**Internship – 2nd group**

**INTERNSHIP ON YARN PRODUCTION / SPINNING**

**Internship on yarn production can be performed in companies which are active in cotton, wool or synthetic yarn production.**

**The expected outcomes of the internship on cotton, wool yarn production will be as follows:**

1. How is the organizational structure of the company?

2. How many engineers and operators are working in the spinning mill? What is the number of machines per operator?

3. What are the raw materials processed in the plant?

4. What are the numbers of washing machines (wool spinning plant), mixing, blending, carding, combing, drawing, roving, spinning machines in the plant?

5. What are the working principle of each instrument? How are the performance and production rate? What is the total production rate of spinning mill?

6. What are the count of materials fed into and produced from each machine?

6. How are the setting of the machines? For example, how many doubling and drawing take place in drawing unit? What is number of drawing in draw frame? What is the number of drawing and twists in roving machine? What are the spindle speed, twist and drawing number in ring spinning machine?

7. What are the properties of the product? Where are these products used? How is the quality of the end product?

8. Is there any bottleneck in the operations of the plant? If yes, what might be a possible solution?

9. What are the precautions undertaken to obtain quality and for its sustainability?

10. How frequently is the machine maintenance performed? How is it performed in general?

**The expected outcomes of the internship on synthetic yarn production will be as follows:**

1. How is the organizational structure of the company?

2. How many engineers and operators are working in the spinning mill? What is the number of machines per operator?

3. What are the chemical and physical properties of polymers used?

4. Is there any polymerization/poly condensation process taking place in synthetic fiber production plant? If yes, what is the mechanism of those processes?

5. What are the properties of synthetic fiber production units (extruder, spin pack, spinneret, godet roll and winder? What are the properties of the instruments used in texturing process?

6. How is the settling of the instruments in the plant? How is the operational flow diagram?

7. What are the process parameters for synthetic yarn production and texturing? How do they affect properties of end product?

8. What are the physical and chemical tests performed on synthetic filaments and textured yarns?

9. How is the ambient conditions in LOY/POY production? What is the effect of ambient conditions on product?

10. How is the conditioning performed in LOY/POY production? What is its importance?

11. What is the relation between process parameters of drawing machine (drawing-twisting/drawing-winding) and yarn properties? What is the importance of spin-finish in synthetic yarn production? What are the types of finishing chemicals?

12. What are the end uses of produced synthetic filaments and textured yarns?

13. Is there any bottleneck in the operations of the plant? If yes, what might be a possible solution?

14. What are the precautions undertaken to obtain quality and for its sustainability?

15. How frequently is the machine maintenance performed? How is it performed in general?

16. How are the production rates and performances of the machines?

Samples that can be collected during internship on Yarn Production

Fibers, roving, lap, sliver, ring traveler that can be fixed into report page. Samples that were not fixed properly into your reports will not be accepted.

**INTERNSHIP ON WEAVING TECHNOLOGIES**

**WEAVING PREPARATION**

The organization of Weaving Preparation Unit, machinery, number of staff and operators.

A- BOBBIN MACHINES:

1. Brand, number of operators, number of heads, speed, performance and daily production
2. Cross winding process and detailed winding processes
3. Bobbin types and properties
4. Yarn breakages
5. Yarn cleaners, electronic cleaners, programming of cleaning, types of yarn defects that can be cleaned
6. Yarn joining systems, particularly loop and splicer (pneumatic or mechanic)
7. Bobbin test systems, bobbin length, diameter and rigidity
8. Waxing process, wax types, properties, consumption rates, rigidity and number

B- WARP MACHINE:

1. Brand, number of operators, working principle, width, raw beam width, diameter, beam length according to yarn count, winding speed
2. Creel properties, capacity, yarn brakes, bobbin changing systems
3. Winding systems, cross comber settings
4. Machine speed, performance data and calculations, creel replace time, yarn break removal times, daily production
5. Reasons for yarns breakages, breakage statistics, breaks per million meter
6. Warp calculations, examination of one of the work order (number of warps, number of raw beams, number of raw beam warps, warp length, remaining yarns on the bobbins, example for warp consumption calculations)

C - SECTIONAL WARPING MACHINE

1. Brand, number of workers, working principle of the sectional warping machine, section/band widths, conical angle, speed, efficiency, daily production
2. Creel properties, capacity, yarn break and stop motion systems, package change systems
3. Sectional warping calculations for one production type (creel color arrangement, number of section calculations, ends per section, section width, conical angle and speed calculations, V-reed number and ends/dent, etc. ) Sample calculations from different product types manufactured on the machine
4. Parameters entered to sectional warping machines
5. Investigation of sectional warping and beaming, their speeds and number of warp breaks

D – SIZING MACHINE

1. Working principle of the sizing machine, speed, daily production
2. Sizing agents and auxiliaries
3. Sizing recipes, preparation of size (cooker, size box, size preparation conditions, temperature and viscosity of the size, refractometer)
4. Machine process settings (yarn tension in each section, pressure settings, temperature settings of drying cylinders, elongation, moisture, pressure on the beam, etc.)
5. Investigating size take-up, size percentage, concentration an increase of the warp yarn strength

E – DRAWING IN and TYING IN

1. Investigation of tying in machines and tying in systems, machine speed and tying in time
2. Drawing in process, analyzing drawing in, investigation of drawing in machine, productivity of the machine, etc.
3. Weave design, denting, drawing in draft plan preparation and process

**WEAVING**

1. The organization of the weaving plant, types of the weaving machines, the number of the weaving machines in the plant, number of workers in the weaving plant and the total number of the workers in the company, diameter of the cloth roll, length of warp yarns wound
2. Investigation of the general working principles of the weaving machines, machine speed, efficiency, number of breakages, number of wefts inserted per day, daily production in meters, reasons of breakages, weft density, programming the weave design and weft density, entering the weft color report, etc. Learning the parameters entered from the panel to the weaving loom.
3. Warp let off motions and systems
4. Investigation of cam, dobby, jacquard shedding systems. Investigation of weft insertion systems
5. Investigation of take-up systems, warp and weft control systems
6. Weft yarn accumulators and their properties
7. Temples and their properties
8. Motor/engine and clutch , sumo motors, direct drive motors, beat-up motion and systems
9. Properties of drop wires, heddles and reed
10. Investigation of breakages in weaving (number of breaks/shift, statistically in 100000 wefts), number of warp and weft yarn breakages, the spots of the breaks and the reasons for breaks
11. Depending on the breaks, how to calculate the number of weaving machines that the weaver is supposed to labor
12. Leno selvages and selvage crimpers
13. Greige fabric control, the qualities of the products and quality standards of the company and the parameters ( weave patterns, number of warp yarns, densities, yarn counts, fabric weights, crimps and shrinkages, reed widths and reed numbers, ends/dent in the reed, fabric faults, fault points, quality judgments, 1st and 2nd quality ratios)
14. Weaving efficiency track, weaving machine efficiencies, weaving plant efficiency and investigation of loom data (if the company has loom data)

**INTERNSHIP ON KNITTING TECHNOLOGIES**

The knitting internship needs to be completed at a company operating at one of the circular knitting, flat knitting or warp knitting areas.

1. Explain the organizational structure of the company
2. How many engineers and labors are working in the knitting plant? How many machines does one employee operates?
3. How many machines are there in the company? What are their types? What are the main differences among the knitting machines?
4. How the working speeds of the machines are adjusted and what are the parameters taken into account for speed adjustment?
5. What is the maintenance period of one knitting machine? What is the procedure of maintenance and `what are the factors considered for maintenance?
6. What are the types of products manufactured in the company?
7. What are the raw materials used in the company?
8. Defining the yarn count range for a knitting machine with known gauge, and for that range of yarn counts and machine gauge, what can be the average fabric basis weight produced on the knitting machine
9. Investigation of technical properties of knitting machines

* Machine diameter /width
* Gauge
* Mechanical – electronical
* Single-double plate- production techniques and differences. What type of differences arise in fabric and fabric properties?

1. Investigation of feeding units

* How many feeding units are there for a knitting machine with known machine diameter and gauge?
* How can you figure out if the feeding units are positive or negative, and for what type of fabrics are each of these feeding units used?
* When producing fabrics consisting elastane, how elastane is fed and what are the considerations during yarn feeding?
* How are the working speeds of the feeding units adjusted?

1. Investigation of knitting components
   * Needle – For a known machine diameter and gauge, what is the number of needles? Explain the types of needles and the main properties that differentiate the needles? What are the contributions of needle-butt differences in terms of patterning?
   * Sinker – what are the main functions?
2. Pattern system – how can you prepare cam design for manufacturing of fabric from selected pattern? Can you give information about electronic pattern design with examples?
3. Please explain winding/rolling mechanisms of knitting machine? Which parameters are important for roller speed? How can you calibrate fabric tension?
4. Please explain properties of products and give information about faults? How can we eliminate faults, please explain with examples?
5. Calculation of production- How many kgs of fabric for determined yarn type can be manufactured from one machine per day? Please give information about efficiency (%) of the company and actual production capacity per day?

NOTE: Examples for needles, sinkers, fabric faults, fabrics with different patterns etc. will be taken from the company.

**Internship – 3rd group**

**INTERNSHIP ON FINISHING PROCESSES AND TECHNOLOGIES**

1. DESCRIPTION OF COMPANY AND ORGANIZATIONAL STRUCTURE
2. Legal entity and full address (phone, fax etc.),legal format (A.Ş., Ltd. etc.),history, map or sketch of companies location
3. Organization chart
4. Staff, number of administrative and technical staff, education levels of the personnel.
5. Capacity of the company (daily and annual capacity as m, kg and YTL)
6. WATER USAGE OF COMPANY
7. What is water source for the company (well water/carriage water, how many tankers are used for water carriage etc.)
8. Pre-treatment processes for water (explain with a schema)
9. Production of water vapor and its usage at the company
10. LABORATORY
11. Availability of quality control laboratory and devices for semi product, end product and finishing bath during finishing process (pre-treatment, coloration and finishing), (name, trade mark, working principles and related standards as TSE, ISO, DIN etc.)
12. Does company do spectrophotometric analysis?
13. Give information about laboratory scale dyeing machine, and their usage period.
14. Give information about harmony between laboratory and production
15. TEXTILE FINISHING MACHINERY
16. Identification of existing textile finishing machinery (pretreatment, coloration (dyeing and printing) and finishing (washing, drying, finishing (dry and wet)),
17. Examination of the types, numbers, names, brands and usage details of existing machines,
18. Auxiliary units of the machines (pumps, valves, liquor control and dosing units, automatic control units),
19. Capacities of the machines, whether they are in service regularly,
20. The layout plan of the machinery,
21. Transfer systems of the goods in finishing department (forklift, rail systems, etc.),
22. The situation of installations (electric, lightning, air condition),
23. Safety precautions and execution methods,
24. Maintenance and repair plant and maintenance periods.
25. TEXTILE MATERIALS AND CHEMICALS
26. Characteristics and blends of textile materials, (cotton, polyester, wool, polyester/cotton, acrylic/wool, etc.),
27. Forms of the textile materials (yarn, knitted, woven, nonwoven etc.) and source of supply (domestic and import %)
28. Tests prior to finishing processes,
29. Pretreatment chemicals, dyestuffs, names of finishing chemicals and auxiliaries, producers (domestic/foreign), usage amounts in the plant (per day and year in kg),
30. Storage system,
31. Stocking system,
32. FINISHING PROCESSES
33. Classification of applied finishing processes,
34. Examination of finishing processes starting from pretreatment according to the textile materials used in the plant, calculation of recipes according to the liquor ratios applied,
35. Determination of machinery to be used,
36. Forming the operation diagram,
37. Determination of the working conditions (time, temperature, pressure, pH, liquor ratio),
38. Examination of the execution methods of process control, intermediate product control and quality control,
39. The attachments of the samples of treated and untreated textile materials,
40. Examination of the solution methods, in the case of faulty process,
41. Detailing the first 8 articles, examination of the whole finishing department of the plant with regard to the finishing process for the following process stage (dyeing, printing, washing, drying, dry or wet finishing, etc.),
42. Examination of the dyeing line selection according to the materials, giving sample recipes for the processes, examination of the encountered problems and related solutions,
43. Washing Rinsing: Examination of washing mechanism, washing materials, machines and washing efficiency,
44. Drying: Examination of the working principles of the machines and the equipment, drying capacities, points to consider for the selection of the machines,
45. Printing Processes: Examination of screen preparation, paste preparation (together with paste recipe), printing machines, drying and fixation after printing; examination of washing and post processes after printing and discussing the efficiencies.
46. Dry Finishing Processes: Examination raising, sue ding, shearing and calendaring, etc. machines, identification of the results of these machines on the materials.
47. Wet Finishing Processes: Depending on the finishing applications of the plant, examination of the application procedures, test methods and related standards of anti-pilling, anti-static, water repellency, soil repellency, flame retardant etc. finishing applications
48. Examination of ecological production or recycling of process water
49. WASTE WATER
50. The activities related to wastewater control and treatment, the related analyses.
51. If there is a wastewater treatment plant, what is the plan and working principle of it?
52. Wastewater capacity (ton/day)
53. How and where the wastewater is discharged

**INTERNSHIP ON GARMENT/READY-WEAR TECHNOLOGIES**

1. Planning: Give information about company, calculation of required fabric weight for designed model manufacturing, cost accounts, stock control, manufacturing control and planning, job description and company organization schema. Product types, daily production, manufactured and used fabrics, accessories and auxiliary materials and control mechanisms for these materials, information about machine park, line and organization chart. Give information about quality control.
2. Preparing model and pattern: Investigation of preparing model, pattern design and pattern series methods. Computer systems and programs for preparing model.
3. Preparing of graph and Cutting: investigation of graph preparing methods, cloth spreading and efficiency of cloth spreading. Cutting, investigation of cutting methods, matching and labelling procedures. Investigation of material transporting methods between cutting room and sewing room.
4. Sewing: Investigation of sewing machine and their usage area. Pictures and schema of sewing machines. Investigation of production line for sewing machine type and count according to product type. Observation of material types for each sewing machine type. Information about machine efficiency, productivity, settings, and period, information about sewing yarn, and needles which are used at the company. Getting samples (accessories such as sewing needle, sewing types, zipper, trimmings etc.)
5. Ironing, quality control and packing: introduction of ironing and press which are used at company. Giving information about their working principle, quality control methods for company and investigation of last control and packing system.

**INTERNSHIP ON ORGANIZATION, PLANNING AND LABORATORY**

1. **Organization internship**: Give information about company, organization chart for company, administrative and technical staff, distributions of work and hierarchical board. If there isn’t any organization chart for the company please prepare it.
2. **Planning internship**: investigation of preparing production plan for manufacturing of various products and applications. Prepare production plan for 3 different products which are manufactured at the company.
3. Please observe work and time study and their results, daily production, efficiency and yield of company, properties of products, raw materials, machine park and number of employee. Give information about quality control systems of company.
4. **Laboratory internship**: Give information for investigation of laboratory devices, their functions, climatic conditions, purpose of laboratory tests, consideration of test methods and results. Give information about test results and acceptance and reject requirements.