*** Faculty of Engineering***

 *Department of Textile Engineering*

 ***Course Code:*** *TE-207*

 ***Course Title****: Fabric Manufacturing I*

 ***Semester:*** *Spring 2023*

 ***Course Teacher:*** *Md. Farhad Hossain*

 *B.Sc. in Fabric Engineering, BUTEX*

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| **Course Code:** TE 207 | **Course Title:** Fabric Manufacturing I |
| **Course Type:** Compulsory | **Level/Term:** Level-2, Term-1 | **Pre-requisite (s)**: None |
| **Credit Value:** 3.0 | **Contact Hours:** 3 Hrs./Week | **Total Marks:** 100 (CIE :35, SMEE : 65) |
| 1. **Course Rationale:** For textile engineers to work successfully in industry, the practitioners will need to know about manufacturing system of fabric. This course will attempt to introduce the basic concepts and principles of fabric manufacturing system.
2. **Course Objectives:** This course is to enable the students to explain the terminology, basic concepts and principles of winding, warping, sizing, drawing and drafting and knitting and to construct proper planning required for weave preparation. In this course students will also learn about how to analyze the requirement of raw materials for winding, warping and sizing and maintain product quality in winding, warping and sizing and how to calculate the production and its efficiency of each section and learn about the process of describing the function of primary elements like needle, sinker and cam of

knitting machine and explain the knitting action of different needles used in knitting mechanism. |
| **3. Course Learning Outcomes (CLO)/(CO):** at the end of the course, the students will be able to- |
| **CLO 1** | Relate to the history of fabric manufacturing technology and explain the importance of yarn preparation for weaving |
| **CLO 2** | Correlate to the impact of different variables of winding package with weaving performance and to find appropriate method for winding and their functions. |

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| **CLO 3** | Classify and compare different type of warping for specific purposes. |
| **CLO 4** | Select appropriate size formulation suitable for particular fabric constructions. |
| **CLO 5** | Demonstrate the basic terms of knitting and identify the primary elements with their actions. |
| **4. Mapping/Alignment of CLOs/COs with Program Learning Outcomes(PLO/PO):** |
|  | PLO(a) | PLO (b) | PL O(c) | PL O(d) | PLO(e) | PLO(f) | PLO(g) | PLO(h) | PLO(i) | PLO(j) | PLO(k) | PLO(l) |
| CLO 1 | √ |  |  |  |  |  |  |  |  |  |  |  |
| CLO 2 |  | √ |  |  |  |  |  |  |  |  |  |  |
| CLO 3 | √ |  |  |  |  |  |  |  |  |  |  |  |
| CLO 4 |  |  | √ |  |  |  |  |  |  |  |  |  |
| CLO 5 | √ |  |  |  |  |  |  |  |  |  |  |  |

**Grading and Performance Evaluation Process:**

Final grade in each course will be given on the basis of the performance on class attendance, quiz, assignment, presentation, midterm test and final examination as indicated below:

 Class attendance 07%

 3 Quizzes 15%

 Assignment/ Presentation 13%

 Midterm Tests 25%

 Semester Final Examination 40%

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 Total 100%

A student may earn five-letter grades on the basis of his/her performance of the course. The letter grades A, B, C, and D are considered passing grades and also acceptable to continuing of grades. Grade F is the failing grade. The numerical equivalents of the grades and grade points are given below:

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| Marks obtained out of 100 | Grade | Grade pointEquivalent | Remarks |
| 80-100 | A+ | 4.00 | Outstanding  |
| 75-79 | A | 3.75 | Excellent |
| 70-74 | A- | 3.50 | Very Good |
| 65-69 | B+ | 3.25 | Good |
| 60-64 | B | 3.00 | Satisfactory |
| 55-59 | B- | 2.75 | Above Average |
| 50-54 | C+ | 2.50 | Average |
| 45-49 | C | 2.00 | Below Average |
| 40-44 | D | 1.00 | Pass |
| 00-39 | F | 0.00 | Fail |

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| **Time Frame/ Session** | **Topics with Contents** |
| Week 1(Session 1-3) | **1. Introduction and Overview of the Course** (Contents: Course outline, introduction and historical background of fabric manufacturing technology, flow chart for weaving, introduction to yarn preparation.) |
| Week 2(Session 4-5) | **2.Winding:** (Contents: Objective, principle and mechanisms of winding, winding requirements, different winding machine, impact of cross angle, conical package, cylindrical package, speed of winding package on weaving performance) |
| Week 2(Session 6-8) | **3.Methods of Winding** (Contents: Methods of driving packages**,** traversing method of yarn on package, precision and non-precision winding, yarn tensioning devices, yarn guides, stop motions and other controlling devices of winding machines) |
| Week 3-4(Session 9-12) | **4.Mechanism of winding** (Contents: Concept of washing, types, requirements of washing, discussion on garments washing, dyeing and drying machines, hydro- extractor, chemicals for washing and dyeing) |
| Week 5(Session 13-14) | **5. Analyzing of Winding and related calculations.** (Contents: Winding defects and remedies, calculations, winding cost, latest development in winding) |
| Week 5( Session 15-17) | **6. Warping.** (Contents: Objective, warping requirements, principle and mechanisms of warping, direct warping, sectional warping process) |
| Week 6-7 (Session 18-19) | Review on Mid Term and Preparatory Leave |
| Week 8-9 | Mid Term Examination |
| Week 10-11(Session 20-24) | **7. Warping Processes and different parts.** (Contents: Essential parts of warping machines and their functions, impact of speed, tension variations, cone length on warping performance, warping defects and remedies, calculations, latest development in warping) |
| Week 12-13(Session 25-29) | **8. Sizing.** (Contents: Objective, principle and mechanisms of sizing, ingredients of a size mixture and their functions, chemistry of sizing and technological changes due to sizing typical recipes, choice of size ingredients, size cooking, methods of sizing and drying, dressing of jute yarn) |
| Week 14(Session 30-32) | **9. Effect, different parameters of sizing and their calculations** (Contents: Spun yarn and filament yarn sizing. effect of the arrangement of warp beam, tension zone, temperature, length, speed, reed on sizing, mechanism of size take up, defects in sizing and their remedies. calculations related to sizing, latest development in sizing) |
| Week 15(Session 33) | **10. Introduction and historical background of knitting technology** (Contents: Introduction and historical background of knitting technology, hosiery yarns, general terms and principles of knitting technology) |
| Week 16(Session 34-35) | **11. Knitting Action**(Contents: knitting action of latch, bearded and compound needle, study on knitting elements (cam and sinker), elements of knitted loop structure.) |
| Week 17(Session 36-38) | Presentation |
| Week 18(Session 39-40) | Review on Final Examination and Preparatory Leave |
| Week 19-20 | Final Examination |

**Reference Books:**

* Yarn Preparation by R Sen Gupta, Vol. I and II
* Warping and Sizing – BTRA
* Weaving Calculation - R. Sen Gupta
* Weaving: Conversion of Yarn to Fabric by P. R. Lord and M. H. Mohamed
* Cotton Weaving by,  V. Gordeev, P. Volkov, I. Blinov& M. Svyatenko
* Knitting Technology by Prof. D.B.  Ajgaonkar
* Knitting Technology by David J. Spencer.
* Circular Knitting- Iyar / Mammel / Schach
* Textile Fibres to Fabric- Bernard P. Corbman