	Modern Packaging Films	S.H. Pinner	London Butter Worths
08	A Handbook for Printing And Packaging Technology	Bishwanath Chakravarty	Galgotia

Course: Advance Graphic and Imaging Techniques Code: M510

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
02	04	06	00	00	00	#50	00	$20

= External, $= Internal Assessment

Rationale:

This subject involves hands on training on professional packaging software - ESKO to understand the designing of 2D and 3D graphics. This subject also contains practical knowledge related to Computer to Plate (CtP) setter.

Chapter	Name of the Topic.	Hours	Marks
1.0	**Overview Of Conventional Imaging Techniques And Digital Imaging**	**06**	
1.1	Study of page make up, photographic characteristics of image carriers of different printing processes.		
1.2	Definition, applications and factors that accelerated the development of Digital Imaging in graphic prepress technologies.		
1.3	Comparison of conventional film, plate making and digital imaging approaches used in graphic reproduction. Advantages of Digital Imaging prepress techniques i.e. computer-to-film and computer-to plate.		
2.0	**Requirements For An Ideal Digital Imaging System.**	**06**	
2.1	Energy i.e. photo speed requirements of different light sensitive chemistries in use. Comparison of direct and indirect methods of plate making.		
2.2	Requirements for computer-to-plate and computer-to-film devices. Study of required properties of illuminants used in computer-to-plate and computer-to-film devices.		
2.3	Different types of Digital Imaging systems. Classification of computer-to-plate and computer-to-film systems as light and non-light sensitive.		

3.0	**Silver Halide Based Light Sensitive Digital Imaging Systems.**	**05**	
3.1	Study of working principle, spectral sensitivity, stages involved in different silver halide based computer-to-plate &computer-to-film systems.		
3.2	Study of advantages, applications and limitations of silver halide based computer-to-plate and computer-to-film systems.		
4.0	**Electro Photography Based Light Sensitive Digital Imaging Systems.**	**05**	
4.1	Study of working principle, spectral sensitivity, stages involved in different electro photography based computer-to-plate &computer-to-film systems.		
4.2	Study of advantages, applications and limitations of electro photography based computer-to-plate and computer-to-film systems.		
5.0	**Organic Photopolymer Light Sensitive Digital Imaging Systems**	**04**	
5.1	Study of working principle, spectral sensitivity, stages involved in organic photopolymer based computer-to-plate systems.		
5.2	Study of advantages, applications and limitations of organic photopolymer based computer-to-plate and computer-to-film systems.		
6.0	**Non Light Sensitive Or Heat Based Digital Imaging Systems**	**04**	
6.1	Study of working principle and characteristics of imaging with the help of thermal cross-linking mechanism and comparative sensitivities of optical i.e. light sensitive and cross-linked plates.		
6.2	General comparison of light and non-light sensitive Digital Imaging systems used in graphic prepress industry.		
7.0	**Digital Thermal Imaging Systems.**	**02**	
7.1	Study of working principle, stages involved in different laser ablation i.e. heat based computer-to-plate making systems.		
	Total	**32**	

No	**Practical**
01	Revision of ArtiosCAD

02	Functions of ArtiosCAD (2D and 3D)
03	2D graphics built in libraries (Run a Standard), ECMA
04	2D graphics built in libraries (Run a Standard), FEFCO
05	Building new design from scratch - show all the tools and their functions
06	3D graphics demonstrate how a 2D design can be converted into 3D
07	Demonstrate how a wrong thickness or size will show in 3D
08	Show - How to add a graphics to a 2D design and then conver it into 3D
09	Show that the shortcomings of design can be detected in 3d before going for production.
10	Comparison of different light sensitive computer-to-film technologies on the basis of spectral sensitivity, photo speed, output resolution, recording light source, etc.
11	Study of construction of an CtP setter and listing its mechanical and optical elements and technical specifications.
12	Study of RIP software and hardware used in CtP setter.
13	Study of routine and preventive maintenance methods of CtP setter.

References Book:

No	**Author**	**Title**	**Publication**
1	Hugh Speirs	Introduction to Prepress	BPIF Publishing
2	Helmut Kipphan	Handbook of Print Media: Technologies and Production methods.	Heidelberg and Springer

Course: Industrial Training Code: M511

Teaching and Examination Scheme

Teaching Scheme hours/week		Examination Scheme						
Theory	Practical	Credits	Paper Duration in Hrs	Theory Marks	Unit Test Marks	PR Marks	OR Marks	TW Marks
00	08	08	00	00	00	00	#50	00

= External, $= Internal Assessment

Rationale:
Industrial training is required for the students -

1. To provide an industrial exposure in tune with the curriculum.
2. To understand industrial standards, safety aspects, organizational structure.
3. To improve employability of students.
4. To provide training on industrial relevant topics.

Student will complete 30 days of training for 8 hours per day. He will maintain daily diary, attendance record certified by industry supervisor.

(1 term = 16 weeks, 30 days X 8 Hrs/Day = 240 Hours)

Chapter	Topic	Hours	Marks
1.0	**Industrial Training**		
1.1	Attendance (based on feedback from the Industry)		
1.2	Involvement (based on feedback from the Industry)		
1.3	Attendance (evaluated by the coordinator)		
1.4	Involvement (evaluated by the coordinator)		
1.5	Viva (as part of evaluation at the institute)		
1.6	Bonafide record - Industrial Training Report should be submitted in the form of CD and well bound hard copy		
			50

Course Objectives of Industrial training -

To observe and understand

1. Nature of operations, sequence, specifications (pre-press, printing, finishing)
2. Different types of substrates, their classification based on physical and chemical properties.
3. Organizational structure, Ethics, Communication, Standard Operating Procedure.
4. To understand managerial aspects such as Costing and planning of material, Manpower planning, Scheduling of job, Logistics, Safety,
5. Print material handling and maintenance.