COURSE TITLE : FLEXOGRAPHY AND GRAVURE PRINTING
COURSE CODE : 4103
COURSE CATEGORY : B
PERIODS/ WEEK : 6
PERIODS/ SEMESTER : 84
CREDIT : 5

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	Introduction to Flexography and Gravure	20
2	Image carrier preparation of gravure and Flexo.	23
3	Flexographic printing.	21
4	Gravure printing.	21
TOTAL		84

COURSE OUTCOME:

G.O	ON THE COMPLETION OF THE STUDY OF THIS MODULE STUDENTS WILL BE ABLE:
1	To comprehend the Gravure and flexographic printing process
2	To understand the Gravure and flexography image carrier preparation
3	To understand flexographic machine and its features
4	To understand gravure printing machine and its features

MODULE I INTRODUCTION TO FLEXOGRAPHY AND GRAVURE

1.1.0 To comprehend the Gravure and flexographic printing process

1.1.1. To define Gravure and flexographic printing process
1.1.2. To list the basic components of flexographic printing machine
1.1.3. To identify the components of feeding unit
1.1.4. To identify the components of printing unit
1.1.5. To identify the components of Delivery unit
1.1.6. To explain flexographic printing process in detail

MODULE II IMAGE CARRIER PREPARATION OF GRAVURE AND FLEXO.

2.1.0 To understand the flexography image carrier preparation

2.1.1 To define the flexography plate structure
2.1.2 To identify the plate structure of flexography
2.1.3 To describe the different flexographic printing image carrier preparation methods.
2.1.4 To define different Gravure cylinder manufacturing methods.
2.1.5 To describe the different Gravure cylinder preparation methods.

MODULE III FLEXOGRAPHIC PRINTING.

3.1.0 To understand flexographic machine and its features

- 3.1.1 To identify different flexo inking systems
- 3.1.2 To list different types of anilox rolls
- 3.1.3 To define the flexographic plate mounting
- 3.1.4 To give examples to the flexo substrates

MODULE IV GRAVURE PRINTING.

4.1.0 To understand gravure printing machine and its features

- 4.1.1 To identify the gravure cylinder parts.
- 4.1.2 To select different doctor blades.
- 4.1.3 To define different Gravure presses.
- 4.1.4 To select different substrates for gravure printing.

CONTENT DETAILS

MODULE I

Principles of Flexography Printing Process: Advantages, Limitations and Characteristics. Main Sections of Flexo Printing Machine: Unwind section, Printing section – Inking Unit, Plate cylinder, Impression Cylinder, Drying section and Rewind section. Configurations of Flexo- Inline, stack, central impression.
Principles of Gravure Printing Process: Advantages, Limitations and Characteristics of Gravure Process. Main Sections of Gravure Printing Machine: Unwind section, Printing section – Ink duct, Printing Cylinder, Doctor blade, Impression roller, Drying section and Rewind section.

MODULE II

Flexo Image Carrier Preparation: Structure of Flexographic Plate – Types of Plates, Plate Preparation Methods – Rubber Plates preparation, Sheet Photopolymer Plates preparation and Liquid Photopolymer Plates Preparation.
Gravure Image Carrier Preparation: Gravure Cylinder manufacture –Thin layer method, Ballard skin method and Heavy Copper plating method. Gravure Cylinder Preparation Methods – Conventional Method / Carbon Tissue Method, Electromechanical Engraving method and Laser Engraving method.

MODULE III

Flexo Inking Systems: Ink Metering, Anilox Roller. Types of Flexo Inking systems – Two-roll ink metering systems, Modified Two-roll with doctor blade ink metering system, Reverse angle doctor blade ink metering system and Chambered blade ink metering system.

Anilox Roll specifications – Cell count, Cell depth, Cell volume. Types of Anilox roll based on cell shapes – Inverted Pyramid shape cells, Quadrangular shapes cell and Trihelical shape cells.

Structure of Flexographic plate – Metal backed plates, Magnetic plates. Flexographic Plate Mounting Fundamentals. Types of Flexo Plate cylinders – Integral Plate cylinders and Demountable / Metal sleeve cylinders.

Flexo Substrates – Paper and Paperboard stocks, Corrugated stocks, Plastic Films, Foils and Laminates. Describe Briefly- Corona Treatment .Wide web presses. Corrugated presses. Narrow web press. Future of flexography. Trouble shooting and remedies in flexography printing.

MODULE IV

Structure of Gravure Cylinder: Gravure cylinder parts – Axis, Shaft, Diameter, Circumference and Face length. Balancing- Static and Dynamic, distinguish static and dynamic balancing. Gravure cylinder well configuration and its advantages and disadvantages.

Doctor Blade –Structure, Types- Conventional doctor blades, MDC / Ringier doctor blades, Counter face doctor blades, Rounded doctor blades,,Mechanisms of doctor blade. Doctor blade wear- Types. Doctor blade materials. Doctor blade problems. Pre wipe blade.

Impression Roller – Structure , functions and covering. Electrostatic assist. Nib width.
Gravure Drying System – Drying Chamber – Solvent Recovery Systems – Environmental Friendly Solvent Removal Systems.

Gravure Presses - Gravure Packaging Presses, Gravure Label Presses and Gravure Publication Presses. Gravure substrates- Paper and non paper. Future of gravure printing.Trouble shooting and remedies in Gravure Printing.

Reference :		
Author	**Title**	**Publishers**
GAA	Gravure Process and technology	GAA
Foundation of flexographic technical associatio0n	Flexographic principles and practices, 4th edition & 5th edition	
Michael Bernard, John Peacock.	Handbook of printing and production	
Heigh. M. Speir	Introduction in Printing Technology	
Adams J.M,	Printing Technology 5th edition	Delmar Publishers, NewYork
Helmut Kipphan	Hand book of print media	Springer Science & Business Media