PTX4I102 YARN MANUFACTURE – II

Course Objectives

To enable the students to learn about :

- Role of combing process and Roving process in preparatory section of short staple spinning .
- Operations and different mechanism of comber and speed frame.
- Design, constructional details and working principles of ring frames and machineries in post spinning process.
- Parameters required for processing of fibres and their blends in comber, speed frame and Ring frame snd their influence on yarn quality.
- Maintenance schedules of comber, speed frame and Ring frame.

Course Outcomes

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

- Gain knowledge on combing, roving, ring spinning process and post spinning processes..
- Understand the constructional features and working principle of combing preparatory machines, comber, speed frame, ring frame and post spinning machines.
- To identify the key components of the machine
- Choose correct parameters in combing, roving, ring spinning process and post spinning processes for quality yarn.
- Identify faults, their causes and remedies in each stage of processing.
- Outline the main gearing diagram of all the machine
- Calculate draft, waste % , speed and production of machines involved in each process.
- Be acquainted with different setting and maintenance schedules of machines involved in
  combing, roving, ring spinning processes and post spinning processes..

Module-I (10 Hours)

Combing Process :

Objectives of Comber; comber preparatory process - Methods of lap preparation for combing: process - outline, operating principles of sliver lap machine & ribbon lap machine and draw frame & super lap former; Working principle of combing machine- Feeding- types of feed, Circular combing and Top combing, detaching, sliver formation - timing diagram, cycle of combing. Production calculation and fractionating efficiency of a comber, factors influencing combing performance - effect of pre-comb draft and no. of doubling in lap preparation, type of feed, combing settings and their importance. Modern developments in comber.

Module-II (10 Hours)

Roving Process:

Principles and objects of Speed Frame. Study of flow of material and different parts

Study of various parts of drafting system, roller weighting and setting, distribution of draft.Principle of twisting, parts and function of flyer, development in design of a flyer.

Principle of Winding, Flyer leading and bobbin leading systems Principles of differential mechanism in a Simplex. Function and description of building mechanism, cone drum arrangements. Features of a modern Simplex Frame, recent developments. Defects and remedies in Simplex process. Lubrication and maintenance schedule for Speed Frame. Calculations pertaining to speed, production, draft and twist, coils/inch, etc.

Module-III (10 Hours)

Ring Spinning Process :

Objects and principles of Ring Spinning Machines.

Constructional features and identification of different parts.

Study of creel, Principles of drafting systems on Ring Frames, High drafting and Super High Drafting System, Weighting System on Ring Frame. Twisting and winding operation.

Study of Rings, Travellers, Spindles for their designs and efficient working.

Study of building mechanism. Factors affecting yarn tension and its control in spinning. Methods of driving ring frame - variable and dual motor drive – spindle drive.

Study of special attachment such as Automatic doffing and pneumatic waster extraction.

Study of common defects in ring spun yarn and their methods of analysing yarn defects due to roller vibrations, roller slip and roller eccentricity.

Calculation pertaing to speed, draft, twist, production and efficiency in Ring Frame.

General idea about Lubrication and maintenance of High Speed Ring Frame.

Module-IV(10 Hours)

Doubling and Reeling Process:

Principles and objects of doubling study of different components of ring doubler- creels, yarn guiding roller, , rings, travellers and spindles , building motions , wet and dry doubling. Concept of balanced twist in doubled yarn, direction of twist in doubled yarn and its relation to single yarn.

TFO – Construction details and principle of operation, advantages.

Brief study of machines used for reeling, straight and corss reeling.

Essential properties of a sewing thread.

Books Recommended:

1. Oxtoby E., "Spun Yarn Technology ", Butterworth, London, 1987
2. Klein W., "The Technology of Short-staple Spinning ", The Textile Institute, Manchester, 1998
3. Klein W., "A Practical Guide to Combing, Drawing and Roving Frame ", The Textile Institute, Manchester, 1999.
4. Klein W., "A Practical Guide to Ring Spinning ", The Textile Institute, Manchester, 1999
5. Lord P.R., "Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, 1999
6. Shaw J., "Short-staple Ring Spinning, Textile Progress", The Textile Institute, Manchester, 1982
7. Iredale J., "Yarn Preparation: A Handbook ", Intermediate Technology, 1992
8. TFO- Technology & Techiques, HVS Murty