



PRINCIPLES OF COMBING, ROVING PREPARATION & RING SPINNING

PROF. R CHATTOPADHYAY

Department of Textile Engineering
IIT Delhi

TYPE OF COURSE : Rerun | Core | UG

COURSE DURATION : 12 weeks (20 Jul' 20 - 9 Oct' 20)

EXAM DATE : 18 Oct 2020

INTENDED AUDIENCE : Undergraduate students of Textile Technology

COURSE OUTLINE :

The course will focus on three processes i.e. combing, roving preparation and ring spinning. The construction, design features and working principles of the machines will be looked into. The role of machine and process parameters on process performance will be explained. The interaction between technology and machine design will be discussed. Emphasis will be on "know why" rather than "know how".

ABOUT INSTRUCTOR :

Dr. R Chattopadhyay, is working as professor in the department of Textile Technology, IIT Delhi, India. He has been teaching in the department for last thirty years and has keen interest in yarn manufacturing processes, mechanics of yarn structure, process control, application of statistics in textile industry and textile product design.

COURSE PLAN :

- Week 1:** Flow chart of combed spinning process, objectives of combing, consequence of short fibres in cotton, segregation principle of short fibres from longer ones, Combing operations and its classification, sequence of operation, Timing diagram
- Week 2:** Pre-combing operation, Comber lap formation, Design features and working principle sliver lap & ribbon lap machines, Draft and its influence on lap quality. Structure and design feature of combing machine. Working principle, Design features of combing machine elements (lap feed roller, cylinder comb, top comb, nipper assembly, detaching roller, sliver table, drafting rollers, coiling arrangement)
- Week 3:** Mechanism for lap feed, nipper assembly movement, detaching roller movement, and cylinder comb Web structure, condensation, sliver guidance & drafting process
- Week 4:** Theory of noil extraction from forward and backward feed machines, Influence of process parameters on combing efficiency Production and draft calculation
- Week 5:** Objects of roving frame, Machine configuration, working principle Drafting system, drafting elements (cradle, aprons, condenser etc.)
- Week 6:** Flyer construction, presser, twisting, flyer top, twist diameter count relationship Bobbin geometry, Operation for bobbin building, Winding process, winding equation, Bobbin leading vs flyer leading frame,
- Week 7:** Variable speed drive, Differential gear Building motion: function and working
- Week 8:** Drive analysis, motion flow, Ring frame: machine configuration, various components, working principle
- Week 9:** Drafting, Drafting elements, drafting angle, Difference between speed frame and ring frame drafting system, break draft and main draft distribution Twisting and winding principle, twisting winding equation, twist flow, winding tension
- Week 10:** Bobbin building: bobbin geometry, Nature of ring rail movement, winding and binding layer, Formation of base and conical bottom. Ring and traveler: types, purpose, traveler number
- Week 11:** Spindle: construction, drive, Spinning geometry, spatial location of elements,
- Week 12:** Balloon mechanics, Tension in balloon yarn, balloon size, End breaks, non uniformity, causes & remedies