

Course Objectives:

To enable the students to learn about :

- Different components of automatic loom.
- Constructional features and operational principle of a automatic loom.
- Loom timing diagram and various mechanisms involved in automatic loom.
- Selection and control of process variables weaving fabric.
- Various setting of loom.

Course Outcomes:

After successful completion of this course, the students should be able to:

- Identify the key components of a automatic loom and ,
- Understand the function of various elements and mechanism of automatic loom, dobby, jacquard etc.
- Select and control process variables and the various settings used to produce fabric of desired quality.
- Identify the trouble shooting problems and their solutions at each stage manufacturing.
- Assemble the dismantled parts of the mechanisms in weaving machine.
- Prepare the patter card for various fabric designs (Both warp and weft pattern)
- Calculate speed, production etc. at each stage of woven fabric manufacturing.
- Create the new designs in woven fabric manufacturing

Module-I (12 Hours)

Study of different motions and mechanism in automatic shuttle loom:

Shedding motion on the loom: Shed geometry and shedding requirement. Types of shed - Bottom closed, Semi-open, Center closed and open-sheds, their advantages and disadvantages, importance of bending factor, reed and reed counting systems;

Shedding mechanisms : Tappet shedding - types of tappet shedding (positive and Negative), Negative tappet shedding – relative throw of cams, Heald shaft reversing motion

Dobby Shedding - Negative Dobby shedding – mechanism of Keighley dobby, preparation of pattern chain for it.

Jacquard shedding - Mechanism of single lift-single cylinder, Double lift-single cylinder, Double lift-Double cylinder. Jacquard harness: different harness ties, e.g. Straight, Pointed and Border Tie, card punching for Jacquard. Comparison of Tappet, Dobby and Jacquard shedding.

Module-II (10 Hours)

Picking motion on the loom: Types of conventional picking mechanism - over picking, under picking and parallel picking. Calculation of shuttle velocity and energy of picking, picking force. Different picking accessories and their functions. Picking timing such as late picking and early picking, reasons of false picking and shuttle fly. Study of picking mechanism as simple elastic system, nominal and actual picker displacement curves, Shuttle retardation curve during checking.

Beat-up motion on the loom: Sley motion, Factors affecting sley motion, Sley eccentricity and its effects, Kinematics of loom sley in normal conditions.

Module-III (10 Hours)

Cloth control: Take-up motion – Objective, types, Five and seven-wheel take-up mechanisms, their comparison. Changes in Pick density, change places, expression for Pick density, Calculation of periodicity in pick variation due to faulty teeth or wheel eccentricity, Shirley take-up; Temples - Function, types.

Warp control: Objective, types. Let-off mechanisms (negative friction type, Bartlett let-off).

Brief outline of Warp stop motion, Weft stop motion, : Side weft fork and center weft fork motion; Warp protector motion.

Module-IV(10 Hours)

Automatic pirn change mechanism: Objective, feeler and types of feeler, change mechanism.

Multiple box motion: Types of multiple box motion, working principle of multiple box motion, two colour and four colour drop box motion, brief description of pick-at-will, pick and pick Motion.

Terry weaving: Essential feature of terry weaving loom, various principle of terry pile

formation.

Numericals based on shedding, picking and sley movement; Production and efficiency calculations.

Limitation to shuttle loom. Fabric defects- causes and remedies.

Books Recommended:

1. Mark R, Robinson A T C, "Principles of Weaving", The Textile Institute, Manchester, 1986.
2. Talukdar M K, Srirammulu P K and Ajgaokar D B, "Weaving – Machine, Mechanism and Management", Mahajan Publisher Private Ltd., Ahmedabad, India, 1998.
3. Aswani K T, "Fancy Weaving mechanism", Mahajan Publisher Private Ltd., Ahmedabad, India 1990.
4. Ormerod & W. S. Sondhelm "Weaving – Technology and Operations,
5. R. Sengupta "Weaving Calculation".
6. Woven Fabric Production – I, II, NCUTE Publications 2002