

**UNIVERSITY OF
RAJSHAHÍ**



**FACULTY OF ENGINEERING
DEPARTMENT OF TEXTILE ENGINEERING**

**Syllabus for
B Sc in Textile Engineering
Session 2012-2013**

November 2013

University of Rajshahi
Faculty of Engineering
Department of Textile Engineering
Syllabus for B Sc in Textile Engineering Session: 2012-2013

The courses designed for B Sc in Textile Engineering consist of 4000 marks of 160 credits (40 units×4 credits, each unit carries 100 marks and 4 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 4 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.

Attendance (Ref. The Rajshahi University Academic Ordinance (RUAO), 2013 for B. Sc in Engineering Curriculum in Colleges/Institutes Affiliated with RU, article no: 33):

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 any course 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	10	Regular
85% to less than 90%	9	
80% to less than 85%	8	
75% to less than 80%	7	
70% to less than 75%	6	
65% to less than 70%	5	Non-collegiate
60% to less than 65%	4	
less than 60%	0	

(Ref. The Rajshahi University Academic Ordinance (RUAO), 2013 for B. Sc in Engineering Curriculum in Colleges/Institutes Affiliated with RU, Article no.33), 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 (RUAO), 2013 for B. Sc in Engineering Curriculum in Colleges/Institutes Affiliated with RU, Article no. 34):

Table-2: Letter Grade System

Numerical grade	Letter Grade (LG)	Grade point (GP/unit)	Credit point (GP/unit)
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	0.00
Incomplete	I	0.00	0.00

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:

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

Where, n is the number of courses offered during the semester, Ci is the number of credits allotted to the i-th course and Gi 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
101	Physics-1	4	C	2.25
103	Chemistry-1	4	A+	4
105	Mathematics-1	4	B-	2.75
108	Introduction to Textile Engineering	4	B+	3.25
110	Engineering Drawing	2	A+	4

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

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

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

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:

$$\text{GPA} = \frac{\sum_{k=1}^m C_k G_k}{\sum_{k=1}^m C_k} \quad (\text{ii})$$

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 & 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 (RUAO), 2013 for B Sc in Engineering Curriculum in Colleges/Institutes Affiliated with RU, Article no -36]

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

Course Type	Marks	Marks (%)		Credits
^a Humanities	250	6.25%		10
^b Mathematics & Basic Sciences (with Laboratory)	1150	28.75%		46
Basic and Major Engineering	2600	65%		104
Distribution	Basic and Major Engineering:			
	• Theoretical	2800	70%	112
	• Laboratory	1125	28.125%	45
	• Board Viva-Voice	75	1.825%	3
Total	4000	100	160	

1 unit course carries 4 credits (100 marks), 0.75 unit course carries 3 credits (75 marks) and half unit course carries 2 credits (50 marks). For other fractions of credit, proportionality shall be applied.

5. Courses offered to the undergraduate students of Textile Engineering Department for B Sc Engineering degree (Session 2012-2013)

Table-4: Part-1 Odd semester (Examination 2013)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
101	Physics-1	3	1	4	15	60	75	10	15	25	100	4
103	Chemistry-1	3	1	4	15	60	75	10	15	25	100	4
105	Mathematics-1	4	0	4	20	80	100	0	0	0	100	4
108	Introduction to Textile Engineering	4	2	6	20	80	100	20	30	50	150	6
110	Engineering Drawing	0	2	2	0	0	0	20	30	50	50	2
	Total =	14	6	20	70	280	350	60	90	150	500	20

A=Continuous Assessment B= Examination

Table-5: Part-1 Even semester (Examination 2013)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
102	Physics-2	3	1	4	15	60	75	10	15	25	100	4
104	Chemistry-2	3	1	4	15	60	75	10	15	25	100	4
106	Mathematics-2	4	0	4	20	80	100	0	0	0	100	4
107	Textile Raw Material – 1	2	0	2	10	40	50	0	0	0	50	2
109	Polymer Science	2	0	2	10	40	50	0	0	0	50	2
111	Engineering Materials & Practices	3	1	4	15	60	75	10	15	25	100	4
	Total =	17	3	20	85	340	425	30	45	75	500	20

A=Continuous Assessment B= Examination

Table-6: Part-2 Odd semester (Examination 2014)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20 %	B 80%	Total	A 40%	B 60%	Total		
201	Yarn Manufacturing -1	3	1	4	15	60	75	10	15	25	100	4
202	Fabric Manufacturing -1	3	1	4	15	60	75	10	15	25	100	4
206	Textile Raw Materials-2	2	0	2	10	40	50	0	0	0	50	2
208	Textile Testing & Quality Control-1	3	1	4	15	60	75	10	15	25	100	4
209	Statistics	2	0	2	10	40	50	0	0	0	50	2
211	Elements of Mechanical Engineering & Machine Design	3	1	4	15	60	75	10	15	25	100	4
	Total =	16	4	20	80	320	400	40	60	100	500	20

A=Continuous Assessment B= Examination

Table-7: Part-2 Even semester (Examination 2014)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
203	Wet Processing -1	3	1	4	15	60	75	10	15	25	100	4
204	Garments Manufacturing -1	3	1	4	15	60	75	10	15	25	100	4
205	Fabric Structure & Design	3	1	4	15	60	75	10	15	25	100	4
207	Textile Physics-1	3	0	3	15	60	75	0	0	0	75	3
210	Elements of Electrical Engineering & Electronics	2	1	3	10	40	50	10	15	25	75	3
212	Computer Science	0	2	2	0	0	0	20	30	50	50	2
	Total =	14	6	20	70	280	350	60	90	150	500	20

A=Continuous Assessment B= Examination

Table-8: Part-3 Odd semester (Examination 2015)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
301	Yarn Manufacturing -2	4	2	6	20	80	100	20	30	50	150	6
302	Fabric Manufacturing - 2	4	2	6	20	80	100	20	30	50	150	6
306	Textile Testing & Quality Control-2	3	1	4	15	60	75	10	15	25	100	4
307	Industrial Psychology & Management	4	0	4	20	80	100	0	0	0	100	4
	Total =	15	5	20	75	300	375	50	75	125	500	20

A=Continuous Assessment B= Examination

Table-9: Part-3 Even semester (Examination 2015)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
303	Wet Processing -2	4	2	6	20	80	100	20	30	50	150	6
304	Garments Manufacturing -2	4	2	6	20	80	100	20	30	50	150	6
305	Textile Physics-2	3	0	3	15	60	75	0	0	0	75	3
308	Sociology	2	0	2	10	40	50	0	0	0	50	2
309	Application of Computer in Textile	2	1	3	10	40	50	10	15	25	75	3
	Total =	15	5	20	75	300	375	50	75	125	500	20

A=Continuous Assessment B= Examination

Table-10: Part-4 odd semester (Examination 2016)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
401	Advanced Yarn/Fabric/Wet processing/ Garments Manufacturing	4	2	6	20	80	100	20	30	50	150	6
404	Textile Testing & Quality Control-3	4	1	5	20	80	100	10	15	25	125	5
405	Production Planning & Control	4	0	4	20	80	100	0	0	0	100	4
406	Industrial Economics, Accounting & Marketing	4	0	4	20	80	100	0	0	0	100	4
Total =		16	3	19	80	320	400	30	45	75	475	19

A=Continuous Assessment B= Examination

Table-11: Part-4 even semester (Examination 2016)

Code no	Name of Subject	Hours per Week			Marks						Grand Total	Credit
					Theory			Practical				
		Theory	Practical	Total	A 20%	B 80%	Total	A 40%	B 60%	Total		
402	Special Yarn/Fabric/Wet processing/ Garments Manufacturing	3	1	4	15	60	75	10	15	25	100	4
403	Utility Services & Maintenance of Textile Machineries	2	1	3	10	40	50	10	15	25	75	3
407	Project Work	0	3	3	0	0	0	30	45	75	75	3
408	Industrial Attachment	0	8	8	0	0	0	80	120	200	200	8
409	Comprehensive Viva	0	3	3	0	0	0	30	45	75	75	3
Total =		5	16	21	25	100	125	160	240	400	525	21

A=Continuous Assessment B= Examination

6. **Rules for Promotion** (Ref: The Rajshahi University Academic Ordinance (RUAO), 2013 for B Sc in Engineering Curriculum in Colleges/Institutes Affiliated with RU, 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 practical, 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

101. Physics-1

Theory: Marks -75

Contact hour/week 2+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 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

Practical: Marks – 25

Contact hour/week 0 + 2

General Physics

1. To determine the 'g' by compound pendulum
2. To determine the Young's modulus for the material of a wire by venire method.
- 3 To determine the rigidity modulus for the maternal of a wire by oscillation or dynamical method
4. To determine the surface tension of water by capillary tube
- 5 To determine the co-efficient of viscosity of liquid by its flow through a capillary tube
- 6 To determine the density of water of vinous temperature by specific gravity bottle.

Light

1. To determine the focal length and hence power of a convex lens by the method of displacement using an optical bench and to verify the result by graphical method
2. To determine the focal length and hence power of a concave lens using an auxiliary convex lens
3. To determine the refractive index of a liquid by plane mirror and pin method using a convex lens.
4. To determine (i) the radius of curvature of a lens and (ii) the refractive index of the material of the lens by Boy's method,
5. To determine the radius of curvature of a lens by Newton's rings.

103. Chemistry-1

Theory: Marks -75

Contact hour/week 2 + 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, Pauli's Exclusion Principle; Aufbau principle, Heisenberg uncertainty principle, Hund's rule, electronic configuration of the elements. Nuclear Chemistry: Nuclear reactions, Mass number, Atomic unit defect, Nuclear binding energy, Nuclear 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. Glanton
5. Environmental Chemistry by H.Kanr and BK. Shirma
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 Bahl
9. Principles of Physical Chemistry by Haque & Nawab S
10. A text book of Environmental Chemistry by S.S. Dara

- Qualitative analyses of inorganic mixtures containing not less than three radicals including insoluble and interfering radicals.
- Volumetric Analyses:
 - Preparation of 0.1 M HCl and Standardization
 - Preparation of 0.1M NaOH and standardization
- Inorganic Preparation
 - Preparation of potassium dichromate
 - Preparation of chrome alum
 - Preparation of ferrous ammonium sulfate
 - Preparation of potassium permanganate

105. Mathematics-1**Theory: Marks – 100****Contact hour/week 3 + 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 eqn. 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, Maclaurin's series, Indeterminate forms, Partial differentiation, Maxima and minima, Tangent 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.

108. Introduction to Textile Engineering**Theory: Marks – 75****Contact hour/week 2 + 0**

Different terms and definition of textiles, Study of textile sector in Bangladesh, An introduction to the historical development of fibre, 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 jute 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 Fibres, 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

Practical: Marks -25**Contact hour/week: 0+ 2**

An introductory study on Spinning, Weaving, Dyeing, Printing, Finishing and Garments Processing

110. Engineering Drawing**Practical: Marks – 50****Contact hour/week: 0 + 4****Introduction:**

‘Instruments and their uses, Planning of drawing sheets, dimensioning, projection and its types, First and third angle- Projection of elementary machine parts, models of pictorial, orthographic drawings, Isometric projection of simple solids and its components. Pictorial projection in oblique and maxillary planes, Assembly drawing from orthographic projection & pictorial views, Sectional views.

Specifications for manufacture; Working drawings; plan and elevation of building: Drawing of gear tooth profile, cam profile, fasteners, key & springs. Free-hand drawing of different textile machinery parts, drawing of assemblies of textile machinery parts from given details: Computer Graphics

Book References:

1. Any book on Engineering Drawing

B Sc in Textile Engineering **Part-1 even semester**

102 Physics-2

Theory: Marks -75

Contact hour/week 2 + 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 fiels and magnetic induction. Magnetic force on a current carrying conductor. Trque 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 forco Magnetic field intensity. Permeability. Susceptibility, Magnetic magnetic materials. Magnetization curves Hysteretic.

Hoat 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 equipartition of energy, Mean free path. Brownian motion, Equations of state of a gas, Van der 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 carnot 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 laq 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 (3rd ed.) by Rogers,Mayhew.

Practical: Marks-25

Contact hour/week:0+2

Heat:

- Co-efficient of linear expansion of a solid
- Specific heat of a solid and liquid by the method of mixture with radiation correction.
- Specific heat of liquid by the method of cooling
- Thermal conductivity of metals
- Determination of the boiling point of a liquid by platinum resistance thermometer.

Electricity:

- Resistance of Galvanometer by self deflection method.
- Determination of the end- correction of a meter bridge
- Specific resistance of a wire by meter bridge
- Determination of the resistance of a wire by P.O Box.
- Verification of ohm's law using a tangent Galvanometer.
- Determination of the E.C E of copper.

Determination of the mechanical equivalent of heat by electrical calorimeter.

104. Chemistry-2**Theory: Marks -75****Contact hour/week 2 + 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
Electrophilic Aromatic Substitution-mechanism, reactivity and orientation.

Hydroxy 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

106. Mathematics-2

Theory: Marks – 100

Contact hour/week 3 + 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 dillereithal cquu'ius. Linear differential equations, Linear equations with constant Coefficients, Inverse operations. $f(D)V = f(D) a$ $f(D)Y = \text{Sinai or Conan}$, $f(D)y \text{ ex.}$, Method of undermined co-efficient, 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:

Lap lace trams formation, 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 dirrcreiiice Interpolation, central differences, Numerical differentiation and integration.

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, Mesmerism etc

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

Oregano-Metallic compounds

l and structure

• Granger 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)

Practical: Marks – 25

Contact hour/week: 0 + 2

Identification of organic compounds:

a) Alcohols: Methyl alcohol, Ethyl alcohol, isopropyl alcohol and tert-buryl alcohol.

b) Carboxylic acids: Formic acid, Acetic acid, Oxalic acid, Benzoic acid, Salicylic acid etc.

C) Carbonyl Compounds: Formaldehyde, Acetaldehyde, Acetone, Benzaldehyde etc.

d) Miscellaneous: Phenols, Aniline, Nitro-benzene, Chloro-benzene, etc. Oxidation, Reduction titration -

- a) Standardization of K₂Cr₂O₇ solution with standard oxalic acid or sodium oxalate.
- b) D Fe standard K₂Cr₂O₇ solution.
- c) Standardization of sodium-thio-sulphate solution with standard K₂Cr₂O₇
- d) Determination of available chlorine in bleaching powder by volumetric method
- e) Determination of Na content of washing soda.
- f) Determination of strength of H₂O₂
- g) Determination of total acid and alkali in soap.

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. Scarborough
- 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.

107. Textile Raw Materials (Natural)-1

Theory : Marks -50

Contact hour/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 Fibres

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 fibres 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 Fibres 1- Natural Fibres by Cook. J. Gordan.
- 2. Dyeing and Chemical Technology of Textile Fibres by E.R. Trotman
- 3. Textile Fibres, Dyes & Processes by Howard L. Needles
- 4. Textiles: Fibres o Fabric by Corbman, Bernard P

5. Textile Fibres by Mathews (John Wiley & Sons Inc.)
6. Textile Raw Materials by Abu sina Md. Ruknul Quader

109. Polymer Science

Theory: Marks – 50

Contact hour/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:** Polycondensation, Polyaddition, 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_m) Flow temperature(T_f) 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_g and T_m

preparation and properties of different polymers: Polyethylene, PolyVinyl Chloride, Polyvinyl alcohol, Polystyrene, Polyester, Nylon, Polyisoprene, 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: Interdscience Publishers, a Division of Joha Wiley and Sons)
3. Polymer Chemistry by Bruno Voilmert (Publisher: Springer-Verlag, New York)

111 - Engineering materials & Practices

Theory: Marks -75

Contact hour/week 2 + 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 modules of elasticity and rigidity, analyses of typical tensile strain curve for a ductile material showing yield points, breaking point, yield stress and ultimate stress, Poison'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. Twpkary
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

Practical: Marks - 25

Contact hour/week: 0 + 2

Identification and use of hand-tools and measuring instruments, reamers, laps and dies, bench, vice and carpentry tools, models making. Identification, use and practices on Lathe, Drill, Grinder, Shaper, Planner, Circular saw and milling machine.

Sheet metal work -Cutting of sheet material to make some useful objects. Metal joining processes — Soldering, Brazing, riveting, gas welding and electric arc welding. Heat treatment of steel such as annealing, normalizing, quenching, tempering and surface hardening, Sand moulds, core moding, pattern for casting and sand casting.

B.Sc. in Textile Engineering

Part-2 odd semester

201 Yarn Manufacturing —1

Theory: Marks -75

Contact hour/week 2 + 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 or 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, Crafting system. Stop mechanism. Can coiling, Roller selling. Production, Introduction and functions of autolevellers.

Long Staple

Flowcharts for production of yarns from bast 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 Practical 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
9. Speed and gearing calculation of Jute sinning by Hafijuddin Ahmed

Practical: Marks-25

Contact hour 0 + 2

Short Staple

Detailed practical study of Mixing. Blow room Carding and Draw frames of Colton Spinning:

Long Staple

Details practical study of batching, softener, Spreader. Breaker card and finisher card of jute spinning.

202 . Fabric Manufacturing - 1

Theory Marks -75

Contact hour/week 2 + 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 I aj mc hauls of a size mxli pro an their fi 'nctinn s; Chemisiry of sizing and technological changes due to sizing, Typical recipes. Choice of size ingredients. Size cooking, short description of different techniques of siing, Methods of drying, Dressing of jute yarn, Warp sizing and weaving efficiency,. Mechanism of size ake 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 thations of loom. Study of primitive, pit, frame fly shuttle, Chitlaranjan and Hatter&ey 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 debby.

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, Sley 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.

Practical : Marks -25

Contact hour/week: 0 + 2

Weaving

Practical study of the process and machinery involved in the warping, sizing and weaving. Visits to plants, Operation of machinery.

Knitting

Practical study of the machinery involved, Understanding of the principles of loop formation in different circular, flat and warp knitting machine.

206. Textiles Raw Materials (Man made) - 2

Theory: Marks -50

Contact hour/week 2 +0

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

Yarn texturing.

Technologies of formation of regenerated fibres. Their properties and uses: Different types of viscose rayon and acetate rayons, derivatives of cellulose different types of regenerated protein fibres. Technologies of formation of purely synthetic fibres, their properties and uses: Polyamides, Polyesters, Polyacrylics, Polypropylenes, PVA, PVC and Electrometric fibres.

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

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

Book References:

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

208. Textile Testing and Quality Control-1

Theory: Marks - 75

Contact hour/week 2 + 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

Practical: Marks -25

Contact hour/week: 0 + 2

Determination of Moisture regain and moisture content of cotton, Fiber length and length characteristics, Fiber fineness, Maturity ratio of cotton fiber, Trash content in cotton, Fiber strength by Presley, Strength tester, Fiber properties measurement by High Volume Instrument (HVI) and Advanced Fiber Information System (AFIS), Hank of sliver and roving, count of yarn by wrap reel and balance in different counting systems. Count of yarn by (i) Knowles balance (iii) Inadrant balance, Twist of single and double yarn.

209. Statistics

Theory: Marks -50

Contact hour/week 2+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 of 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 practical applications, ideas on multiple correlation 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, Practical 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.

211. Elements of Mechanical Engineering & Machine Design

Theory: Marks – 75

Contact hour/week 2 + 0

Thermodynamics and Hoat Transfer

Fundamental Concepts and definitions. Revision of gas laws properties of perfect gas and steam, laws, of thermodynamics; homodynes, mic process and cycles, Vapor power cycles Rankine, 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, Kinemetres pains Turn of motion and power-by belt, ropes, chains and gears: geartrans.

Conversion of motion-Shedding, tappets and cams, Shering 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

Practical: Marks – 25

Contact hour/week: 0 + 2

Study and experiments based on TXE 307. Conduction and Convection heat transfer, Bernoulli's experiment, flow through pipes and circular orifice Centrifuga' pump boilers I C C

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203. Wet Processing -1

Theory : Marks -75

Contact hour/week 2 +0

Water Materials and chemicals for wet processing: Water, Water importance in wet processing (hydrogen bonding, Cluster fot off evaporation, Dissolving ability), Water treatment (Estimation and Removal of Hardness), 'So detërg 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 Ackls, 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 presscaké). “

Colour measuring instruments.

History of dyeing: Classification of dyes according to their chemical constitu 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, Bleaching & 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

Practical: Marks -25**Contact hour/week: 0 + 2****Study on Wet Processing Machineries.**

Preparation for dyeing, Desizing, Scouring and bleaching of cotton, Jute, Wool and silk fibers, practical application of direct, Acid, Basic and Vat dyes for Dyeing of Cotton, Jute, Wool and Silk fibers.

NB: Per year 3 to 4 Running Textile Mill visit necessary.**204. Garments Manufacturing-1****Theory : Marks -75****Contact hour/week 2+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 shirt 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

Practical: Marks -25**Contact hour/week: 0+2**

Sewing machine handling and adjustment, General sewing practices, Marker and Marker Making, Marker copying, Pattern making for shirt and Trousers Pattern grading, Fabric cutting, Industrial visit.

NB: Per year 3 to 4 Running Textile Mill visit necessary.**205 Fabric structure & Design****Theory Marks -75****Contact hour/week 2 + 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 balanced 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, mockleno 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 locknit and 2 x I weft locknit structures.

Book References:

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

Practical Marks -25

Contact hour/week 0 + 2

General procedure for the analyses of woven and knitted fabric. Determination of specifications for the reproduction of fabric samples of all types Practical setting of sample and compound structures

Calculations relevant to woven and knitted fabric structure

NB: Per year 3 to 4 Running Textile Mill visit necessary.

207. Textile Physics-1

Theory: Marks - 75

Contact hour/week 2 +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, bire fringence.

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 Fibre and their uses by Hess

210. Elements of Electrical Engineering & Electronic

Theory : Marks – 50

Contact hour/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

Practical: Marks -25

Contact hour/week: 0 + 2

Study on - D.C. circuits, AC. circuits, D.C. motors, Induction motor, A.C. and D.C. generators, single phase transformer, 3-Phase transformer, Star-delta starter, Full-wave and Full-wave rectuer, Transistor amplifier circuit, Transducer and sensor application circuits.

Application of IC's in every day and industrial use.

House wiring and layout o a factory (Electrical).

212. Computer Science

Practical: Marks – 50

Contact hour/week: 0+2

Basic Programming Technique

Writing Algorithm and Drawing Flowchart, Use of different commands, C/C" / JAVA (variables, operators and formulas, input-output statements, branching and looping, library functions. defining functions and subroutines, arrays and subscripted variables, sequential and random data files, use of colour and sound. microcomputer graphics).

Introduction to different types of microprocessor

Microprocessor architecture, Instruction set, I/C operations, Interrupt structure, Interfacing and interfacing ICs, Microprocessor based system design

Introduction to robotics: Definitions, Industrial robots, Robot structure and robot configuration. Robot drives and control systems, Robot sensors, Robot Applications

Introduction to control systems and their representation

Different types of control systems, Hydraulic and pneumatic control systems. Elements of electro mechanical controls, Introduction to digital computer control

Book References:

1. Mechatronics by D. A. Bradley
2. Mechatronics by W. Bolton
3. Modern Control System (8th Cd.) by Don & Bishop
4. Automatic Control Engineering by Francis H. Raven
5. Feedback & Control System by Di Stefano
6. Engineering Instrumentation & Control IV by Adams
7. Measurements & Instrumentation by Adams
8. Pneumatics & Hydraulics by Stewart

B.Sc. in Textile Engineering**Part-3 odd semester****301. Yarn Manufacturing - 2****Theory: Marks – 100****Contact hour/week 3 + 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 Win.... and Bobbin Building, Drives to Bobbins, Bobbins rail and Spindles. Object and action of cone 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 travellers. Yarn tensions and forces acting on the traveller. 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. eneral Technology of Cotton Manufacturing by P.T. Bukayer (Publisher: Mir Publisher)
3. The Technology of Combing & Drawing Vol-3 by W. Klein
4. A Practical 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

Practical : Marks-50**Contact hour/week: 0+2**

Short Staple: Practical study of Comber, Speed frame, Ring frame, Doubling and Reeling machine of cotton spinning

Long Staple: Practical study of Drawing frame, Spinning frames of jute spinning.

302. Fabric Manufacturing - 2

Theory: Marks – 100

Contact hour/week 3 + 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, Cause 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 Raschel machines, knitting cycle of bearded beedle Tricot and single needle bar Raschel 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 locknit, 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-wovens. 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

Practical:. Marks – 50

Contact hour/week: 0 + 2

Weaving

Practical study of the relevant machinery. Dismantling and reassembling of various parts. Operation of machinery. Visit to manufacturing plants etc.

Knitting

Practical study of different mechanisms- feeding. drawing-off, winding and receiving, driving and stopping mechanisms. operational technique of knitting machinery. Detection of fabric specification from given samples.

306. Textile Testing and Quality Control —2

Theory Marks -75

Contact hour/week 2 + 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 in 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

Practical Marks-25

Contact hour/week: 0 +2

Determination of (i) Single yarn strength by single strength tester (ii) Lea strength and C.S.P. of yarn (iii) Irregularity of sliver, roving and yarn (iv) Imperfections Analyses of spectrogram.

Determination of (i) Woven and Knitted fabric dimensions (Fabric weight/unit area (iii) cloth thickness (iv) Size percentage in fabric (v) Porosity of fabric (vi) Fabric strength (tensile, tearing ballistic and bursting) (vii) abrasion resistance of fabric (viii) Fabric crease recovery (ix) Water repellency, water absorption, Carpet testing, Identification of fibre from a given sample (single or blended).

307. Industrial' Psychology & Management

Theory: Marks -100

Contact hour/week 3 + 0

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

303. Wet processing-2

Theory: Marks – 100

Contact hour/week 3 + 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 fibres 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 parchmentsation, resin finishing, water repellency, flame retardancy.

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

Practical: Marks – 50

Contact hour/week: 0 + 2

Dyeing of various fibers with sulphur, Azoic, reactive and Disperse dyestuffs. Printing of different fabrics with Direct, Basic, Acid, Vat, sulphur, Azoic, Reactive and Disperse dyestuff. Pigment printing, Production of water repellent and flame retardant effects on different fabrics.

304. Garments Manufacturing- 2

Theory: Marks – 100

Contact hour/week 3 + 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, Moulding 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.

Practical : Marks -50

Contact hour/week: 0+2

Production of different types of stitches, Production of different types of seams, pattern making for trouser, Pattern grading, Manufacturing problems and their correction, Fusing of garments parts, Test of fuse quality, Industrial visits.

305. Textile Physics – 2

Theory Marks -75

Contact hour/week 2 + 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 flexural 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: Otter worth & Co. Ltd. and Textile Institute)
2. Textile Fibre and their uses by Hess

308. Sociology

Theory: Marks -50

Contact hour/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. Sociology: Features of Village community in Bangladesh. Social nobility. 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 Industry
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

309. Application of Computer in Textile

Theory Marks -50

Contact hour/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.

Practical: Marks – 25

Contact hour/week 0 + 2

Practical application and practice of the above topics

B Sc in Textile Engineering **Part-4 odd semester**

401. Advanced Wet Processing (Optional)

Theory: Marks – 100

Contact hour/week 3+0

Pretreatment

Special scouring processes (solvent scouring and Vapour-bc scouring); Estimation of scotnng, Bleaching and mercerizing effects; Estimation of available chlorine in bleaching powder, Faults arid 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. Color fastness. Assessment of color-fastness with gray scale Faults dyeing and their remedy's. Dycliry ul 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 Fibres by ER. Trotnian
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

Practical: Marks – 50

Contact hour/week: 0 + 2

Determination of hardness of water, Removal of hardness by different methods. Dyeing of different fibers with mordent dyes and pigments, Preparation of screen and printing of different fabrics by flat bed and rotary printing machines. Production of crease resistant cotton fabrics with different types of cross-linking agents.

Identification of dyestuffs. Color fastness tests of different dyeing. Dyeing of blended fabrics with appropriate dyes. Color matching by production of combination shade. Practical estimation I Scouring, Bleaching and Mercerizing effects. Printing of blended fabrics with appropriate dyesurl Transfer printing.

401. Advanced Garments Manufacturing (Optional)

Theory : Marks -100

Contact hour/week 3+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, se strongly 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

Practical : Marks — 50

Contact hour/week: 0 + 2

Swatch making and reproduction of swatch, Different types of garments washing, Different types or garments dyeing, Seam strength analyses, Fabric sew ability analyses,visits. Processing Man-made staple fiber and their blends. Detailed study of Rotor and other modern short and long staple spinning machines.

401. Advanced Fabric Manufacturing (Optional)

Theory: Marks -100

Contact hour/week 3 + 0

Weaving

0 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, desizing 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 m/c, plush in sinker top latch needle m/c 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 Raschel 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

Practical : Marks – 50

Contact hour/week: 0 + 2

Weaving

Detailed study of relevant mechanisms and machinery. Dismantling and reassembling of parts. Operation of machinery, Visit to manufacturing plants study of fabric defects

Knitting

Production of knitted samples with given specifications and study of their dimensional behavior.

Adjustment of the machine for the production of fabrics of different GSM.

Detailed practical study of mechanisms and machinery, Dismantling and reassembling of different parts of machinery. Production of knitted fabric samples containing basic structures.

401. Advance Yarn Manufacturing (Optional)

Theory: marks-100

Contact hour /week:3+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)

Practical: Marks-50

Contact hour/week:0+2

Practical processing of different counts of cotton and jute yarns and analyses of yarn specimens. Processing of Man made staple fiber and their blends. Details study of Rotor and other modern short and long staple spinning machines.

***404. Textile Testing and Quality Control —3**

Theory: Marks – 100

Contact hour/week 3 + 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 of 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

Practical: Marks – 25**Contact hour/week: 0 + 2**

Quality control practices for yarn, Grey fabrics, finished fabrics and garments including use of control charts, Industrial visits.

405. Production Planning and Control*Theory : Marks — 100****Contact hour/week 3 + 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 piop 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

406. Industrial Economics, Accounting and Marketing-*Theory : Marks – 100****Contact hour/week 3 + 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

tirrhs. Standard cost preparation of cost sheets and statements, break even analyses, stock taking and control of stock and stores, payroll, Dummy worker on payroll.

Marketing

Concept, Scope and Functions of marketing tools, product concept, types and 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. Schwayer-Process Engineering economics. ((chem. Engg. Series)
5. MS. Peters and K. D. Timmerhaus-Plant design and economics for chemical engineering.

B Sc in Textile Engineering Part-4 even semester

402. Special Yarn Manufacturing (Optional)

Theory Marks – 75

Contact hour/week 2 + 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 of amount and direction of twist at each twisting stage on strength, elongation, luster and balance twist. Twist setting. Manufacture of fancy yarns.

Top-to-top conversion

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

Practical: Marks – 25

Contact hour/week 0 + 2

Practical application and practice on the above topics.

402. Special Fabric Manufacturing (Optional)

Theory: Marks – 75

Contact hour/week 2 + 0

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

Practical: Marks – 25

Contact hour/week: 0 + 2

Practical application and practice on the above topics.

402. Special Wet Processing (Optional)

Theory: Marks -75

Contact hour/week 2+0

Foam technology in wet processing (foam generation, application, advantages and disadvantages). Solvent dyeing, Dyeing under supercritical conditions; Computer assisted recipe calculations. Human colour vision, Munsell's trichromatic theory of colour vision and colour matching equations Effluents wet processing, their effects on environment, various types of effluent threatening and their disposal systems.

Practical: Marks-25

Contact hour/week: 0+ 2

Practical application and practice on the above topics.

402. Special Garments Manufacturing (Optional)

Theory: Marks – 75

Contact hour/week 2 + 0

Brief description of fashion house in Imopn and IJ II(ii fashion It,made clothing industry. Fashion trends in different country traditional including mothticc 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.

Practical: Marks – 25

Contact hour/week: 0 + 2

Practical application and practice on the above topics.

*403. Utility Service & Maintenance of Textile Machinery

Theory: Marks – 75

Contact hour/week: 0 + 2

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, cconior:iic 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 ,iies and lift, truck hoist.

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

Ergonomics — Definition, importance and application of erogonomics 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.

Practical : Marks – 25

Contact hour/week: 0+2

Practical application and practice on the above topics of respective departmental machineries as follows

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 sassed. In particular, maintenance of guards.

guard door solenoids and position of emergency stop buttons. All maintenance should be related the quality of product from each machine.

Examination of all gearing for wear and correct depth of setting; also flat belt, V-velt, 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 arid re-setting schedules

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

Draw frames: Maintenance of drafting system, slop mechanisms, Comber check cylinder half laps, tnp 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 foller 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 / latching, 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, Dyeing 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:

1. 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, Blindstitch, Chain stitch, Over edge stitch and flat lock sewing machines Repair, maintenance and setting of fusing machines and pressing machines.

***407 Project Work**

Practical: Marks — 75

Contact hour/week: 0 + 6

For successful completion of course work every student shall submit a project report on his project work, which would be selected and approved by the department. Every candidate shall be required to appear at an comprehensive oral examination on a date fixed by the head of the department and must satisfy the examiners that he is capable of intelligently applying the results of this research to the solution of problems of undertaking independent work and also afford evidence of satisfactory knowledge related to the theory and technique used in his research work.

***408. Industrial Attachment**

Practical: Marks -200

Contact hour/week: 0 +12

For Industrial training or internship, the students will be placed in selected textile mills or organizations for eight weeks. On completion of the internship, the student will prepare and submit an industrial training report for assessment & examination.

***409. Comprehensive Viva**

Marks : —75

A Comprehensive Viva will be taken for all students through whom they complete formalities by the head of the respective department.