YARN MANUFACTURE I: PRINCIPLE OF CARDING AND DRAWING

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INTENDED AUDIENCE: Undergraduate students of Textile Technology

COURSE OUTLINE:
Carding and drawing are two fundamental processes in yarn manufacture. In carding, the fibre tufts are opened, cleaned, and separated thoroughly by fast-moving pinned surfaces and then reassembled to form a nice 2D array of fibres which is subsequently transformed into a uniform sliver. Drawframe is essentially a stretching device for sliver used to improve mass irregularity of sliver and parallelization of fibres.

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

COURSE PLAN:

Week 01: Objectives of carding process, carding actions, working principle of carding machine, Card feed system, lap and continuous feed systems, design feature of taker-in/licker-in, waste extraction, opening intensity.

Week 02: Design feature of cylinder section, construction, design and working of flats, analysis of carding theory, carding force, fibre shedding, Transfer of fibres from cylinder to doffer, Technological significance of doffing arc, doffing of web, web condensation, Package formation: Forms of packaging, coiling, analysis of can drive.

Week 03: Motion transfer in card, draft and production calculations, card setting, significance of setting.

Week 04: Card clothing: licker-in, cylinder, doffer clothing; card tooth geometry, Operational load on cylinder, fibre transfer efficiency, carding process.

Week 05: Autoleveller in card: principle of autolevelling, type of autoleveller, type of autoleveller, correction length, Fibre configuration in card sliver, mechanism of fibre hook and nep formation, cloudy web, Drawframe: Fundamentals of drafting, draft, ideal drafting, geometrical analysis of fibre movement in drafting.

Week 06: Objectives of drawing, Design features and working mechanism of drawframe. Drafting unit, drawing rollers, Drafting roller arrangement and its significance, package formation, Autoleveller in drawframe, Sliver irregularity and its control.

Week 07: Theory of drafting, Vasileff’s model of drafting, drafting wave, Drafting force, draft vs drafting force, Roller setting: analysis of roller setting, influence of roller setting.

Week 08: Drawing process and its influence on fibre configuration in sliver, Draft and production calculation.