

**UNIVERSITY OF  
RAJSHAHI**



**FACULTY OF ENGINEERING  
DEPARTMENT OF TEXTILE ENGINEERING**

**Syllabus for  
B.Sc. in Textile Engineering  
Session 2014-2015**

**December 2014**

**University of Rajshahi**  
**Faculty of Engineering**  
**Department of Textile Engineering**  
**Syllabus for B.Sc. in Textile Engineering Session: 2014-2015**

The courses designed for B.Sc. in Textile Engineering consist of 4000 marks of 160 credits distributed over eight semesters in four academic years. Each academic year is divided into two semesters (odd & even) each of duration not less than 11 weeks (66 working days). There shall be final examinations at the end of each semester. The medium of answer in all examinations will be either Bangla or English, but not the mixer of both. The theoretical examination of courses less than or equal to 2 credits shall be of 2 hours duration and courses greater than 2 credits shall be of 3 hours duration. An academic schedule for an academic year shall be announced for general notification before the start of the academic year, on the prior approval of the academic committee.

**1.Attendance** (Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, article no: 13): In order to be eligible to appear, as a regular candidate, at the semester final examinations, a student shall be required to have attended at least 70% of the total number of periods of lectures/tutorials/laboratory classes offered during the semester in every course. A student whose attendance falls short of 70% but not below 60% in any course may be allowed to appear at the final Examinations as **non-collegiate** student and **he/she shall not be eligible for the award of any scholarship or stipend** for the following academic year/semester. A student, appearing the examination under the benefit of this provision shall have to pay in addition to the fees, the requisite fee prescribed by the syndicate for the purpose. Students having less than 60% attendance in lectures/tutorials/laboratory classes of any courses will not be allowed to appear in the final examinations of the semester. The basis of awarding marks for class participation and attendance is shown in Table-1.

**Table-1: Distribution of Marks in Attendance**

Attendance	Marks%	Remarks
90% and above	100	Regular
85% to less than 90%	90	
80% to less than 85%	80	
75% to less than 80%	70	
70% to less than 75%	60	
65% to less than 70%	50	Non-collegiate
60% to less than 65%	40	
less than 60%	00	

(Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, article no: 13), unit=100 marks.

## 2. The Grading System

The letter grade system shall be used to assess the performance of the students as shown in Table-2 (Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no. 14.1):

**Table-2: Letter Grade System**

Numerical grade	Letter Grade (LG)	Grade point (GP) (G <sub>i</sub> )	Credit (C <sub>i</sub> )
80% or above	A+	4.00	4.00
75% to less than 80%	A	3.75	4.00
70% to less than 75%	A-	3.50	4.00
65% to less than 70%	B+	3.25	4.00
60% to less than 65%	B	3.00	4.00
55% to less than 60%	B-	2.75	4.00
50% to less than 55%	C+	2.50	4.00
45% to less than 50%	C	2.25	4.00
40% to less than 45%	D	2.00	4.00
less than 40%	F	0.00	4.00
Incomplete	I	0.00	4.00

A letter grade 'I' ((incomplete) shall be awarded for courses in the odd semester which continue through to the even semester.

A **Grade Point Average (GPA)** shall be calculated for each semester as follows:

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i} \quad (\text{i})$$

Where, n is the number of courses offered during the semester, C<sub>i</sub> is the number of credits allotted to the i-th course and G<sub>i</sub> is the grade point earned for that course.

**Illustration:** Suppose a student obtained following grade in Part-1 odd semester:

Code No	Subject	Credit	Letter Grade	GP
PHY 1111	Physics-1	4	C	2.25
CHEM 1113	Chemistry-1	4	A+	4.0
MATH1115	Mathematics-1	4	B-	2.75
TE 1111	Introduction to Textile Engineering	6	B+	3.25
CE 1112	Engineering Drawing	2	A+	4.0

Therefore, GPA in the Part -1 odd semester =  $\frac{4(2.25) + 4(4) + 4(2.75) + 6(3.25) + 2(4)}{4 + 4 + 4 + 6 + 2} = 2.40$

And let's assume that his/her GPA in Part-1 even semester is 3.13

A **Yearly Grade Point Average (YGPA)** shall be calculated for each academic year as follows:

$$\text{YGPA} = \frac{\sum_{j=1}^2 C_j G_j}{\sum_{j=1}^n C_j} \quad (\text{ii})$$

Therefore, YGPA of Part-1 Examination =  $\frac{20(2.40) + 20(3.13)}{20 + 20} = 2.77$

The **Cumulative Grade Point Average (CGPA)** gives the cumulative performance of students from the first year upto the end of the fourth year to which it refers, and will be calculated as follows:

$$CGPA = \frac{\sum_{k=1}^m C_k G_k}{\sum_{k=1}^m C_k} \quad (iii)$$

where, m is the total number of years being considered,  $C_k$  is the total number of credits registered during the k-th year and  $G_k$  is the YGPA earned in that particular year.

Similarly assume that, the YGPA of the student for the other 3 Parts are as follows:

Year	Credit	YGPA
Part-II	40	3.47
Part-III	40	2.96
Part-IV	40	3.33

Then his/her CGPA of four academic years is

$$\text{Therefore, } CGPA = \frac{40(2.77) + 40(3.47) + 40(2.96) + 40(3.33)}{40 + 40 + 40 + 40} = 3.13$$

(Both YGPA & CGPA will be rounded upto the second place of decimal for reporting. For instance, YGPA= 2.212 shall be rounded up as YGPA=2.22)

### 3. Earned Credit

The courses in which a student has obtained minimum 'D' in 'Theoretical courses' and 'C' in 'Laboratory courses & Board Viva-Voice' or higher grade will be counted as credits earned by the student. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credit. 'F' grade will not be counted for GPA calculation but will stay permanently on the Grade sheet and Transcripts.

### 4. Marks and Credits distribution for B.Sc. in Textile Engineering

The distribution of marks and credits in various Definitions of Disciplines in the ordinance for B.Sc.. Engineering Degree in the Department of Textile Engineering are given in Table-3 [Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no 6.1]

**Table-3: Marks and Credits distribution in discipline for B.Sc. in Textile Engineering**

Course Type		Marks	Marks (%)	Credits
<sup>a</sup> Humanities		300	7.50	12
<sup>b</sup> Basic Sciences (with Lab)		675	16.87	27
Engineering		3025	75.63	121
Distribution	a. Theoretical	2825	70.63	113
	b. Board Viva-Voce	75	1.87	3
	c. Laboratory	1100	27.50	44
<b>Total</b>		<b>4000</b>	<b>100</b>	<b>160</b>

<sup>a</sup>Each department must include course on English.

<sup>b</sup>Each department must include courses on Physics, Chemistry and Mathematics.

**5. Courses offered to the undergraduate students of Textile Engineering Department for B.Sc. Engineering degree (Session 2014-2015)**

**Table-4: Part-1 Odd semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
PHY1111	Physics-I	3	3	0	0	3	3
PHY1112	Physics-I Sessional	0	0	1	2	1	2
CHEM1113	Chemistry-I	3	3	0	0	3	3
CHEM1114	Chemistry-I Sessional	0	0	1	2	1	2
MATH1115	Algebra, Trigonometry, Analytic Geometry and Differential Calculus	4	4	0	0	4	4
TE1111	Introduction to Textile Engineering	3	3	0	0	3	3
TE1112	Introduction to Textile Engineering Sessional	0	0	1	2	1	2
CE1112	Engineering Drawing	0	0	2	4	2	4
HUM1117	English	2	2	0	0	2	2
Total		15	15	5	10	20	25

No. of Theory Course : 05

Total Contact Hours : 25.0

No. of Sessional Course : 04

Total Credit Hours : 20.00

**Table-5: Part-1 Even semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
PHY1211	Physics-II	3	3	0	0	3	3
PHY1212	Physics-II Sessional	0	0	1	2	1	2
CHEM1213	Chemistry-II	3	3	0	0	3	3
CHEM1214	Chemistry-II Sessional	0	0	1	2	1	2
MATH1215	Integral Calculus, Differential Equations, Vector Analyses and Mathematical Methods	4	4	0	0	4	4
TE1211	Textile Raw Materials – I	2	2	0	0	2	2
TE1213	Polymer Science	2	2	0	0	2	2
CE1211	Engineering materials and Practices	3	3	0	0	3	3
CE1212	Engineering materials and Practices Sessional	0	0	1	2	1	2
Total		17	17	3	6	20	23

No. of Theory Course : 06

Total Contact Hours : 23.0

No. of Sessional Course : 03

Total Credit Hours : 20.00

**Table-6: Part-2 Odd semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
TE2111	Yarn Manufacturing -I	3	3	0	0	3	3
TE2112	Yarn Manufacturing -I Sessional	0	0	1	2	1	2
TE2113	Fabric Manufacturing -I	3	3	0	0	3	3
TE2114	Fabric Manufacturing -I Sessional	0	0	1	2	1	2
TE2115	Textile Raw Materials-II	2	2	0	0	2	2
TE2117	Textile Testing and Quality Control-I	3	3	0	0	3	3
TE2118	Textile Testing and Quality Control-I Sessional	0	0	1	2	1	2
STAT2111	Statistics	3	3	0	0	3	3
ME2111	Elements of Mechanical Engineering and Machine Design	2	2	0	0	2	2
ME2112	Elements of Mechanical Engineering and Machine Design Sessional	0	0	1	2	1	2
Total		16	16	4	8	20	24

No. of Theory Course : 06

Total Contact Hours : 24.0

No. of Sessional Course : 04

Total Credit Hours : 20.00

**Table-7: Part-2 Even semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
TE2211	Wet Processing -I	3	3	0	0	3	3
TE2212	Wet Processing -I Sessional	0	0	1	2	1	2
TE2213	Garments Manufacturing -I	3	3	0	0	3	3
TE2214	Garments Manufacturing -I Sessional	0	0	1	2	1	2
TE2215	Fabric Structure and Design	3	3	0	0	3	3
TE2216	Fabric Structure and Design Sessional	0	0	1	2	1	2
TE2217	Textile Physics-I	3	3	0	0	3	3
EEE2211	Elements of Electrical Engineering and Electronics	2	2	0	0	2	2
EEE2212	Elements of Electrical Engineering and Electronics Sessional	0	0	1	2	1	2
CSE2211	Computer Science	0	0	2	4	2	4
Total		14	14	6	12	20	26

No. of Theory Course : 05

Total Contact Hours : 26.0

No. of Sessional Course : 05

Total Credit Hours : 20.00

**Table-8: Part-3 Odd semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
TE3111	Yarn Manufacturing -II	4	4	0	0	4	4
TE3112	Yarn Manufacturing -II Sessional	0	0	2	4	2	4
TE3113	Fabric Manufacturing -II	4	4	0	0	4	4
TE3114	Fabric Manufacturing -II Sessional	0	0	2	4	2	4
TE3117	Textile Testing and Quality Control-II	3	3	0	0	3	3
TE3118	Textile Testing and Quality Control-II Sessional	0	0	1	2	1	2
HUM3111	Industrial Psychology and Management	4	4	0	0	4	4
Total		15	15	5	10	20	24

No. of Theory Course : 04

Total Contact Hours : 24.0

No. of Sessional Course : 03

Total Credit Hours : 20.00

**Table-9: Part-3 Even semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
TE3211	Wet Processing -II	4	4	0	0	4	4
TE3212	Wet Processing -II Sessional	0	0	2	4	2	4
TE3213	Garments Manufacturing -II	4	4	0	0	4	4
TE3214	Garments Manufacturing -II Sessional	0	0	2	4	2	4
TE3217	Textile Physics-II	3	3	0	0	3	3
HUM3211	Sociology	2	2	0	0	2	2
TE3215	Application of Computer in Textile	2	2	0	0	2	2
TE3216	Application of Computer in Textile Sessional	0	0	1	2	1	2
Total		15	15	5	10	20	25

No. of Theory Course : 05

Total Contact Hours : 25.0

No. of Sessional Course : 03

Total Credit Hours : 20.00

**Table-10: Part-4 Odd semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
TE4111	Advanced Yarn/Fabric/Wet processing/ Garments Manufacturing	4	4	0	0	4	4
TE4112	Advanced Yarn/Fabric/Wet processing/ Garments Manufacturing Sessional	0	0	2	4	2	4
TE4113	Textile Testing and Quality Control-III	4	4	0	0	4	4
TE4114	Textile Testing and Quality Control-III Sessional	0	0	1	2	1	2
IPE4111	Production Planning and Control	4	4	0	0	4	4
HUM4111	Industrial Economics, Accounting and Marketing	4	4	0	0	4	4
Total		16	16	3	6	19	22

No. of Theory Course : 04

Total Contact Hours : 22

No. of Sessional Course : 02

Total Credit Hours : 19.00

**Table-11: Part-4 Even semester**

Code No.	Name of Subject	Theory		Sessional		Total	
		Credit Hours	Contact Hours	Credit Hours	Contact Hours	Credit Hours	Contact Hours
TE4211	Special Yarn/Fabric/Wet processing/ Garments Manufacturing	3	3	0	0	3	3
TE4212	Special Yarn/Fabric/Wet processing/ Garments Manufacturing Sessional	0	0	1	2	1	2
TE4213	Utility Services and Maintenance of Textile Machineries	3	3	0	0	3	3
TE4214	Utility Services and Maintenance of Textile Machineries Sessional	0	0	1	2	1	2
TE4216	Project Work	0	0	6	12	6	6
TE4218	Industrial Attachment	0	0	4	8	4	8
TE4210	Board Viva-Voce	0	0	3	6	3	6
Total		6	6	15	30	21	36

No. of Theory Course : 02

Total Contact Hours : 36.0

No. of Sessional Course : 05

Total Credit Hours : 21.00



6. **Rules for Promotion** (Ref. The Rajshahi University Academic Ordinance, 2013 for B.Sc. in Engineering Curriculum of the Affiliated Colleges/Institutes, Article no. 15):

There shall be final examinations conducted by the Examinations Conducting Committee of the college/institute at the end of each semester. The results shall be finalized at the end of the even semester of the academic year. A student entering in an odd semester shall automatically move on to the next semester, unless she/he was debarred from appearing at the final examinations at the end of the semester. Individual course grades and GPA shall be announced within a date ordinarily not later than three weeks after the end of the semester final examinations.

- 6.1 **Minimum passing grade:** The minimum passing grade in a theoretical course will be D and the minimum passing grade in a laboratory/project/field work/in-plant training/workshop/ similar Courses (henceforth referred to as laboratory course) and Viva-voce will be C.
- 6.2 **Promotion to higher class:** A student who has a grade point average of 2.25 or higher and no F grade in the theoretical courses and not less than C grade in the laboratory courses and viva-voce of the two semesters shall be promoted to the next higher class.
- 6.3 There shall be no refereed in laboratory courses and viva-voce. A student failing to secure a minimum C grade in any of the laboratory courses and Viva-voce in any semester will not pass in that year.
- 6.4 **Course Improvement:**
  - 6.4.1 **Referred (with 'F'):** A student who has a grade point average of 1.7 or higher, with 'F' grade in the theoretical courses, not more than 10 credit points in an academic year shall be awarded Referred up to 10 credits in the courses where less than B grade (including F grade) were obtained and he/she may appear at a supplementary examination in those courses only. In such case the student has to give his/her choice of course/courses for supplementary examination in writing.
  - 6.4.2 **Referred (with no 'F'):** A student having grade point average of less than 2.2 and no 'F' grade in theoretical courses may appear at a supplementary examination in not more than 10 credit points in an academic year, only for courses in which less than B grade was obtained. In such case the student has to give his/her choice of course/courses for supplementary examination in writing.
  - 6.4.3 **Promotion of Referred student to higher Class:** In order to be promoted to the next higher class, a student must obtain a grade point average of 2.2 with no less than D grade in any of the courses in which he/she appeared in supplementary examination.
  - 6.4.4 Grades obtained by a student in the courses in which s/he appeared at the supplementary examination will be recorded for assessment and the grade obtained by him/her in those courses at the regular final examination shall automatically be treated cancelled.
  - 6.4.5 Clause 6.4.4 is not valid for a candidate, who cannot improve his/her course grade at the supplementary examination, in that case the previous grade shall remain valid.
  - 6.4.6 **Improvement of YGPA:** A candidate obtaining an YGPA of less than 2.75 at the end of the academic year shall be allowed to sit for supplementary examination up to a maximum of 8 credit points of (courses in where less than 'B' grade was obtained) theoretical courses in the academic year. No improvement shall be allowed for laboratory examination and Board Viva-voce. If a candidate fails to improve YGPA with the block of new GP in total, the previous YGPA shall remain valid.
  - 6.4.7 All **Referred examinations** shall ordinarily be held during the inter-session break. This break may also be utilized for industrial attachment training or survey Sessional , etc.
- 6.5 **Course Exemption:** students who fail to be promoted to the next higher class shall be exempted from taking the theoretical and laboratory courses where they obtained grades equal to or better than B. These grades would be counted in calculating GPA in the next year's examination results.
- 6.6 **Merit Position:** The YGPA obtained by a student in the semester final examinations will be considered for determining the merit position for the award of scholarships, stipends etc.

## 7. Publication of Results:

- 7.1 A student must successfully complete the courses of all the semesters within a maximum of seven academic years as outlined by the Committee of Courses with all its pre-requisites in order to be eligible for the award of B.Sc. Engineering degree. The student must earn 160 credits (no 'F' grade) and CGPA 2.25 or higher.
- 7.2 **Merit position:** Merit position of a student for each academic year of each degree) awarding department shall be determined on the basis of his/her YGPA of that particular year. Merit position for the award of the degree of B.Sc. Engineering will be based on CGPA of all the academic years.
- 7.3 **Honours:** Candidates for Bachelor's degree in engineering will be awarded the degree with Honours if their CGPA is 3.75 or higher.
- 7.4 **Result Improvement:** A candidate obtaining a CGPA of less than 2.75 at the end of Part-IV even semester examinations, within 4 or 5 academic years shall be allowed to improve his/her result, of upto a maximum 4 units (courses less than B grade) of the Part-IV, maximum 2 units from any one semester of the year, theoretical courses in the immediate next regular examination after publication of his/her result. No improvement shall be allowed for laboratory examinations and Board Viva-voce. If a candidate fails to improve CGPA with the block of new GP in total, the previous result shall remain valid.
- 7.5 **Dean's List:** As a recognition of excellent performance, the names of students obtaining a cumulative GPA of 3.75 or above in two regular semesters in each academic year may be published in the Dean's List in the faculty. Students who have received an 'F' grade in any course during any of the two regular semesters will not be considered for Dean's List in that year.
- 7.6 **Industrial and Professional Training Requirements:** Depending on each department's own requirements, a student may have to complete a prescribed number of days of industrial/professional training in addition to minimum credits and other requirements, to the satisfaction of the concerned department.
- 7.7 **Recording of Results:** The overall results of a successful student covering all semesters' examinations of four years shall be declared on the basis of CGPA with the corresponding Letter Grade (LG). The transcripts in English will show the course designation, course title, credit, grade and grade point of individual courses. YGPA of each year, CGPA and corresponding LG for the overall result.

## 8. Eligibility for Examination:

- 8.1 A candidate may not be admitted to any semester final examinations unless he/she has
  - 8.1.1 Submitted to the registrar/ Vice-Chancellor an application in the prescribed form for appearing at the examination.
  - 8.1.2 Paid the prescribed examination fees, and all outstanding college/institute dues.
  - 8.1.3 Fulfilled the conditions for attendance in class and
  - 8.1.4 Been barred by any disciplinary rule.
- 8.2 On special circumstances the Vice- Chancellor may permit a student to appear at the examination.
- 8.3 A student whose attendance falls short of 70% but not below 60% in any course as mentioned above may be allowed to appear at the final examinations as a non-collegiate student.

## **B.Sc. in Textile Engineering Part-1 odd semester**

### **PHY1111 Physics-I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Elasticity:** States of matter Elastic properties of Solids, Woods, Stress, Strain, Hooks law, Elastic limit stress strain diagram of a material Different types of elasticity Elastic constants Poisson a ratio Relation between elastic constants Work done in a strain Twisting couple on a cylinder Tensional pendulum, Determination of Young's Modulus and Rigidity Modulus, Factor affecting elasticity.

**Hydrodynamics:** Flow of liquids, Equation of continuity. Laminar and turbulent flow, Reynolds number and its significance, Bernoulli's theorem, Torricelli's theory, Venturimeter, Pilot tube.

**Viscosity:** Viscosity and co-efficient of Viscosity, Pineville's equation, Motion in a viscous medium-Stake's law, Determination of the co-efficient of viscosity, Variation of Viscosity with temperature, .Eyeing equation.

**Surface Tension:** Surface tension, Molecular theory of surface tension. Surface tension and surface energy, Excess pressure across a curved film, Capacity and angle of contact, Determination, of surface tension

**Moment of Inertia:** Moment of inertia- its Physical significance, Radius of 'gyration, Torque, General theorems of moment of inertia Calculation of moment of martial of a body Determination of moment of inertia.

**Light:** Wave theory, Huygens principle of Rectilinear propagation of light, interpretation of law reflection and refraction by hyphen s principle interference Young s experiment determination of wave length light by bi prism Newton s nag Colors of thin films Diffraction grating and its u Zone plate, X-ray diffraction, Polarizations, Polarization by reflection, Brewster's law, Double refraction, Nicola's prism, Colorimeter.

#### **Book References**

1. Outlines of-Physics by Dr. Glassed-in Ahmed
2. Physics by David Holliday & Robert Ransack

### **PHY1112 Physics-I Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **PHY1111**

### **CHEM1113 Chemistry-I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

#### **The structure of Atom:**

Rutherford and Bohr's atom model with its limitation, Quantum number and atomic orbital, Distribution of electron in the atoms of elements, Paula's Exclusion Principle; Aruba principle, Heisenberg uncertainty principle, Hand's rule, electronic configuration of the elements. Nuclear Chemistry: Nuclear reactions, Mass number, Atomic unit defect, Nuclear 'binding energy, Nu fission and fusion, Radioactivity, Radio active decay, Half life.

#### **The Chemical Bond:**

Electronic theory of chemical bond, the concept of balancing ionic and coordinate bond.

#### **Pollution and its effects in the living world**

The atmosphere and its structure, Types of pollutants, Air pollution, green house effect, Acid rain. photochemical smog, Prevention and control, Water pollution, Noise Pollution, Treatment of Industrial effluents and wastes, Industrial hazards and precautions.

#### **Complex Compound**

D theories, Structure, Isomerism and applications.

## Physical Chemistry

Theory of dilute solution: Colligative Properties

- Lowering of vapor pressure
- Elevation of boiling point
- Depression of freezing point
- Osmosis and osmotic pressure, Deduction of their formulae and molecular weight from Raoult's law.

## Chemical Equilibrium.

Law of mass action, Equilibrium constant, Application of law of mass action to a chemical reaction,

Heterogeneous equilibrium, Le-chatelier principle and its application to industrial reactions.

## Chemical Kinetics:

Rate of reaction order and molecular. Zero order reaction, 1st and 2 order reaction with its mathematical formulation, Determination of order of reaction, Activation energy. Activation complex.

## Colloids and Colloidal Solution

Classification, Preparation and purification. Properties. Proactive action and application of colloids

## Photochemistry:

Law of photochemistry, Quantum yield, Decomposition of hydrogen halide, Photosensitized reaction,

Fluorescence and phosphorescence, Luminescence and Chemiluminescence.

## Book References:

1. Modern Inorganic Chemistry by R.D. Madan
2. General Chemistry by Ebbing
3. Environmental Chemistry by A.K.Dey
4. Physical Chemistry by G.L. Glaston
5. Environmental Chemistry by H.Kanr and BK. Shurma
6. Basic Inorganic Chemistry by F. Albert & Paul L. Gaus
7. Basic Inorganic Chemistry by Cotton, Wilkinson & Gaus S
8. Essential of Physical Chemistry by B.S. Bahl, G D. Tuli & Arun BahI
9. Principles of Physical Chemistry by Haque & Nawab S
10. A text book of Environmental Chemistry by S.S. Dara

## CHEM1114 Chemistry-I Sessional

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **CHEM1113**

## MATH1115 Algebra, Trigonometry, Analytic Geometry and Differential Calculus

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

**Algebra:** Matrix, adjoint, inverse, Rank of matrix, determinants, Convergence and divergence: Inequalities, Theory of equations, Sets and functions.

**Trigonometry:** De Moivre's theorem, Deduction from de Moivre's theorem: Complex arguments, Gregory's series, Summation of series, Hyperbolic Functions

**Analytic Geometry:** Transformation of co-ordinates, Pair of straight lines, General equation of 2nd degree, Circle, system of circle, conic section. Co-ordinates, Direction cosines, Projections, The plane, the straight line, sphere cone.

**Differential Calculus:** Function, Limits, Continuity, Simple differentiation, Successive differentiation, General theorem and expansions, Rolle's theorem, Mean value theorem,

Taylor's series, Machlaurin's series, Indeterminate forms, Partial differentiation, Maxima and minima, Target and normal. Curvature. Asymptotes, Euler's theorem, Taylor Series. Singular points.

**Book References:**

1. Differential Calculus by B. C. Das & B. N. Mukherjee
2. Differential Calculus by Abu Yusuf
3. Differential Calculus by M. A. Matin & B.B. Chakravarty
4. Linear Algebra by Md. Abdur Rahrnan
5. Set Theory by S. Lipschutz.
6. Higher Algebra by Hall and knight.
7. Higher Trigonometry by S.A. Sattar.

**TE1111 Introduction to Textile Engineering**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Different terms and definition of textiles, Study of textile sector in Bangladesh, An introduction to the historical development of fabric, yarn, thread, filament, fabric etc. processes industry, its application and products.

**Yarn Manufacturing:**

Ginning, Mixing and Blending, Flow chart of different spinning processes, different terms related to cotton and lute spinning, spinning process and machinery used for different spinning and working 'principle of individual Cotton and Jute spinning machinery

**Fabric Manufacturing:**

Different basic terms of weaving process, preparatory of weaving process (winding. warping, sizing, drafting and denting) and its functional effects. Flow chart of weaving process, Basic principle of weaving, weaving process and machines, motions of loom, difference between weaving and knitting, knitting process and machines, non-woven fabric formation. Wet Processing : Flow-Chart of wet Processing, Flow-Chart of dyeing and printing for cotton, Synthetic and cotton synthetic blended fabric, Preparatory process for different textile goods for proper wet processing according to flow-chart, Basic concept of dyes and chemicals used in textiles, Basic concept of theory of dyeing, Different machinery used in woven and knit dyeing industry, Dyeing, printing and finishing process of major types of fabrics.

**Garments Manufacturing:**

A brief history of the development of the garments industry with particular reference to Bangladesh Garments Industry. Nomenclature of different types of garments. Flow chart of garments manufacturing process, Basic idea of pattern making sample making, marker making, cutting, sewing, Trimming and garments finishing.

**Book References:**

1. Textile Terms and Definition by Melintyre, J.E.
2. Dyeing and Chemical Technology of Textile Fibres by ER. Trotman
3. Modern Techniques of Textile Dyeing, Bleaching & Finishing by S.M. Arora
4. Textile Fibers, Dyes & Processes by Howard L. Needles
5. Textiles: Fiber to Fabric by Corbman, Bernard P
6. General Technology of Cotton Manufacturing (Mir Publisher) by PT. Bukayer
7. General Textile Processing by Abu sina Md. Ruknul Quader

**TE1112 Introduction to Textile Engineering Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE1111**

## CE1112 Engineering Drawing

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

## HUM1117 English

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

English phonetics: the places and manners of articulation of the English sounds. Vocabulary. English grammar Construction of sentences, some grammatical problems. Comprehension. Composition on current affairs. Amplification, precise writing, Phrases and idioms. Commercial correspondence and tenders. Technical report writing, Lessons in spoken English, Drafting notes. - Short stories written by some well- known classic writers.

## B.Sc. in Textile Engineering Part-1 Even semester

### PHY1211 Physics-II

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Electricity and Magnetism: Electric Charges and coulomb's law. Electric field, Electric flux, Gauss Law and it's application, Gaus's law in vector form, Electric potential, Relation between electric field and potential capacitors and capacitance. Capacitors with dielectrics, I aplaco's and poison's equation, Current and resistance, Kirchoff's law, charging and discharging of a capacitor (RC circuited). Magnetic files and magnetic induction. Magnetic force on a current carrying conductor. Torque on a current carrying loop. Ampere's law and its applications, Laws of electromagnetic induction. Self inductance and mutual inductance. LR circuit, Magnetic properties of matter. Magnet motive force Magnetic field intensity. Permeability. Susceptibility, Magnetic materials. Magnetization curves Hysteretic.

Heat and Thermodynamics Measurement of high temperature platinum resistance thermometer Thermo-electric thermometer, optical and radiation pyrometers. Specific heats of a gas. General heat of gas laws from kinetic theory o gases. Expression for pressure exerted by a gas, Dilution of gas laws from kinetic theory, kinetic interpretation of temperature, Maxwell's distribution at molecular speeds, Degrees of freedom of a gas, Principle of equation of energy, Mean free path. Brownian motion, Equations of state of a gas, Vander wall's equation, critical constants of a gas Specific heat of gas, Relation between the two specific heats, General heat energy equation of a gas Isothermal and adiabatic Changes, Adiabatic equation of a perfect gas, Adiabatic and Isothermal laxities and isothermal elasticizes, Work done during expansion or Compression of a gas, Zero law of thermodynamics, First law of thermodynamics ,Reversible and irreversible process, Efficiency of a heat engine, The carnet cycle Efficiency of carnet engine, Refrigerator. The second law of thermodynamics. Carnot's theorem, Absolute scale of temperature, Entropy and disorder. Thermodynamic functions, Maxwell relation, Claudius-Chaperon equation, Gibbs phase rule, Third law of thermodynamics.

Modern Physics: Radioactivity ,Law governing radioactive delay, Half life, Crystalline and non crystalline solids ,Unit cell ,Cryptal systems, Co ordination number, packing factor ,miller indices. Defects in solids, point defect, Line defect, Different types of bonds in solids, X rays, X-rays diffraction. Bragg's law introduction to band theory, Distinction between metal, insulator and semi- conductor.

### Book References:

- Outlines of physics by Dr.Giasuddin Ahmed
- Heat & Thermodynamics by Brijlal & N. Subrahmanyam
- Thermodynamics: An Engineering Application by Yunus A.Cengel.
- A Text book of thermal Engineering by R.S Khurmi& J.K Gupta
- Engineering thermodynamics (3<sup>rd</sup> ed.) by Rogers,Mayhew.

## PHY1212 Physics-II Sessional

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **PHY1211**

## CHEM1213 Chemistry-II

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

### **Aliphatic Hydrocarbons**

**Alkenes:** Classification, Structure & Conformation; Nomenclature, General methods of preparation; and important reactions.

**Alkenes:** Classification, Structure & Conformation; Nomenclature, General methods of preparation; and Important reactions.

**Alkynes:** Classification, Structure & Conformation; Nomenclature, General methods of preparation; and important reactions.

### **Aromatic Hydrocarbons**

Introduction to Aromatic Compounds; Structure of Benzene, Stability of Benzene ring; Reactions of Benzene, Resonance structure of benzene, Orbital picture of Benzene: Aromatic Char Electrophonic Aromatic Substitution-mechanism, reactivity and orientation.

### **Hydroxyl Compound**

**Alcohols:** Classification, Nomenclature, structure, Isomerism, general methods of preparation reactions of aliphatic and aromatic alcohols

**Phenols:** Classification, Structure, preparation and important reactions.

### **Carbon Compounds**

Aliphatic aldehydes and ketenes: Structure, nomenclature, general methods of preparation and important reactions

Aromatic aldehydes and ketenes: Structure, nomenclature, general methods of preparation and important reactions

### **Carboxylic Acids**

Carboxylic acids: Structure, nomenclature, general methods of preparation physical properties and important reactions, Derivatives of carboxylic acid:- chlorides, anhydrides, Esters and amides.

### **Amines**

Aliphatic Amines: Classification, Structure, Nomenclature, isomerism, general methods of preparation and reactions, Aromatic Amines: Structure, preparation and reactions, A brief study of Diazonium salts and Azoic compounds

### **Carbohydrate**

Classification, Nomenclature and stereo chemistry and inter conversion of carbohydrates.

### **Monosaccharide**

D-Glucose and Fructose

D-Glucose: Open chain structure, cyclic structure, physical properties and reactions.

Disaccharides: Structure of sucrose, reactions and uses.

Poly saccharine: Starch and cellulose

Cellulose: Preparation, structure, derivatives and uses.

Starch: Source, structure, Derivatives and uses. .

### **Amino acids, Proteins and Enzymes**

Classification nomenclature, synthesis and reaction

### **Isomerism**

Structural isomerism, Chain isomerism, Positional isomerism, Functional group isomerism, Mesomerism etc

Stereo- isomeric Geometrical isomerism and optical isomerism. Configuration and conformation:

### **Organometallic compounds**

Grignard reagent and structure

• Grignard reagent Preparation, Important reactions and application in organic synthesis Organ-zinc compound: Preparation, Properties, Reactions and uses.

Tetraethyl lead Preparation, reaction uses and its adverse effects on environment.

### **Color Dyes and Pigments**

Theories of color and color conjugated system, Nomenclature, Classification, Raw materials for synthesis of dyes

### **Book References:**

1. Organic Chemistry by Morrison & Boyd
2. Organic Chemistry by Arun Bahl
3. Organic Chemistry by Finer (Vol. 1 & 2)

## **CHEM1214 Chemistry-II Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **CHEM1213**

## **MATH1215 Integral Calculus, Differential Equations, Vector Analyses and Mathematical Methods**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

### **Integral Calculus:**

Method of substitutions; special type of Integration, reintegration of rational fractions; Integration by parts, Integrals of special trigonometric functions, Reduction formulae for trigonometric functions, Miscellaneous integral, Definite integrals, Improper integrals, Multiple integrals.

### **Differential Equations**

Variables, Homogeneous equation. Reducible to homogeneous form, Lie's Differential Equations. Linear differential equations, Linear equations with constant Coefficients, Inverse operations.  $f(D)V = f(D) a$   $f(D)Y = \text{Sin}i$  or  $\text{Conan}$ ,  $f(D)y$  ex., Method of undermined coefficient, Method of venation of parameters. Particulars Integrals; Linear Homogeneous equation with variable coefficient, Equation of the first order but of higher degree, Equation solvable for y, Equation solvable for x equation, System of linear different equations.

### **Vector Analyses**

Scalar product or Dot product of two vectors, three vectors, four vectors, vector product or cross product vectors, Solution of vector equations, Gradient, divergence, Curl, Application of vectors in Geometry, Vector differentiations, Vector Integration.

### **Mathematical Methods:**

Laplace transformation, Fourier series and Fourier Integral, The line integral, The surface integral. The volume integral, Green's theorem, Gauss's Divergence theorem, beta and gamma functions, Numerical analyses (method of interaction). Calculation of finite differentiation Interpolation, central differences, Numerical differentiation and integration.

### **Book References:**

1. Integral Calculus by B. C. Das & B. N. Mukherjee
2. Integral Calculus by Abu Vusuf
3. Numerical Mathematical analysis by Jame B.Sc.arborough
3. Numerical Analysis by Schaums Outline Series.
4. Numerical Methods by H. Mathews.
5. Numerical Analysis by Kedarnath & Ram Math
6. Vector Analysis by Spiegel
7. Integral Calculus MA. Matin & B.B. Chakravarty
8. Differential Equations by S.L. Ross
9. Integral Calculus by M.L. Kharina
10. Mathematical Physics by Rajput.



## TE1211 Textile Raw Materials – I

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

Definition of textile fabric, Classification of fibers with examples.

**Study of cellulose fibers:**

Cotton: Cultivation and harvesting, Growth, Composition. Physical and chemical structure and properties, Geographical distribution, Ginning, Grading classification and End uses.

**Best Fibers**

Cultivation and harvesting of different types of best fibers with special reference to Jute; Growth, Composition, Physical and chemical structure and properties, Retting, Study of fiber ultimate, Sorting, Grading, classification and End uses.

Brief study of other types of cellulose fibers such as leaf and fruit fibers.

**Study of Protein fibers:**

**Wool:** Growth, composition, physical and chemical structure and properties, Geographical distribution of main wool producing countries, Shearing, classing sorting and End uses;

Sources and types of animal hair fibers.

**Silk:** Production of raw silk-egg production, cocoon production, reeling and throwing, Composition, Physical and chemical structure and properties, Geographical distribution and End uses;

**Book References:**

1. Hand Book of Textile Fibers 1- Natural Fibers by Cook. J. Gordan.
2. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman
3. Textile Fibers, Dyes & Processes by Howard L. Needles
4. Textiles: Fibrils o Fabric by Corbman, Bernard P
5. Textile Fibers by Mathews (John Wiley & Sons Inc.)
6. Textile Raw Materials by Abu sina Md. Ruknul Quader

## TE1213 Polymer Science

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

**Introduction and history of polymer science**

**Definition of different terms:** Polymer, monomer, bloomer, repeating unit, Degree of polymerization end group etc.

**Classification of Polymers:** Based on the origin, Chemical and geometrical structure. Chain Architecture, monomer or Chemical Microstructure, the side Chain Structure I Configuration of Polymer Chain/ Stereo regular Polymer

**Criteria of fiber forming polymers**

**Different types of chain polymerization:** Free radical polymerization, Ionic polymerization, Co ordination polymerization.

**Kinetics of Polymerization:** Introduction, Free radical chain polymerization, Ionic Polymerization etc. **Different types of step polymerization:** Poly condensation, Poly addition, Ring-opening etc.

**Technical of polymerization:** Liquid, Gas and Solid phase.

**Molecular Weight and Size**

Number average molecular weight, Weight average molecular weight, Viscosity average molecular weight and their measurements, molecular weight distribution, Effect of molecular weight on mechanical properties.

**Glass Transition Temperature:** Definition, Melting temperature (T<sub>m</sub>) Flow temperature (T<sub>f</sub>) etc. Transition and associated properties, melting temperature, Factors influencing the Glass transition temperature, Importance of glass transition temperature.

**Crystallinity in Polymers:** Crystalline solid and their behavior, Degree of Crystallinity, Crystallisability, Polymer Crystallization, Structural regularity and crystallisability, Amorphous and their: effect on T<sub>g</sub> and T<sub>m</sub>

**preparation and properties of different polymers:** Polyethylene, Poly Vinyl Chloride, Polyvinyl alcohol, Polystyrene, Polyester, Nylon, Poly isoprene, Polyurethane, Silicone polymers etc.

**Polymer degradation:** Types of degradation Thermal degradation, Photo degradation, Mechanical Degradation, Oxidative degradation etc.

**Polymer Processing:** Introduction, Compounding, Processing Techniques

**Book References:**

1. Polymer Science by Gowariker, VR. (Publisher: Wiley Eastern Limited)
2. Text Book of Polymer Science by Fred W. Billmeyer, Jr. (Publisher: Interscience Publishers, a Division of John Wiley and Sons)
1. Polymer Chemistry by Bruno Voilmert (Publisher: Springer-Verlag, New York)

### **CE1211 Engineering materials and Practices**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Definition of stress and strain, various types of stress and strain - tensile, compressive, shear, calculation of various stress, Mohr's circle of stresses.

Hook's law of elasticity, definition of modulus of elasticity and rigidity, analyses of typical tensile strain curve for a ductile material showing yield points, breaking point, yield stress and ultimate stress, Poisson's ratio.

Springs, Types of spring, closely coiled spring, spring subjected to axial loads and axial twist, open coiled spring.

Columns and strut, buckling of column, Euler's column theory, Euler's crippling load for column,

Ranking's crippling load for column, Eccentric loading on column.

Mechanical properties of iron and steel, strain, energy and resilience, breaking energy and toughness, repeated loads and fatigue, hysteresis, and endurance limit, time 'effect, creep and relaxation of stresses, hardness and its methods of measuring, structure and properties of wood, Alloys of metals and their properties, Material in hostile environment (high temp.. sub-normal temp. and corrosion).

**Book References:**

1. Introduction to Physical Metallurgy by S. H. Avner
2. Physical Metallurgy for Engineers by D. S. Clark & W. R. Varney
3. Engineering Physical Metallurgy by V. Lakhtin
4. Introduction to Modern Steel Making by R. H. Twipkary
5. Introduction to Engineering Materials by B. K. Agrawal
6. Metallurgy for Engineers by E. C. Rollason
7. Engineering Materials- Properties & Selection by K. G. Budinski
8. Mechanics of Materials 1 (ed) by E. J. Hearn

### **CE1212 Engineering materials and Practices Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **CE1211**.

### **B.Sc. in Textile Engineering Part-2 Odd semester**

#### **TE2111 Yarn Manufacturing -I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Short Staple**

Characteristics of considered by a spinner; Flow chart for the production of carded and combed yarns; Importance of mixing and blending:

**Blow Room**

Principle of Opening and Cleaning: Study of Blow Room Machines for Blending Opening. Cleaning and control of regularity or mass per unit length, Extraction and control of waste: Settings or waste. Blow-room lines for different purposes; Use of suitable sequence of machines: Production of scorchers laps; Advantages and disadvantages of chute feeding to cads, Safety; Prevention of fires, methods of extraction of metal objects; Main settlings, Speeds, Production calculation.

**Carding**

Principles and objects of carding: Detailed study of the revolving flat card; types and care of wire SU and Grinding, Doffing mechanism; Extraction end control of waste and dust, an coiling. Speeds. Production calculation. Settings. Cleaning efficiency. Control of nep and Fiber damage. variation in sl mass per unit length

**Draw Frame**

Principles of roller drafting; Drafting forces: Fiber control: Drafting wave and effect of short Fibers until hooked ends created in carding; Mechanical bull causing periodic variation; Minimum t variation Effects of doubling and drafting Study of draw frame, Drafting system. Stop mechanism. Can coiling, Roller selling. Production, Introduction and functions of auto travelers.

**Long Staple**

Flowcharts for production of yarns from bust fibers, Woolen and worsted and silk; Processing of Jute; Importance and methods Of batching and batch selection; Emulsion preparation of application. Softening technique and machinery; Treatment of cuttings;

**Carding**

Principles and objects of Jute card; Detailed study of carding systems and machinery. Methods of spreading. Differences in treatment on breaker and finisher cards, pinning. Control of opening and waste, Cleaning efficiency, Settings, Speed; and productions.

**Book References:**

1. Textiles: Fiber to Fabric by Corbrnan. Bernard P
2. General Technology of Cotton Manufacturing Mir Publisher) by PT. Bukayer 41 -
3. A Sessional Guide to Opening & Carding-2 by W. Klein
4. Jute Fiber to Tam by RR. Atkinson (Publisher: A I-teywood Book. Temple press Book Ltd.)
5. A guide to Jute Technology by Sadruddin Ahmed
6. Yarn Manufacturing-i by Abu Sina Md. Ruknul Quader.
7. Manual of Cotton Spinning by
8. Jute Spinning by Hafijuddin Ahmed

**TE2112 Yarn Manufacturing -I Sessional****Sessional: Credit Hours- 1****Contact Hours/week 0 +2**

Sessional based on the theory of course TE2111

**TE2113 Fabric Manufacturing -I****Theory: Credit Hours- 3****Contact Hours/week 3 + 0**

Weaving Preparation: Introduction and historical background of fabric manufacture; Flow chart for weaving: Introduction to yarn preparation.

Winding: 'Minding requirements. Different types of winding methods and packages. Precision and non-precision winding. Winding defects and remedies.

Warping: Techniques of warping— Direct warping of cotton and jute and sectional warping. Essential parts of warping machines and their function. Faults in warping and their remedies.

**Sizing:** Introduction to sizing hauls of a size maxi pro and their Functions; Chemistry of sizing and technological changes due to sizing, Typical recipes. Choice of size ingredients. Size cooking, short description of different techniques of sizing, Methods of drying, Dressing of jute yarn, Warp sizing and weaving efficiency. Mechanism of size takes up. Defects in sizing and their remedies, Calculations related o winding, warping and sizing

**Weaving Mechanism:** Basic principle of weaving, Classification and brief description of looms. Classification and definition of loom. Study of primitive, pit, frame fly shuttle, Chitlaranjon and Hatterxey looms, Study of Hessian and Sacking loom, relevant calculations.

Chronological Development of looms. Loom drive and brakes. Different types of sheds.

**Shedding:** Tappet shedding, Construction of shedding Tappet.

Debby Shedding: Scope and classification, negative, positive and cross-border, Peg-plan, Timing and dwell of doobby.

**Picking:** Classification, over picking and under picking mechanisms, Construction of picking tappet, picking faults.

**Boating:** Principle of crank and crank arm beating, Effect of crank arm and crank length, Slay eccentricity and its effects, Forces involved in beating action.

**Take-up and let-off mechanisms. Calculation** of take-up constant, picks/cm and rate of let off. Necessary calculations.

Book References:

1. Textiles: Fiber to Fabric by Corbman, Bernard P
2. General Technology of Cotton Manufacturing (Mir Publisher) by P.T. Bukayer
3. Weaving Calculations by R. Sen Gupta (Pub S.D. Taraporevala Sons & Co. Private Ltd.

### **TE2114 Fabric Manufacturing -I Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

Sessional based on the theory of course TE2113.

### **TE2115 Textile Raw Materials-II**

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

Introduction and historical development of man-made fibers, Definition and classification of man-made fibers, Significance of man-made fibers, Advantages and disadvantages of man-made fibers. Principles of different spinning systems, Different fiber structures and their effects on fiber properties.

Yarn texturing.

Technologies of formation of regenerated fibers. Their properties and uses: Different types of viscose rayon and acetate rayon's, derivatives of cellulose different types of regenerated protein fibers. Technologies of formation of purely synthetic fibers, their properties and uses: Polyamides, Polyesters, Poly acrylics, Polypropylenes, PVA, PVC and Electrometric fibers.

Formation of carbon fibers, Bi/Multi-component fibers, glass fibers and metallic fibers, their properties. their properties and uses.

Present trends of chemical fibers production and their economic and social aspects.

**Book References:**

1. Hand Book of Textile Fibers 1-Natural Fibers by Cook. J. Gordan.
2. Dyeing and Chemical Technology of Textile Fibres by ER. Trotman
3. Textile Fibers, D Ves & Processes by Howard L. Needles
4. Textiles: Fiber to Fabric by Corbman, Bernard P
5. Textile Fibers by Mathews (John Wiley & Sons Inc.)
6. Textile Raw- Materials by Abu sina Md. Ruknul Quader
7. Man-Made Fibers by R.W. Moncrief

### **TE2117 Textile Testing and Quality Control-I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Introduction to Textile Testing and Quality Control, Importance of Textile Testing and Quality Control, Sampling methods for fiber.

**Moisture:** Moisture content and moisture regain standard moisture regain of different fibers, Relative humidity measurement of relative humidity, standard conditions for testing importance of moisture regain, methods of measurement of moisture in textiles.

**Fiber Testing:** Length, staple length, effective length, span length, fiber length dispersion, Short fiber percentage, methods of test, Fineness and maturity of cotton, Importance in processing, Relationship between fineness and maturity, Methods of measurement and expressions of results, Maturity ratio, measurement of foreign matters in fiber sample.

**Tensile strength (Tenacity)**-Single fiber and fiber bundle test, comparison of different methods and between single fiber and bundle test.

**Yarn Testing:** Measurement of linear density of lap, sliver, roving and yarn, counting systems, different methods of measurement of yarn count, Twist in yarn, Measurement of twist.

**Book References:**

1. Principles of Textile Testing by J.E. Booth (Publisher: Newnes Butterworths)
2. Textile Testing by Skinkle
3. Technology of Textile Testing and Quality Control by Elliot B. Grover D.S. Hamby

### TE2118 Textile Testing & Quality Control-I Sessional

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course TE2117.

### STAT2111 Statistics

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Introduction to descriptive statistics:** Collection of data: Organizing and presentation of data: Importance of Statistical data; Population and sample.

**Frequency Distribution:** Grouped frequency, distribution and their presentation in the form of frequency polygon and histogram

**Measurement of Central Tendency:** Mean, Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode, definition, computation, advantages, disadvantage and uses.

**Measurement of Dispersion:** Absolute measurement, Range, Mean deviation, Quartile deviation, Standard deviation, Relative measurement, Co-efficient co variation. Definition, computation and uses.

**Moment, Skewness and Kurtosis:** Definition, computation and uses

**Probability:** Simple idea of probability, Different definitions related to probability, Addition law of probability, Multiplicative law of probability, Dependent and independent probabilities, Bayes' Theorem, Discrete and continuous probability distribution, Concept about probability distribution, Binomial, poisson distribution and Normal distribution and their Sessional applications, ideas on multiple co relation Concept of sampling, Types of Sampling distribution and their application in statistics.

**Correlation and Regression:** Basic idea about correlation, Measure of correlation, Pearson correlation coefficient, and Spearman's rank correlation coefficient, Computation correlation coefficient and rank correlation coefficient

**Concept on simple regression:** Scatter diagram. Distinction between regression and correlation. importance of regression analyses in statistics, Concept of dependent and independent variables Computation of regression parameters, Sessional exercises on the regression line, Concept of multiple regression. Regression coefficients and their interpretations, R-square and its interpretation.

**Test of Significance:** Basic idea on test of significance, Different test statistics, Student's I. Fisher's Chi- square, Paired t- test and variance ratio, Concept on test of hypothesis, Types of hypothesis. Import of test of hypothesis in statistics, Types one and two errors, confidence interval, h P value, Design of experiments, one way and two way of analyses of variance, Computation of arc: variance table.

**Sampling fundamentals:** Drawing random sampling, Sampling frame, Steps of designing a sample survey, Sampling frame, Steps for designing a sample survey, Sampling and non sampling errors, Probability sampling and non probability sampling, Types of sampling and sample size determination.

**Statistical quality control:**

Introduction, The classical time series model, Description of trend, Measurement of seasonal variations, Concept on Quality of control process and product control, Control chart and control limits, Computation of quality control limits, CL, UCL, LCL

**Book References:**

1. An Introduction to statistics and probably by M.N.Islam .
2. Theory and problems of statistics by M.R.Spiegel
3. Methods of statistics by Ahmed, Bhuiya, Rezard l'lossain
4. Introductory statistics wiley and sons, NY by Hool, P.C
5. An Introductory statistics 3rd Ed. witey and sans, NY; by wonnacot, T.H. and Wonnacot R J
6. Probability McGrow Hill, NY; by lipschitz.T
7. Fundamentals of Mathematical statistics by S.C. Gupta and V.K. Kapoor.

**ME2111 Elements of Mechanical Engineering and Machine Design**

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

**Thermodynamics and Heat Transfer**

Fundamental Concepts and definitions. Revision of gas laws properties of perfect gas and steam, laws, of thermodynamics; homodynes, Mechanical process and cycles, Vapor power cycles Rankin, Reheat.

**Different modes of heat transfer-** conduction, convention and radiation. One dimensional steady state conduction of heat in solid plane wall. Radiation heat transfer, the law of black-body radiation.

**Hydraulics** -Properties of fluids, pressure head of a liquid, pressure gauges, flow of black-body radiation. equation, General energy equation for steady flow. Laminar flow and turbulent flow, head loss due to friction in a pipe, flow through circular orifices.

**Compressed air** -General discussion, textile applications and safety.

**Pumps** -Characteristics and application of reciprocating and centrifugal pumps.

Boilers, Steam engine, Diesel and Petrol engine, Gas turbine.

**Friction**-Limiting friction and co-efficient of friction, screw friction efficiency of screw jack, friction in journal bearing, friction clutches, rolling resistance.

**Mechanism:** Crank connecting rod mechanism, Quick return mechanism, links, Kilo meters pains Turn of motion and power-by belt, ropes, chains and gears: gear trans.

Conversion of motion-Shedding, tappets and cams, Shearing force and ..... moment, impact of forces, momentum, torque, torsion, moment of forces and its application in textile machines. Method finding radius of gyration of revolving or oscillating bodies.

**Machine Design:** Tolerances and allowances, variable loads and stress concentration. Design of screw joints, riveted joints; Spring Columns; Keys and couplings; Journal, ball and roller bearings, pressure vessels.

**Book References:**

1. Heat Transfer by Kreith,
2. Heat Transfer by Holman
3. Heat Transfer by Gebhat
4. Mechanical Engineering Design (5th Edition Mc-Graw Hill Int.) by J.E. Shigley & CR. Mischke
6. Mechanics of Machine (2nd ed. SI metric) by Stephen & Hanna
7. Mechanics of Materials 1 by E. J. Hearn
8. Theory of Machine 1 by E. J K. Gupta

8. Fluid Mechanics by Shames
9. Fluid Mechanics by Fox & Medonald
10. Fluid Mechanics (1st SI metric ed.) by Streeter, Wylie

### **ME2112 Elements of Mechanical Engineering and Machine Design Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course ME2111.

### **B.Sc. in Textile Engineering Part-2 Even semester**

#### **TE2211 Wet Processing -I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Water Materials and chemicals for wet processing:** Water, Water importance in wet processing (hydrogen bonding, Cluster off evaporation, Dissolving ability), Water treatment (Estimation and Removal of Hardness), ‘Soda, detergent etc.

**General concepts of Seeps:** Classification of detergents. Detergency (Mono’ molecular layer, Middle formation, Surface and intern tension, wetting an dispersing. Different types of surface active agents (Synthesis, Effects, Degradability); Chemistry, properties and uses various Acids, Alkalis, salts, Oxidizing Agents and Reducing Agents in Textile Wet Processing.

**Pretreatment:** Flow-chart of wet processing. Chemistry of various impurities in fibers and their, removals; Singeing, Desizing, Scouring of cotton, Jute, Wool and silk fibers, Methods of bleaching of cotton, Jute, wool and silk fibers, Mercerization of cotton.

**Technology of Dyeing:** Elementary concepts of colour and constitution, Chromophore, Chromogen,

Auxochrome, Resonance theory.

**Definition of dyestuffs:** Pigments and their classifications, Commercial dyestuff preparations (Powder, Paste, Lump, Solution and press cake).

**Colour measuring instruments.**

**History of dyeing:** Classification of dyes according to their chemical constitute and application.. Structure and application of direct, Acid, Basic and Vat dyes on different fibers:

**Book References:**

1. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman
2. Modern Techniques of Textile Dyeing, Blé & Finishing by S.M. Arora
3. Technology of Bleaching & Mercerizing by Prof. V. A. Shenai
4. General Technology of Cotton Manufacturing (Mm Publisher) by P.T. Bukayer
5. Textile chemistry—i & 2 by Abu sina Md.Ruknui Quader

#### **TE2212 Wet Processing -I Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course TE2211

#### **TE2213 Garments Manufacturing -I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Historical Development of Garments industry in Bangladesh and other countries of the world. Garments terms and definitions’, Garments manufacturing sequence, General discussion on pattern making, Sample garments making, Components of shirt, trouser and their types, Standard body,, measurement ‘for Gents, Standard body measurement for ladies, Principle of pattern making for shut and trousers Pattern grading.

**Marker Making:** Definition, marker efficiency, objectives, constraints, method, drawing, duplicating and wastage in marker making.

**Book References:**

- 1 Apparel Manufacturing by Glock Ruth
2. Garments and Technology by M.A. Kash

**TE2214 Garments Manufacturing -I Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE2213**

**TE2215 Fabric Structure and Design**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Introduction** — Classification of woven fabrics, Plain weave fabric and its representation, Factors affecting the fabric structure.

**Plain Weave Fabrics** — Derivatives of plain weave and their characteristic. Ornamentation of plain weave fabrics by varying set, yarn linear density, crimp, twist and material.

**Twill weaves** — Definition of the terms balance warp-faced and weft-faced Mill weaves. Developed twill weaves, I.e. waved, herring diamond and Relative firmness of twill weave, Large twills influence of the twist of the yarns. Angle of inclination of twill weaves Satin and sateen weaves, Drafts, denting and pegging plans.

**Fancy designs of fabrics** — Characteristic, appearance and texture of simple fancy weaves (viz, mock leno Including distorted thread effects), huckaback honeycomb, basic crepe weaves and Bedford cord structures.

Stripe and check effects using basic and simple fancy weaves, Colour in combination with weave effects, i.e. pinstripe, crowfoot, dog's tooth, shepherds check.

Designs of fabrics figured with extra weft and extra warp and weft.

Designing of double width tubular multiply and stitched double cloth designing of double equal plain fabrics figured by inter change

**Knitted Fabric Structure**

Structure of I x I rib and I x 1 purl weft knitted fabrics and their representation on design paper.

Comparison of the properties of plain, I x I purl weft knitted fabrics.

Structures of simple, tuck and miss stitches and their representation using loop diagrams.

Representation using conventional notation I x 1 straight lock, 1 x 1 cross lock, hail-cardigan, full-cardigan, 1 x I weft lock knit and 2 x I weft lock knit structures.

**Book References:**

1. Grammar of Textile Design by I-I. Nisbet.
- 2 Laboratory Practice in Knitting Technology by L. Kudriavan (Publisher Mir Publishers Moscow)
3. Watsons Textile Design and Colour by Z. Grosicki

**TE2216 Fabric Structure and Design Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE2215**

**TE2217 Textile Physics-I**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**



Physical structure of fibers Crystallinity and orientation, Basic concepts of methods for investigating fiber structure, e.g. X-ray diffraction, optical and electron microscopy infra-red absorption, relations between fiber properties and structure of fiber.

**Detailed study of fiber properties**

**Mechanical properties**-Tensile strength (tenacity), flexural and torsional properties, stress/strain relations under various conditions. Modules of elasticity, plasticity, creep and relaxation.

**Effects of moisture**-Effect of water on fiber e.g. swelling.

**Frictional properties**- Importance in drafting experimental methods of measurement. Effect of lubricant and dyes. Relationship of frictional properties of knitting, stitching and sewing.

**Optional properties**-Reflection, refraction, scattering, polarization, birefringence.

**Thermal properties**-Absorption and emission of radiation, Energy changes associated with changes of state including transition temperature of fibers. Moisture content and heat of wetting.

**Book References:**

1. Physical Properties of Textile Fibers by W.E. Morton & J.W.S. Hearle (Publisher: Butterworth & Co. Ltd. and Textile Institute)
2. Textile Fiber and their uses by Hess

**EEE2211 Elements of Electrical Engineering and Electronics**

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

**Electrical Engineering**

**D.C. Current** -D.C. fundamentals, Generators and their characteristics motors and their characteristics. Speed control process.

**A.C. Current** -A.C. Fundamentals, Flow of A.C. through coils, Inductance and resistance in series and in parallel. Power in A.C, Circuits, Power Factor and Power Factor Improvement. Resonance circuit, Transformer, Poly phase circuits, Induction motors.

**Sub-station**-Its purpose, Substation equipments (HT.LI Switch gear etc.), Distribution board and sub-distribution board.

**System network**- Typical distribution circuits, cables and wiring systems and their selection.

**System protection**-Types of faults, (transformer and motor) principles of protection, Protective devices — circuit breaker, switches, starter.

**Electrical hazards**-Protection against shock and fire, earthing and its importance, procedure to be adopted when a person is in contact with a live contact.

**Electronics**- Amplifiers, Rectifiers and Transistors Diodes and their uses voltage amplification. Power amplification, Photo sensor and Transducer, Integrated Circuits (IC.).

**Book References:**

1. Introductory Circuit Analysis by Boylestad
2. Introduction to Electrical Engineering by R. P. Ward
3. A Text Book of Electrical Technology (Vol 1 & 2) by B. L. Theraja
4. DC & AC machinery by Rosenblatt
5. Electrical Machine by Bhattacharje
6. Alternating Current Machine by T. C. Lioyd

**EEE2212 Elements of Electrical Engineering and Electronics Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course EEE2211.

**CSE2211 Computer Science**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

## **B.Sc. in Textile Engineering Part-3 Odd semester**

### **TE3111 Yarn Manufacturing -II**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

#### **Short Staple**

**Comber** - Objects of the combing process. Methods of comber tap preparation and importance arrangement of fiber in card sliver. Principles of comber, Cycle of operations. Comber waste and waste control. Main comber settings, effect of change of settings on sliver quality, waste quality and percentage extraction, Methods of waste removal, drafting system. Sliver system. Sliver coiling system.

**Speed frame** - Objects of speed frames. Detailed study of types of drafting systems, amount and distribution of draft twisting and amount of twist for different materials use of false twist winding and Bobbin Building, Drives to Bobbins, Bobbins rail and Spindles. Object and action of cone winding drive and differential motion, alternative methods of bobbin drive. Builder mechanism. Setting, Speeds and Productions.

**Ring frame** -Function of ring spinning process, description of main working parts, Drafting systems, types of spindle, ring and travelers. Yarn tensions and forces acting on the traveler. Winding, building mechanism, Settings, Speeds and Production. End breaks.

Study of doubling and Twisting machines different systems of doubling Reeling building Brief outline of modern spinning systems.

#### **Long Staple**

Objects and functions of jute drawing Detailed study of jute drawing frames, drafting system Suitable drafts and roller settings.

Objects and functions of flyer and other spinning machines, types of drafting system. Twisting and winding. Bobbin building mechanisms. Amount of twist necessary in jute yarns. Brief outline of modern spinning systems for jute yarns.

#### **Book References:**

1. Textiles: Fiber to Fabric by Corbman, Bernard P
2. General Technology of Cotton Manufacturing by P.T. Bukayer (Publisher: Mir Publisher)
3. The Technology of Combing & Drawing Vol-3 by W. Klein
4. A Sessional Guide to Ring Spinning V-4 by W. Klein
5. Jute Fiber to Tarn by R.R. Atkinson (Publisher: A Heywood Book, Temple press Book Ltd)
6. A guide to Jute Technology by Sadruddin Ahmed

### **TE3112 Yarn Manufacturing -II Sessional**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course TE3111

### **TE3113 Fabric Manufacturing -II**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

#### **Weaving**

Features of automatic looms. Weft replenishment. Methods of welt patterning, Warp protector motion Side and center welt lurk motion, Warp stop motions.

**Jacquard Weaving** -Scope. Types and Basic principle of Jacquard shedding Classification of Jacquards, S.L.S.C., D.L.S.C. & D.L.D.C. Open shed, center shed fine pit and cross border Jacquard shedding. Systems of harness mounting, Method of increasing the figuring capacity of Jacquard costing out, Card cutting and lacing, Jacquard calculations.

Study of board (C.B.C.) loom. Time studies in weaving and calculation of weaver's load, Cloth costing, Causes of warp and well breakage in weaving, Cloth faults and their remedies, Factors controlling loom efficiency and means of increasing loom efficiency. Relevant calculations.

**Knitting:** Introduction and historical background of Knitting Technology, Hosiery yarns.

General terms and principles of knitting Technology, Knitting action of latch, bearded and compound needle, Basic mechanical principles of Knitting Technology, Elements of knitted loop structure Warping. Plain circular latch needle machine. Description, knitting action, Cam system, Sinker timing.

**Circular Rib machine-** Description, knitting action, needle timing etc.

**Circular Interlock machine-** Description, knitting action, interlock cam system, etc.

**Purl knitting machine-**Description,, purl needle transfer action, Use of dividing cams, use of spring loaded cams, characteristic features of the knitted fabric. Hosiery machine drive, control mechanism and sequences. **Hosiery machines** -Mechanism for welts, heels and loc production, Hosiery stitch control mechanism.

**Study on weft knitting machines-** Fabric machine, Garment length machine. Stitches produced by varying the timing of the needles, loop intermeshing.

**Straight bar frame-**Development. Fully fashioned article, knitting action of straight bar frame, Rib to plain machines.

Double cylinder hosiery machine, Closed toe hosiery machine, Knitting Argyle designs on circular half hose machine, Fish net, stockings and panty house production.

**Basic warp knitting principles-**Terminology mechanism and Classes of warp knitting machinery Tricot and Ratchet machines, knitting cycle of bearded needle Tricot and single needle bar Ratchet machines. Compound needle warp knitting machine. Crochet machine, warping.

Tricot two full set guide bar m/c and its product. Rules for product. Rules for lock knit, Tricot, Sharksm etc. fabric production. surface interest, relief and open work fabrics. Calculations related to well and warp knitting. Non-woven Definition and classification. Methods of web formation. Conventional method of non-woven fabric formation. Modern techniques for the production of non-woven's. Properties and uses of non-woven fabrics. Fault and remedies of non-woven fabrics. Environmental problems caused by non-woven fabrics.

#### **Book References:**

1. Textiles: Fiber to Fabric by Corbman, Bernard P
2. Weaving Conservation of Yarn by Lord, P R& Mohamed, M.H
3. Weaving Calculations by R. Sen Gupta (Publisher: B.D. Taraporevala Sons & Co. Private Ltd)
4. General Technology of Cotton Manufacturing by PT Bukayer (Publisher Mir Publisher)
5. Laboratory Practice in Knitting Technology by L. Kuidriavan (Publisher: Mir Publishers, Moscow)
6. The Mechanism of Weaving by Thomas W. Fox
7. Fabric manufacturing -2 by Abu sina Md. Ruknul Quader

### **TE3114 Fabric Manufacturing -II Sessional**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course **TE3113**

### **TE3117 Textile Testing and Quality Control-II**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

#### **Yarn Testing**

Sampling methods, irregularity; measurement of sliver, roving and yarn by cutting and weighing methods, thickness under compression, capacitance and other methods; length variance curves, Use of spectrogram for analyses of periodic, random and drafting wave variation, Measurement of imperfections. Comparison of results with Uster statistics. Measurement of yarn hairiness

Measurement of tensile strength of yarn; single thread, skein or lea strength. and ballistic test: comparison of results, CRT, CRE, and CRL machines and methods of loading.

**Fabric Testing:** Fabric dimension, measurement of length. Width, thickness: ends and picks per unit length in woven fabric; courses and Wales per unit length in knitted fabric. Crimp of yarn fl woven and knitted fabric.

Methods of measurement for tensile. tearing. ballistic and bursting tests. Relationship of Fiber yarn and fabric strength.

Measurement of fabric stiffness and its relation to handle and drape.

Measurement of air, water permeability/retention, water pressure; crease recovery. Serviceability, wear and abrasion tests, pilling of fabrics. Flame retardant resistance tests.

Measurement of fastness to light, washing and rubbing Estimation of damage to materials caused by physical and chemical treatments viz, Singeing securing, bleaching. Determination of size and filling.

**Carpet testing** — Carpet thickness, compression and durability, Identification of fibers.

Book References:

- 1, Principles of Textile Testing by J.E. Booth (Publisher: Newnes Butterworths)
2. Textile Testing by Skinkle
- 3, Repair & Adjustment of textile Machines

### **TE3118 Textile Testing & Quality Control-II Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE3117**.

### **HUM3111 Industrial Psychology and Management**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

**Industrial Psychology:** Principles of human behaviors, Motivation of behavior and mechanism of adjustment of conflict, analysis of human and any entire behaviors.

#### **Management and Organization**

Definition, Function and role of management, Nature and scope of business, Direction and Communication, Controlling-budgetary control; Organization-structure, Type of structure, Work measurement and Wage plan operational research, Span of Supervision, Motivation, Leadership, Nature of Behavior, Personality, Psychology of labour/management reactions from different types of companies.

#### **Personnel Management**

Concepts, Policy, Structure and Functions of personnel department. Line and staff organization, Recruitment, Training, Job evaluation, Methods of remuneration, Organization of employers and work people, ILO, Trade union organization, Collective, Bargaining. Labour Welfare, Disputes. Job specification Job descriptions, disciplinary actions show cause, charge sheet etc. Health, Safety and working conditions. Textile Industry and law, Health and hazard, Waste management.

#### **Production Economics**

Basic concepts in economics - utilities of goods wealth value price and want Theory of utility of supply and demand. Elasticity of supply and demand. Problems of allocation and investment study capital.

**Production** - factors of production-division of labour, location of industries, specialization. The economics of small scale and large scale production. Producers curves and production function.

#### **Investment Decisions**

Feasibility studies to set up a new Mill - Economic, Market. Financial and technical feasibility studies. Economic evaluation and comparison of alternative investments - Capital budgeting technique. Project Management through CPM/PERT. Textile industry and laws, Health and hazard, Waste management.

**Book References:**

1. Management by James A.F. Stoner & R. Edward
2. Management by Ricky W. Griffin S
3. Management by Harold Koontz & Heinz Weihrich
4. Management by Kathryn M. Bartol & David C. Martin
5. Management by W. Rue & Lloyd L. Byars
6. Financial Management- Texts & Problems by MY. Khan & P. K. Jam
7. Fundamentals of Financial Management by E. F. Brigham & J. F. Huston
8. Financial Management by I. M. Pandey
9. Financial Decision Making- Concepts, Problems & Cases by John J. Hampton
10. Labor & Industrial Laws of Bangladesh (1 ed.) by Chowdhury
11. Basic Labor Laws of Bangladesh by Iqbal Ahmed
12. Bangladesh Labor & Industrial Law by A. A. Khan
13. Industrial Relations by M. Arora
14. Industrial Relations- Theory & Practices, Prentice Hall by Michael Salomon
15. Industrial Relations, Tata McGraw Hill Publishing Inc. by Ariin Monappa
16. Industrial Labor Ordinance (ILO 1969), People's Republic of Bangladesh
17. Personnel Management & Industrial Relations, Tue vvu' Id P ess Private Ltd. by Biswanath Ghaosh
18. J.P poe- American business.

**B.Sc. in Textile Engineering  
Part-3 Even semester****TE3211 Wet Processing -II****Theory: Credit Hours- 4****Contact Hours/week 4 + 0****Technology of Dyeing** - Structure and application of Sulphur, Azoic, Reactive and Disperse dyestuffs on different fibers, Stripping.**Dyeing machineries:** For different types of dyeing processes loose Fibers, Yarn, Packages. Fabrics) Continuous, Semi-continuous and discontinuous process. Technology of Printing: Flow chart of Printing, Thickener and types of Thickeners, Methods and styles of Printing; Machineries used in printing: Printing processes for different fibers with Direct, Acid, Basic and Vat dyes.

Printing process for different fibers with reactive, Azoic and Disperse dyestuff. Assistants used in printing operations and their functions; Structure of Pigments, Pigment printing, Computer aided print designs, Garment printing, Novelty printing effects, economics of printing processes. Technology of Finishing — Definition and classification of finishing; Physical and Mechanical Finishing of Cotton, Jute, Wool and fabrics; Shearing and Cropping, different types of calendaring, measuring and cutting, making up of different jute goods. Hooplength and dead weight measurement calculations, raising beetling, breaking, folding sanforsing; chemical finishing; mercerization and pre mercerization, resin finishing, water repellency, flame ret ardency.

**Book References:**

1. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman
2. An Introduction to Textile Finishing by J.T. Marsh
3. Modern Techniques of Textile Dyeing, Bleaching & Finishing by SM. Arora
4. Chemistry of Dyes & Principles of Dyeing by V.A Shenai
5. An Introduction to Textile Printing by Butterworth
6. Textile Chemistry-2 & 3 by Abu sina Md. Ruknul Quader
7. Textile Printing by L.W.C Miles
8. An Introduction to Textile Printing by W. Clark

## TE3212 Wet Processing -II Sessional

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course TE3211

## TE3213 Garments Manufacturing -II

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

**Sewing:** Seam properties, types and usages; Stitch types, properties and usages; Principle of lock stitch and chain stitch formation; Sewing machine-feed mechanism, needles, sewing thread, Sewing problem and remedies, Sewing machines, Work aids in sewing, simple automatic machines.

**Alternative methods of joining fabrics-**Welding, adhesives, Fusing, Molding and their comparison.

**Trimmings-**Discussion on label and motifs, Chain, Buttons, lining, Hood and loop fastening, shoulder pad, lace braid and elastic, performance of trimmings.

**Pressing and finishing-**Objects, types, methods and International care labeling codes.

**Folding and Packing-**Types, methods, equipments, symbol and markings. Discussion on garments washing, dyeing and drying machines.

**Garments washing -**Concept of washing, requirements of washing, different, types of washes Caustic wash, bleach wash, pigment wash, Enzyme wash, stone wash, Acid wash, Super white wash.

**Garments Dyeing-** Concept of swatch making and garments dyeing, Garments dyeing with reactive and other dyes, Problems associated with garments dyeing.

### Book References:

1. Sewing for the Apparel Industry by Shaeffer, Claire
2. Garments and Technology by M.A. Kashem.

## TE3214 Garments Manufacturing -II Sessional

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course TE3213

## TE3217 Textile Physics-II

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Electrical properties** — Electronic properties of solids, conductors and insulators, capacitance, dielectric constant, effect of moisture. Measurement of dielectric constants of fibers, yarns and fabrics.

Static electricity formation-Theories of static electrification. measurement of static charge. explanation of the phenomenon of static electrification in textile, its effect and remedies in textile processes.

Engineering approach to fiber structure, Mechanics of simple yarn structure, effects of fiber properties and yarn twist on tensional and flexile rigidity. Effect of fiber length, fineness, strength and moisture on yarn strength.

Yarn geometry, effect of yarn strength (obliquity effect) luster, yarn diameter and handle Fiber migration, theory and causes of migration of fibers to surface or core of yarn Geometry of plain woven fabrics. calculation knowing crimp ratio and thread spacing. Geometry of jumped conditions, crimp interchange, effect of yarn flattening, deformation or fabric. Application of cloth geometry, tensile testing, geometrical change during extension of Fabrics. Fabric buckling, shear and drape, Geometry of plain knitted structure. Engineering design of fabric to meet specific mechanical properties. Prediction of tensile properties of fabrics

- Book References:
1. Physical Properties of Textile Fibers by WE. Morton & J.W.S Hearle wor (Publisher: Outter worth & Co. Ltd. and Textile Institute)
  2. Textile Fiber and their uses by Hess

## HUM3211 Sociology

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

**Scope of sociology:** Micro and Macro sociology. Some fundamental concepts. Society from savagery to civilization

**Social evolution and techniques of production:** Social structure of Bangladesh.

**Oriental and occidental societies:** Feudalism.

**Industrial revolution:** the growth of capitalism, Features, Social consequences. Social fascism, Social Pathology: Crime, Juvenile delinquency, Slum

**Urban ecology:** city, Pre industrial and industrial, growth and nature of cities in Bangladesh. 1 sociology: Features of Village community in Bangladesh. Urban-rural contrast Social structure of the tribal people of Bangladesh.

**The concept of work:** Work and art, Nature of industrial work, Work ideology; Work values. Role of work in Man's life: Work and mental health. Work attitudes, Work involvement. The motivation to work, Work satisfaction, Commitment to industrial work, Development and commitment of the industrial labor force in Bangladesh.

**The worker and the factory:** The factory system and its characteristics, The formal relations of production in the factory system.

**The industrial Bureaucracy:** The executives in the industrial bureaucracy.

**The role of worker:** Industrial production and the worker's role, Social relations at work motivation.

### **Book References:**

1. Sociology: A guide to Problems and Literature by Blackie and Son (India) Ltd; Bottomore, TB, 1975.
2. Environmental Sociology, Routledge, London by Horton, P.B. and Hant, CL., Ed., Mc-Graw Hill. Hanningan, J.A. 1995.
3. Planning Commission: Taskforce Report on Urbanization and Indu
4. Environment and Development in Bangladesh by Rahman, Atiqur del,
5. Sociology by Worth Publishers, Inc. New York; Robertson, I., 1977.
6. World Commission on Environment. Our Common Future
7. Survey Methods in Social Investigation, the English, Book Society and Heinemann Educational Books Ltd London Moser C A and Kalto G 1979

## **TE3215 Application of Computer in Textile**

**Theory: Credit Hours- 2**

**Contact Hours/week 2 + 0**

Use of computer in Textile Manufacture (Machine/process control dye recipe formulation quality control, colour matching, mixing ratio formulation etc.), General programming principles used in developing business and Textile applications of computers (Payroll, stock control, whole retailing etc.). Series of structure on c-language.

**Principles** - System analyses, system design, documentation, and planning.

**Applications**- Critical path analyses linear programming accounting forecasting etc use of available textile related software.

## **TE3216 Application of Computer in Textile Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE3215**.

## **B.Sc. in Textile Engineering Part-4 Odd semester**

### **TE4111 Advanced Wet Processing (Optional)**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

#### **Pretreatment**

Special scouring processes (solvent scouring and Vapor bi scouring); Estimation of scouring, Bleaching and mercerizing effects; Estimation of available chlorine in bleaching powder, Faults and damages in bleaching.

#### **Dyeing**

Dye Aggregation; interaction of dyes and fibers, Mechanism of Dyeing, Dyeing Kinetics (Diffusion, Pore Model, Free volume model). Thermodynamics of dyeing (dyeing Isotherms, Affinity/Standard Chemical Potential difference).

Structure and application of Mordant dyes, Pigments and Mineral colorants on different fibers. Additive and subtractive colour mixing. Colour measurements, CIE and Lab Systems of colour Measurement, Spectrophotometers. Colour fastness. Assessment of color-fastness with gray scale. Faults dyeing and their remedies. Dyeing blended fibers and fabrics.

#### **Printing**

Special printing methods (Transfer Printing, Jet printing. Flock printing, Burn-out printing). Faults in printing and their remedies.

Special types of thickeners (Synthetic Polymers, Emulsion thickeners): methods of screen and roller preparation; detailed study on screen printing technology.

#### **Finishing**

Removal of excess water and various drying systems in wet processing. Low-wet pick-up finishing and its Importance, application of optical brightening agents. Lectures on recently published research and developments in wet processing.

Softening agents (different types, applications, special finishing treatments (rot-proofing, mildew proofing, insect and bactericidal finishes, soil lease finishes).

#### **Book References:**

1. Dyeing and Chemical Technology of Textile Fibers by ER. Trotman
2. An Introduction to Textile Finishing by J.T. Marsh
3. Modern Techniques of Textile Dyeing. Bleaching & Finishing by SM. Arora
4. Chemistry of Dyes & Principles of Dyeing by V.A. Shenai
5. An Introduction to Textile Printing by Butterworth
6. Textile Chemistry -1, 2 & 3 by Abu sina Md. Ruknul Quader
7. Technology of Printing by Prof. V.A. Shenai

### **TE4112 Advanced Wet processing (Optional) Sessional**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course **TE4111**.

### **TE4111 Advanced Garments Manufacturing (Optional)**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

**Garments inspection and quality control** — Raw material and finished garments inspection. In- process inspection, Final inspection, Product quality audit, Comparability test.

**Garments costing**- System of garments costing, determination of fabric consumption, thread consumption and trimmings. Analyses of fabric requirements in relation to garments costing, Determination of costs. Factorial study of seam strength, Mechanism seam slippage, seam strength prediction. seam strength testing, Fabric sew ability assessment. Selection and setting of



machines per lien for the production of shirt/trouser and T-shirt. Production planning. Production control and Production management. Line balancing. Production systems.

**Tools of planning** - Work measurements, time study motion study and method study.

Material handling and transportation system of garments components advance study on scheduling in cutting room.

**Material Management In the Clothing Production** - Principle of purchasing, Marker utilization variation Fabric loss outside marker F utilization variation control of material wastage Manufacturing resource planning.

Producti4n engineering, production engineering, Cost control, Total quality control, Quality from design to dispatch, Production and people, Training

Discussion category 4d quota, Merchandizing in the garment factory.

Detailed study of garments design, Lecture on latest trend in garments manufacturing. Lecture on recently published research and development works.

**Book References:**

1. Garments and Technology by M.A. Kashem
2. Garments Washing

**TE4112 Advanced Garments Manufacturing (Optional) Sessional**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course **TE4111**

**TE4111 Advanced Fabric Manufacturing (Optional)**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

**Weaving**

Study of interrelationships between winding parameters, Uniform build o the cone, Introduction to balloon theory and tension variation during unwinding Relationship between size and angle of creel the distance between creel and head stock and warp width. Sizing of blended arid synthetic yarns, Comparative study of different techniques of sizing, Disadvantages of sizing, de sizing ad recycling, Analyses of weaving performance of sized yarn. Description of attempts to substitute sizing operation. Factors influencing the drying efficiency of a sizing machine. Comparison of different methods of drying, Means of uniform drying. Eccentricity and Acceleration of slay, Differences between conventional and unconventional looms, Factors involved in warp and weft strain and calculation of warp strain, Variations in pick spacing. Conventional and various unconventional selvages and calculation of welt waste percent. Shirley picking and take-up mechanism. Detailed study of projectile, Rapier, Jet and Multiphase weaving machines. Standard commercial fabrics (Jute/Cotton/Synthetic) Fabric properties and comfortable clothing, Factors to be considered in choosing a fabric for particular end u condition. Current issues in weaving. Relevant calculations of weaving machinery allocation, production management, project balancing and modernization.

**Knitting**

Colored stitch designs in welt knitting — welt knitted Jacquard e.g. single jersey Jacquard, Rib Jacquard. Pattern and selection devices — Butt length, Butt position, Multi step butt set-out, Element selection Full Jacquard mechanical and electronic needle selection, Pattern wheel, Pattern area calculations. Production of weft knitted fabrics — Simple Tuck and float stitch single jersey fabrics non jacquard double jersey fabrics. Double jersey inlay, Loop transfer stitches — plain loop, fancy lacing, Rib loop, eyelet. Welts, Garment sequences and knitting to shape calculation of fashioning frequencies. Flat knitting principles and structures. Laying in warp knitting — General rules, Fall plate patterning. Full width weft insertion, Cut presser and Miss-press structures. Aspects of knitting science loop shape and loop length control, yarn let-off, welt knitted fabric relaxation, knitted fabric geometry, Tightness factor, Robbing back.

Multiple guide bar warp knitting machines and their product. Fabric control mechanism — Run-in, yarn feeding and tension control, Fabric take up and batching mechanisms. Specialty welt knitted fabrics and machines — loop wheel frame, production of fleecy on sinker top m/c. Fleecy interlock, sinker wheel Machine, plush in sinker top latch needle Machine sliver or high pile knitting. Knitted fabric faults and their

#### **Remedies**

Production of high quality cotton knit goods. Production of knit goods from yarns containing man-made fiber. Study on linear and non linear cams in welt knitting. Kinetics and economics of welt knitting.

Automation in knitting industry, Multi-axial knitted fabric construction. Multi-axial Ratchet machine. Uses of multi-axial fabrics. Recent Research and Development in Knitting.

#### **Book References:**

1. Textiles: Fiber to Fabric by Corbman, Bernard P
2. The Mechanism of Weaving by Thomas W. Fox
3. Weaving Conservation of Yarn to Fabric by Lord, P.R. & Mohamed, M.H
4. Laboratory Practice in Knitting Technology by L. Kudriavan (Publisher: Mir Publishers.
5. Weaving Conservation of Yarn to Fabric by Lord, P.R.& Mohamed, M.H.
6. Shuttle less looms by J.J. Vincent
7. Repair & Adjustment of Textile Machines

### **TE4112 Advanced Fabric Manufacturing (Optional) Sessional**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course TE4111.

### **TE4111 Advance Yarn Manufacturing (Optional)**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

Short Staple Assessment, Calculation and control of mixing cost & quality. Study of Modern trends & development in a ring spinning mill from flow room to baling.

Automation in all sector of spinning industry for Creeping, Doffing, Piecing, Cleaning, Materials handling & linking of machines. Data Processing, Relationship of automation with quality & productivity & its relevance in the Bangladesh Textile Industry.

Processing parameters such as hanks, Speeds, Settings, Waste, Cleaning efficiencies, neap content, Production and CV% for mass per unit length at all stages of processing. Setting of Suitable values for the material processed and machine condition.

Waste control at all stages of manufacture, Centralized waste collection. Dust filtration bags and setting chambers. Theoretical considerations of fiber disentanglements during carding & formation of fiber hooked ends. Reduction of fibers hooks during drafting.

Theory of ring spinning and ballooning, causes of end breaks. Evaluation of properties and characteristics of spun yarns.

Detailed study of processing chemical staple fibers, viz, viscose Rayon, Polyester,

Acrylic and their blends with cotton on cotton processing machines differences in machine speeds, setting and productions. Properties of blended yarns, Analyses of blends, effect of length, Fineness and surface characteristics of fibers on yarn properties.

In depth study of rotor spinning and other modern short staple spinning methods. Comparison of Methods, yarn quality, productions and economics with spinning.

Long staple

Study of modern trends and developments of batching, softening, carding, Drawing, Drafting Systems and flyer spinning. Processing parameters of different qualities and counts of jute yarns.

Yarn faults, causes of end Breakages. Waste recovery, dust extraction and utilization of waste. Evaluation of properties and characteristics of jute yarns.

Detailed study of modern long staple spinning systems such as recon, spin-grad, wrap spun, core spun and twist less spinning.

Lectures on recently published research and development work in spinning industries in Bangladesh and in other countries for short and long staple materials.

Book References:

- Comparative study in Modern jute Technology by Santosh Kumar Paul.
- (Publisher: Das Gupta & Co. Ltd)

### **TE4112 Advance Yarn Manufacturing (Optional) Sessional**

**Sessional: Credit Hours- 2**

**Contact Hours/week 0 +4**

**Sessional** based on the theory of course **TE4111**

### **TE4113 Textile Testing and Quality Control-III**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

Definition and purpose of Q.C., S.Q.C., Q.A., T.Q.M

Introduction to and Administration of Quality Control Department. Duties and responsibilities of quality control officers. Use of standards .BSTI, ISO, ASTM, British, Pakistan and Indian standards. Quality Control and Inspection Planning.

Quality control charts use of charts and setting of limits. Analyses of variance, acceptance sampling. correlation analyses to determine relationship between various factor, tests of significance. Acceptance tests and inspection of raw materials for each sector of the industry.

Yarn manufacturing - raw cotton/jute/chemical fibers.

Fabric manufacturing - yarns.

Wet processing - yarn and fabric, Dyes and auxiliaries manufacturing finish fabric, sowing thread.

Process and finished goods control for each sector of the industry. Effects of process control on costs and quality Parameters measured, Sample sizes, Tests made, Results expected at each stage processing from fiber to finished garment production.

**Book References:**

1. Process Control in Spinning by A.R. Garde & T.A. Sabramian
2. Technology of Textile Testing and Quality Control by Elliot B. Grover & D.S. Hamby

### **TE4114 Textile Testing and Quality Control-III Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE4113**

### **IPE4111 Production Planning and Control**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

Functions and types of production; production life cycle; capacity planning, process planning; process design; PPC function — Forecasting, Loading, scheduling, dispatching, order control; Line balancing. Plant layout: Plant location factors; Inventory control, Purchasing Principles - make or buy decisions Quality control in production life cycle, Maintenance and productivity.

**Work Study**

Method study, Purpose and techniques used; Procedure of select, Record, Examine, Develop, Install and Maintain.

Precautions when introducing new methods, Relationship with work measurement.

Work measurement, purpose and techniques used, Rating, Elements, Break points. Basic time. Use of allowances.

Activity sampling. Definition, purpose and procedures, use of pilot study, interpretation of results Production studies. Machine utilization and operator hours per 100 Kg production).

Machine interference. Materials handling Mechanic 3rd static handling

**Book References:**

1. Production & Operation Management (2 ed.) by S. N Chary

2. Operation Management (5 ed.) by Heigeh & Render
3. Production & Operation Management by R. Panneerselram
4. Operation Research- An Introduction by Taha
5. Probability & Statistics for Engineers & Scientists by Walpole & Meyer
6. Apparel Manufacturing by Glock, Ruth

### **HUM4111 Industrial Economics, Accounting and Marketing**

**Theory: Credit Hours- 4**

**Contact Hours/week 4 + 0**

**Industrial Economics :** Types of interest, nominal and effective interest rates, present worth and discount, Types of taxes, Capital gains tax, tax returns, Insurance, types of insurance, Types of depreciation, service life, salvage value, present value, methods for determining depreciation. Profitability, attentive investments and replacements, Mathematical methods for profitability evaluation.

**Asset and Cost Accounting**

Principles and practice of book-keeping, single entry and double entry system. journal, ledger. cash book, trial b partnership, shares joint stock company, sole trader ship, manufacturing and profit and loss accounts, Balance sheet, consignments, forms of sales consignments, consignee proforma invoice bill of exchange, Description of Assets and Equipment.

Function and advantage of costing, Methods of cost accountancy. Elements of cost accounting, ' direct and indirect expenditures, cost of overhead and cost accounts and financial accounts for terms. Standard cost preparation of cost sheets and statements, break even analyses, stock taking arid control of stock and stores, payroll, Dummy worker on payroll.

**Marketing**

Concept, Scope and Functions of marketing tools, product concept, types acne product types of markets, market segmentations, approaches of marketing Sales promotion and advertisement, export marketing. Distribution channel and pricing of product for local and export markets. Export Marketing and documentation methods of market study. Elementary marketing research.

**Book References:**

1. Advanced Accounting (Vol-1)
2. International Marketing by Cartler
3. Marketing Management by Cartler
4. HE. Schwyayer-Process Engineering economics. ((Chem. Engg. Series)
5. MS. Peters and K. D. Timmerhaus-Plant design and economics for chin engineering.

### **B.Sc. in Textile Engineering**

#### **Part-4 Even semester**

#### **TE4211 Special Yarn Manufacturing (Optional)**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Study of, two-fold manifold cabled and core yarns for particular end uses Twisting and doubling machines including up- twisters and 2-for-1 twisters.

Effects pf amount and direction of twist at each twisting stage on strength, elongation, luster and balance twist. Twist setting. Manufacture of fancy yarns.

Top-to-tow conversion m

Methods pf producing textured filament yarn. Effect of process variables on characteristics of textured yams of twines and ropes.

#### **TE4212 Special Yarn Manufacturing (Optional) Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE4211**

#### **TE4211 Special Fabric Manufacturing (Optional)**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Definition, Structure, Production, Properties, End-uses etc. of Laminate, Tape, Belt, Label, Braid, Lappet swivel; velvets arid velveteen Carpet: Terry Towel; Geo textiles; Medical Textile; Textural Fabrics; Coated and filter fabrics.

### **TE4212 Special Fabric Manufacturing (Optional) Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE4212**.

### **TE4211 Special Wet Processing (Optional)**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Foam technology in wet processing (foam generation, application, advantages and disadvantages). Solvent dyeing, Dyeing under hypercritical conditions; Computer assisted recipe calculations. Human colour vision, Mesmerism, Tri-chromatic theory of colour vision and colour matching equations Effluents wet processing, their effects on environment, various types of effluent threatening and . T-disposal systems.

### **TE4212 Special Wet Processing (Optional) Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE4212**

### **TE4211 Special Garments Manufacturing (Optional)**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

Brief description of fashion house in 1mopn and IJ II (ii fashion It, made clothing industry. Fashion trends in different country traditional including modern ethnic designs. Modern trends in relation to the following: length, silhouette, exposure, colour, cloth texture and cloth design. Modern trends 01 fashion and design. Physiological process of maintaining constant “core” temperature of human body Mechanism of heat transfer from human body. Concept of apparel design, heat transfer and comfort. Detail study on thermal, underwear, wind proof garments. Breathable fabric sand garments, fire proof garments, Rain coats, Racing drivers garments; clothing and safely item Jogging suit, space suits and divers suits.

### **TE4212 Special Garments Manufacturing (Optional) Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE4212**

### **TE4213 Utility Services & Maintenance of Textile Machineries**

**Theory: Credit Hours- 3**

**Contact Hours/week 3 + 0**

**Maintenance**-Types of maintenance, planning and organizing maintenance, repair cycle. maintenance stages, lubrication and lubricants, Inspection.

**Inventory Management** — Types of inventory, cost analyses of inventory, inventory control, economic order quantity (EOQ), economic lot size, lead time, Mean absolute deviation (MAD), Re-order lev

Material handling - Conveyors used in textile mill - belt conveyer, chain conveyer, hydraulic, iess and lift, truck hoist.

**Air conditioning** - Co condition, psychometric chart, Heating, cooling, dehumidification, humidification, Ventilation, Filtration, Mill illumination.

**Ergonomics** - Definition, importance and application of Ergonomics to work place and layout.

**Machine erection** - Floor preparation, foundation, machine fixation, leveling etc.

**Safety in textile mill** - Industrial hazards, safety rules, factory act, first aid and pollution control.

### **TE4214 Utility Services & Maintenance of Textile Machineries Sessional**

**Sessional: Credit Hours- 1**

**Contact Hours/week 0 +2**

**Sessional** based on the theory of course **TE4213**

#### **Maintenance of Yarn Manufacturing Machinery (Optional)**

**Safety-** Drives to any machines on which maintenance is being carried out should be isolated and machine unable to be switched on. Safety must be assessed. In particular, maintenance of guards, guard door solenoids and position of emergency stop buttons. All maintenance should be related to the quality of product from each machine.

Examination of all gearing for wear and correct depth of setting; also flat belt, V-belt, Tape, Rope in Chain drives for wear, correct setting and slippage where appropriate. Positioning of oiling and

greasing points; schedules for cleaning, Oiling and Greasing, scouring and re-setting schedules

**Blow-room:** Inspection for wear and setting of beater bars, lattices, regulating and lap forming.

**Draw frames:** Maintenance of drafting system, stop mechanisms, Comber check cylinder half laps, tri combs and brushes for wear, check and adjust all settings, care of drafting system.

**Speed frames:** Maintenance of drafting systems, rings and travelers, spindles, drive to ring rail:

Rotors spinning frames: Maintenance of opening fuller rotor driving systems, suction unit.

#### **Book References:**

1. Technology of Textile Testing and Quality Control by Elliot B. Grover OS. Hamby

#### **Maintenance of Fabric Manufacturing Machinery (Optional)**

Through understanding of different preparatory and fabric manufacturing machinery.

To become familiar with various parts of the machines

To become familiar with the maintenance tools and their functions, Cleaning. Oiling/Lubricating and greasing of various machine parts. Understand the basic principles of tightening and loosening of nut-bolt, screw, belt, etc. and skill development thereof. Proper meshing of the gears, putting on and putting off the belts etc. locking / linking of cam, cone, pulley, toothed gear etc. Fitting of bush, bearing collar and bracket. Systems of dismantling and reassembling of machine parts. Changing and setting

of various machine parts and observing their effects on changing. Overhauling and erecting of preparatory and fabric manufacturing machinery.

#### **Book References:**

1. Technology of Textile Testing and Quality Control by Elliot B. Grover D.S. Hamby

#### **Maintenance of Wet processing Machinery (Optional)**

Preparatory machineries: Maintenance of singeing, kier boiler, J-box, Rope wasting machines boiler.

Dyeing Machineries: Maintenance of jigger dyeing, Which dyeing, HTHP, dyeing, Hank dyeing machineries.

Finishing machineries: Maintenance of different padding mangles, Dying machineries, Stenter Mercerizing machines, Calendaring and folding machines.

Printing machineries: Maintenance of different roller printing and screen printing machineries.

Laboratory machineries: Maintenance of different laboratory machineries.

#### **Book References:**

- Technology of Pi by Prof. V.A. Shenai.

#### **Maintenance of Garments Manufacturing Machinery (Optional)**

Repair, Maintenance, setting and replacement of different parts of rotary knife, Straight Knife, Band knife, Die cutting machine, Notches and drill machines, Repair maintenance, setting and replacement of different parts of lockstitch, Blind stitch, Chain stitch, Over edge stitch and flat

lock sewing machines Repair, maintenance and setting of fusing machines and pressing machines.

**TE4216 Project Work**

**Sessional: Credit Hours- 6**

**Contact Hours/week 0 +12**

**TE4218 Industrial Attachment**

**Sessional: Credit Hours- 4**

**Contact Hours/week 0 +8**

**TE4210 Board Viva-Voce**

**Credit Hours- 3**