



NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF CHEMICAL AND TEXTILE ENGINEERING
TEXTILE ENGINEERING PROGRAM

PIT31 – FABRIC FORMATION SYSTEMS I

I. GENERAL INFORMATION

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|-----------------------|------------------------------------|
| CODE | : PIT31 Fabric Formation Systems I |
| SEMESTER | : 4 |
| CREDITS | : 3 |
| HOURS PER WEEK | : 5 (Theory–Practice) |
| PREREQUISITES | : PIT21 Thread Formation Systems I |
| CONDITION | : Compulsory |
| DEPARTMENT | : Textile Engineering |

II. COURSE DESCRIPTION

The course prepares students for analyzing the process of fabric formation focusing on winding, warping, gumming, tucking and looming processes. Students analyze the components of the processes, required machines and quality control operations.

III. COURSE OUTCOMES

At the end of the course, students:

1. Formulate and analyze flow diagrams of fabric production process.
2. Understand and analyze winding process, related machines and its quality control.
3. Understand and analyze warping process, related machines and quality control.
4. Understand and analyze gumming process, related machines and quality control.

IV. LEARNING UNITS

1. INTRODUCTION

Fabric types: flat, knit, non-fabric / Basic characteristics of each fabric type / Flat fabric: warping, weft, ligaments / Production process of flat fabric.

2. WINDING

Need of positive and negative winding / Conicity and crossing angle / Important parameters / Warping, weft and flat fabric requirements / Purge, types / Paraffined / Cone machine types / Bobbins / Calculation of cone parameters / Winding quality control.

3. WARPING

Objectives / Warping types / Creels, forms and types / Creel elements and accessories / Technical and economic issues of warping processes / Quality control.

4. DIRECT WARPING

Direct warping / Machine parts and components / Warper head / Working possibilities / Production costs / Quality control.

5. SECTIONAL WARPING

Sectional warping / Machine parts and components / Working possibilities / Production costs / Quality control.

6. GUMMING

Objectives / Factors determining gumming needs / Warping sizing / Gumming machine / Creels, creel breaker, gum box, heating systems / Immovable roller / Squeeze rollers /

Drying systems / Separation zone / Humid separation after waxing / Gum preparation equipment and storage / Gumming machine control: humidity control, stretching tension control, level control / Gumming products: natural and synthetic starch, grease, water / Gummed fabric quality control / Gumming of synthetic fibers / Biodegradable gumming /

7. TUCKING

Definition / Tuck types / Lamella / Frames / Mesh / Knotting.

8. LOOMING

Primary and secondary mechanism / Dragging.

V. WORKSHOP AND PRACTICAL EXPERIENCE

Direct and sectional warping

Gumming

Primary and secondary mechanisms of loom machine

Technical Visit: Warping, winding and gumming processes

VI. METHODOLOGY

The course takes place in theory, practice and laboratory sessions. In theory sessions, faculty presents the concepts, methods and applications. In practice sessions, students solve diverse problems related to fabric formation systems including different types of machines used for formation. In laboratory sessions, students carry out experimental tests and workshops to determine the specification of different types of fabric. Students visit textile industry plants to analyze fabric formation processes. Student active participation is promoted along the course.

VII. GRADING FORMULA

The Final Grade PF is calculated as follow:

$$PF = (EP + 2*EF + PP) / 4$$

EP: Mid-term Exam EF: Final Exam

PP: Average of Practical and Experimental Work.

VIII. BIBLIOGRAPHY

1. ORMEROD A.

Modern Preparation and Weaving Machinery

2. SEYDEL P.

Gumming of Textile Warp