



**Academic Regulation, Course Structure  
And Detail Syllabus for The  
B.Sc. in Textile Engineering Courses**

**BANGLADESH UNIVERSITY OF TEXTILES**

92 Shahid Tajuddin Ahmed Sharani  
Tejgaon, Dhaka-1208



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Approved by the Syndicate, vide its Meeting No.: 09, Dated: 12- 04-12 on the recommendation of Academic Council (Meeting No.: 07, Date: 29-03-2012) and the Syndicate, vide its Meeting No.: 14, Dated 26-06-2013 on the recommendation of the Academic Council (Meeting No.:14, Dated 27-05-2013)

**Effective from the Level-I of session 2010-2011 and onwards.**

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**Bangladesh University of Textiles**

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# Bangladesh University of Textiles

Tejgaon, Dhaka-1208

## Academic Regulations for the Undergraduate Students

[Effective from the Level-I of session 2010-2011 and onwards.]

Approved by the Syndicate, Vide its Meeting No.: 09, Date: 12-04-2012 on the recommendation of Academic Council (Meeting No.: 07, Date: 29-03-2012)

### 1.0 Definitions

In these regulations, unless the context otherwise requires

- 1.1 "University" means the Bangladesh University of Textiles abbreviated as BUTex;
- 1.2 "Regulations" means Academic Regulations;
- 1.3 "Syndicate" means the Syndicate of the University;
- 1.4 "Academic Council" means the Academic Council of the University;
- 1.5 "Academic Committee" means Academic Committee of Degree Awarding Departments.
- 1.6 "Vice-Chancellor" means the Vice-Chancellor of the University;
- 1.7 "Dean" means the head of a Faculty of the University.
- 1.8 "Registrar" means the Registrar of the University.
- 1.9 "Department" means concerned Academic Department of the University;
- 1.10 "Head" means the Head of the Academic Department;
- 1.11 "Chairman" means the Chairman of the Examination Committee.
- 1.12 "Controller" means the Controller of Examinations of the University;
- 1.13 "Equivalence Committee" means the Equivalence Committee of the University;
- 1.14 "Level" means an academic year, consisting of Term-I and Term-II.
- 1.15 "Term" means a semester.
- 1.16 "Student" means a student admitted in any degree awarding department of the University.
- 1.17 "Course System" means pass or fail on course basis.
- 1.18 "Failed Courses" means the courses registered but not appearing at the examination or not passed after appearing at the examination.
- 1.19 "Discontinuity" means failure to appear in all courses (Theory and Practical/Sessional) in a particular Term/ level.

### 2.0 Faculties

The University shall have the following faculties

- 2.1 Faculty of Textile Manufacturing Engineering
  - (a) Department of Yarn Manufacturing Engineering
  - (b) Department of Fabric Manufacturing Engineering
- 2.2 Faculty of Textile Chemical Process Engineering & Allied Science
  - (a) Department of Wet Processing Engineering
  - (b) Department of Applied Science
  - (c) Department of Allied Engineering
- 2.3 Faculty of Textile Clothing, Fashion & Business Studies
  - (a) Department of Apparel Manufacturing Engineering
  - (b) Department of Textile Fashion & Design
  - (c) Department of Textile Management & Business Studies

2.4 Any other Faculties to be instituted by the Syndicate on the recommendation of the Academic Council from time to time.

### **3.0 Departments**

#### **3.1 Degree Awarding Departments**

The University shall have following Degree Awarding Department

- (a) Department of Yarn Manufacturing Engineering
- (b) Department of Fabric Manufacturing Engineering
- (c) Department of Wet Processing Engineering
- (d) Department of Apparel Manufacturing Engineering
- (e) Department of Textile Management & Business Studies
- (f) Department of Textile Fashion & Design
- (g) Any other department to be instituted by the syndicate on the recommendation of the Academic Council from time to time.

#### **3.2 Teaching Departments**

The University shall have the following departments

- (a) Department of Yarn Manufacturing Engineering
- (b) Department of Fabric Manufacturing Engineering
- (c) Department of Wet Processing Engineering
- (d) Department of Apparel Manufacturing Engineering
- (e) Department of Textile Management & Business Studies
- (f) Department of Textile Fashion & Design
- (g) Department of Applied Science
- (h) Department of Allied Engineering
- (i) Any other department to be instituted by the syndicate on the recommendation of the Academic Council from time to time.

### **4.0 Degree to be offered**

The University shall offer courses leading to the award of the following Degrees

- (a) B.Sc. in Textile Engineering (Yarn Manufacturing)
- (b) B.Sc. in Textile Engineering (Fabric Manufacturing)
- (c) B.Sc. in Textile Engineering (Wet Processing)
- (d) B.Sc. in Textile Engineering (Apparel Manufacturing)
- (e) B.Sc. in Textile Engineering (Textile Management)
- (f) B.Sc. in Textile Engineering (Fashion & Design)
- (g) Any other degree may be awarded by a department on the approval of the Syndicate upon the recommendation of the Academic Council from time to time.

### **5.0 Student Admission**

5.1 Students shall be admitted into the Level-I, Term-I class of B.Sc. in Textile Engineering courses.

5.2 An Admission Committee shall be formed in each academic session by the Academic Council for admission into Level I of Term-I of B.Sc. in Textile Engineering courses.

5.3 Candidate for admission into the Level-I, Term-I class must have passed the H.S.C. Examination from a Higher Secondary Education Board in Bangladesh (after 12 years of schooling) with Physics, Chemistry and Mathematics as his/her subjects of Examination or any examination in Higher Secondary Level of

examination recognized as equivalent by Equivalence Committee and must also fulfill all other requirements as may be prescribed by the Admission Committee.

- 5.4 The Rules and conditions for admission into various courses of studies of Department shall be framed by the academic council on the recommendation of the Admission Committee.
- 5.5 All candidates for admission into the courses of B.Sc. in Textile Engineering must be the citizens of Bangladesh unless the candidature is against the seats which are reserved for foreign students. Candidates for all seats, except the reserved ones, if any, shall be selected on the basis of merit. The rules of admission into the reserved seats (for Foreign, Freedom Fighter, Tribal etc.), if any, shall be framed by the Academic Council on the recommendation of the Admission Committee.
- 5.6 No candidate shall be admitted in the Level-1, Term-1 course after the beginning of the corresponding session, i.e., when the classes start.
- 5.7 List of newly admitted students shall be notified in the University notice board before commencement of the classes.
- 5.8 A student shall never take admission simultaneously in more than one Department/Course of this University or any other higher institution with an exception of Certificate/Diploma course. If the stated clause is violated, studentship, examination and examination results of the reported student shall immediately be cancelled.
- 5.9 If any newly admitted student fails to attend the classes within the first two weeks after the start of the classes, he/she will not be allowed to Level-1 courses and his/her admission will be cancelled.
- 5.10 Being admitted to the university, each student shall attain his/her studentship for the University to an academic program as per the University rules. He/ She shall be required to register with the University through the University registration process and on payment of the required fees as determined by the University authority from time to time.

## **6.0 Medium of Instruction**

The medium of instruction will be English for the B. Sc.in Textile Engineering courses.

## **7.0 The Curriculum & Courses**

7.1 The undergraduate curriculum of Bangladesh University of Textiles is based on course system. The salient features of course system are:

- (a) Provision for continuous evaluation of student's performance through Attendance, Class Test, Practical/Sessional class etc.
- (b) Evaluation of the performance of course/courses by using letter Grades and Grade Points.
- (c) In the curriculum, besides the professional courses pertaining to each discipline, there is an emphasis on acquiring knowledge in basic sciences, humanities and social science & related courses of other discipline. Emphasis shall be given to introduce courses dealing with professional protective, project planning and management, socio- economic and environmental aspects of development projects, communication skills etc.

## **7.2 Number of Terms in an Academic Year (Level)**

The duration of Bachelor Degree program shall be 04 (four) academic years and 8 (eight) Terms. The four academic years of study for the degree of H.S.C. in Textile Engineering shall be designated as Level-1, Level-2, Level-3 and Level-4 in succeeding higher Levels of study. Each academic year comprises two semesters, i.e. Term-I and Term-II.

### 7.3 Duration of Terms

The duration of each of Term-I and Term-II will be as follows:

#### Term -I

Classes	: 15 weeks
Recess before Term final Examination	: 02 weeks
Term final examination	: 03 weeks
	<hr/>
	: 20 weeks
Interterm Break	: 1 week

#### Term -II

Classes	: 15 weeks
Recess before Term final Examination	: 02 weeks
Term final examination	: 03 weeks
	<hr/>
	: 20 weeks
Holidays, Vacations and Result Publication	: 11 weeks
	<hr/>
	Total: 52 Weeks

### 7.4 Definition of Courses

**7.4.1** Syllabus of different Department shall consist of several courses. Following structure shall be followed to articulate the courses. There shall be 05 (Five) types of courses as follows:

- (i) **Theoretical Courses:** Includes Class-teaching, Open discussion, Academic tasks etc.
- (ii) **Practical/Sessional Courses:** Includes Laboratory experiment/Field Work etc.
- (iii) **Industrial Attachment:** The students must undergo 2 (two) months intensive Industrial Training program in the relevant area of specialization after completion of Level-III, Term-II.
- (iv) **Project and Thesis:** During the Level-IV of study each student will be required to complete a Project and Thesis in the relevant field of their specialization. For such a work the students will be guided by a teacher of the concerned Department.
- (v) **Comprehensive Viva:** The Comprehensive Viva will cover the whole each Level course of study as per course structure. No specific class hour will be assigned for the Comprehensive Viva.

### 7.5 Course Designation & Numbering

Each course shall be designated by a two to four letter word identifying the Department which offers it followed by a three digit with the following criteria.

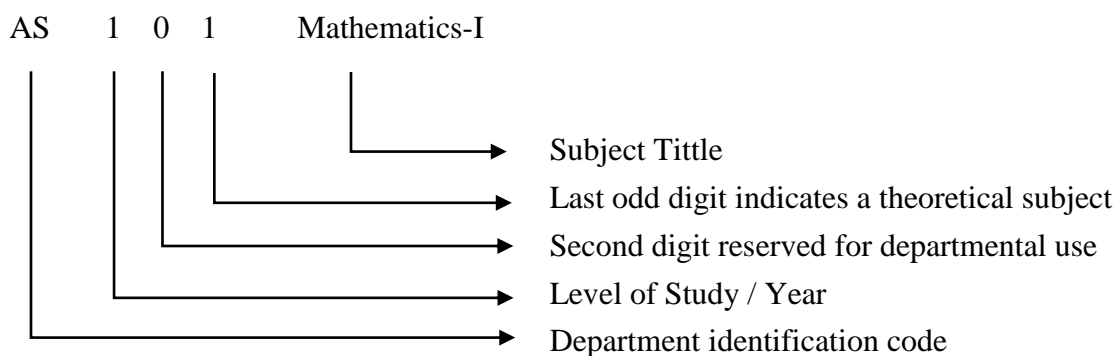
The first digit shall represent the Level in which the course is taken by the students.

The two digits shall represent a theoretical course when it is odd number and a Sessional/Laboratory/Design-subject/Course when it is even.

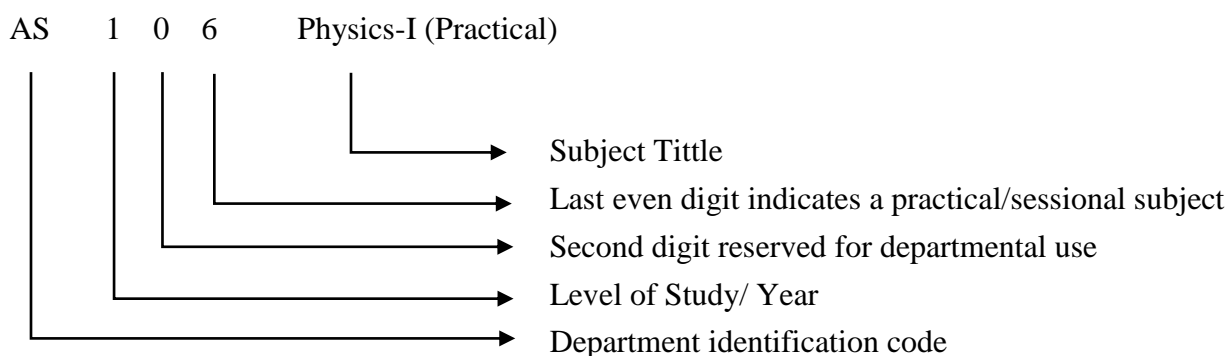
The courses designation system is illustrated by examples as shown below:



### (Theoretical Subject)



### (Practical Subject)



#### 7.6 Departmental and Non-Departmental Courses

In every Department, courses offered should be either 'Departmental courses' or 'Non-departmental courses'. Non-departmental courses are the courses of other disciplines.

The offered Non-departmental courses shall be taught either by the concerned Department or by the faculties of the related Department as and when requested by the concerned Department.

#### 7.7 Minimum Credit Point

Minimum Credit hours for requirement for the awards of Bachelor Degree in Textile Engineering will be decided by Academic Committee subject to the approval of the Academic Council. However, at least 164 credit hours for Textile Engineering must be earned to be eligible for graduation.

#### 7.8 Assignment of Credits & Contact Hours

##### 7.8.1 Theoretical Courses

One Lecture per week per Term will be equivalent to 1 (one) Credit. There shall be at least 15 contact hours for each theoretical credit point in each Term. Each theoretical class duration will be 50 minutes.

**7.8.2 Practical/Sessional**

There shall be normally 03 (three) contact hours in a week and 45 contact hours in a Term for each credit point of Practical/ Sessional course.

**7.8.3 Industrial Attachment**

Credit point for Industrial Attachment will be 3.00.

**7.8.4 Project and Thesis**

The students will be allowed 09 (nine) working hours per week exclusively dedicated for the Project Work. Credit Point for Project and Thesis will be 3.00.

**7.8.5 Comprehensive Viva**

Credit Point for Comprehensive Viva will be 3.00.

**7.9 Layout of Courses offered by different departments in Different Term & detail outline of courses are given in Annexure: page 20 to 43.**

A student must register for the requisite number of credits points per Term as per course layout.

**7.10 Academic year of B. Sc in Textile Engineering program will be from July to June.****7.11 A course plan for each course approved by respective Head, showing the details of Lectures to complete the course, is to be announced by the concerned teacher at the beginning of the Term.****7.12 Time Limit for Completion of Bachelor Degree**

For the degree of B. Sc. in Textile Engineering maximum allowable number of Terms is 14. But an additional Term may be granted after judging the merit of individual ease.

**7.13 Syllabus & Curriculum Development****7.13.1 The Curricula of the B. Sc. in Textile Engineering Degree in the different Departments shall be as proposed by the Academic Committee and Committee of courses and studies of the concerned department and approved by the syndicate on recommendation of Executive Committee of respective faculty and Academic Council.****7.13.2 The Academic Committee & Committee of Courses and Studies of the concerned Department and Executive Committee of respective faculty shall review the curricula at least once in every academic year and put forward the recommendations to the Academic Council.****8.0 Grading System:****8.1 For Evaluation purpose 1 (one) Credit hour will be equivalent to 50 Marks.****8.2 Grades and Grade Points:**

Grades and Grade Point will be awarded on the basis of marks obtained in the Written, Oral or Practical Examinations / Laboratory performances according to the following scheme:

Marks Obtained (%)	Grade	Grade Point
80 to 100	A+	4.00
75 to 79	A	3.75
70 to 74	A-	3.50
65 to 69	B+	3.25
60 to 64	B	3.00
55 to 59	B-	2.75
50 to 54	C+	2.50
45 to 49	C	2.25
40 to 44	D	2.00
Less than 40	F	0.00
	I	Incomplete
	W	Withheld

### 8.3 Calculation of GPA/CGPA

A student obtaining 'D' or higher grade will be counted as credits earned by him/her. A student obtaining 'F' grade will not be counted towards his earned credits. The GPA (grade point average) will be calculated according to the following formula:

$$\text{GPA} = \frac{\text{Grade points in a course} \times \text{Credits for the course}}{\text{Total Courses Passed/Completed}}$$

CGPA= Cumulative GPA for different Level

The overall or Cumulative GPA gives the cumulative performance of the student from Term-I up to any other Term to which it refers and is computed by dividing the total grade points accumulated up to the date by the total credit hours.

Both GPA and CGPA will be rounded off to the second place of decimal for reporting.

### 8.0 Distribution of Marks

#### Theory

(a) Continuous Assessment	
(i) Class Attendance	: 10%
(ii) Class Test	: 20%
(b) Term Final Exam	: 70%
	<hr/>
	Total: 100%

#### Practical/Sessional

(a) Continuous Assessment	
(i) Class Attendance	:20%
(ii) Experiment & Performance	: 40%
(iii) Report & Viva-Voce	: 20%
	<hr/>
	Total: 80%
(b) Practical (Final)	: 20%
	<hr/>
	Total: 100%

#### Industrial Attachment

(a) Continuous Assessment	: 50%
(b) Final Exam	: 50%
	<hr/>
	Total: 100%

#### Project and Thesis

(a) Continuous Assessment	: 50%
(b) Final Exam	: 50%
	<hr/>
	Total:100%

#### Comprehensive Viva:

Departmental Subject	:60%
Others Subjects	:40%
	<hr/>
	Total:100%

## 10.0 Evaluation System

10.1 Basis for Awarding marks for class participation and attendance will be as follows:

Attendance	Marks
90% and Above	10
85% to 89%	9
80% to 84%	8
75% to 79%	7
70% to 74%	6
65% to 69%	5
60% to 64%	4
Less than 60%	0

A student is required to attend at least 60% of all classes held in every course.

## 10.2 Class Test

- The number of class Tests of a course shall be “n+1”, where ‘n’ is the number of credit of the course. Evaluation of the performance in the Class Test will be on the basis of the best ‘n’ number of Class Tests.
- Class Test should held regularly in every 3 to 4 weeks after starting of class.
- Duration of each Class Test shall be 20 minutes.
- For convenience of conducting the Class Tests 50 minutes’ slot should be kept at the beginning of at least 4 working days in a week.
- The dates for the Class Tests shall be fixed by the Course Co-ordinator/Chief Course Co-ordinator and shall be announced accordingly.
- All Class Tests shall be equal value. The result of each individual Class Test shall be posted to display board for information of the students before the next Class Test is held.
- The final computed marks sheet of the Class Tests and Class Attendance shall be submitted in 2 (Two) separate sealed envelope by the course teacher to Chairman of concerned Examination Committee before preparatory leave for Term final starts. The third copy of mark sheet along with answer scripts of all the Class Tests should be sent to the Controller of Examinations.

## 10.3 Practical Final

Course Teacher, Respective Head of the Department and Dean/Representative of the Dean will conduct practical final Examination. It will be completed in the last two weeks before the preparatory leave starts.

## 10.4 Project and Thesis

50% marks for Continuous Assessment to be evaluated by respective Supervisor.

50% marks for final examination to be evaluated by Project Evaluation Committee consisting of all the Deans and Head of the Departments & Project Supervisor.

## 10.5 Industrial Attachment

50% marks for Continuous Assessment to be evaluated by respective Supervisor and relevant Officer of the concerned industry.

50% marks for Final Examination to be evaluated by Evaluation Committee consisting of all the Deans and Head of the Departments & Supervisor.

## 10.6 Comprehensive Viva

(i) For Departmental subject (60% marks): Comprehensive Viva board will be formed with all Deans and 4 (four) teachers including respective Head of the Department.

(ii) For Other subject (40% marks): Comprehensive Viva board will be formed with all other Head of the Departments.

## **11.0 Term Final Examination Procedure (Theory & Practical)**

### **11.1 Examination Date**

Date for Term final examination will be announced by the controller of examinations in consultation with the respective Dean, Head of the Department & Co-ordinators.

### **11.2 Examiner's Panel**

There shall be a panel of examiners for all the subjects of a Department, proposed by the respective Department through Dean and approved by the Academic Council.

### **11.3 Examination Committee**

The Examination Committee for each Level shall consist of 5 (five) members subject to the approval of the Vice-Chancellor. One Dean will act as Chairman & 4 (four) members will be amongst the Head of the Departments.

## **11.4 Function of the Examination Committee**

(i) The Chairman of the relevant Examination Committee shall send the names of 2 (two) Question Setters and Examiners for each theory courses from the panel of examiners to the Controller of Examinations who shall issue appointment letters subject to the approval of the Vice-Chancellor.

(ii) The Examination Committee shall arrange moderation of question papers.

**11.5** All Term Final Examinations shall be conducted by the concerned Examination Committee with the assistance of the Office of the Controller of Examinations. The Controller of Examinations shall be responsible for the safe custody of manuscript, question papers and answer scripts. On the date of examination, the Controller of Examinations shall handover the respective question paper to Coordinator/Chief Coordinator in time.

## **11.6 Duration of Term final Examination**

There shall be 2 (Two) hours examination for 2 (Two) Credit and 3 (three) hours examination for 3 (three) Credit theory course.

## **11.7 Term Final Script Evaluation**

Each theoretical paper of the Term Final Examination will have two parts (Part-A & Part-B). Part-A will be evaluated by 1<sup>st</sup>examiner and Part-B will be evaluated by the 2<sup>nd</sup> examiner separately. Separate Answer Scripts shall be used for the two parts.

The 1st examiner & 2nd examiner will take delivery of the answer scripts from the Office of the Controller of Examinations on the date of examination and will return the answer scripts to the Controller of Examinations within the specific date, and simultaneously send two copies of the mark sheet in sealed envelope to the Chairman of the Examination Committee and the third copy of the mark sheet in sealed envelope to the Controller of Examinations, who will keep it in safe custody.

## **11.8 Term Final Script Scrutiny**

Each theoretical paper (Both of Part-A & B) evaluated by the examiners will be scrutinized by scrutinizer appointed by the controller of examinations with the approval of Vice-Chancellor.

## **12.0 Tabulation**

**12.1** The Controller of Examinations will appoint 02 (two) tabulators with the approval of Vice-Chancellor.

The tabulators will add up the marks of Class Attendance, Class Test, Practical /Sessional, Term Final Examination, Industrial Attachment, Project and Thesis Work and Comprehensive Viva- to produce Letter Grade, Grade Point Average and Cumulative Grade Point Average.

**12.2** The tabulation shall not begin until marks of all the courses are received.

**12.3** The tabulators will finalize the tabulation sheets separately and then compare together.

**12.4** Fractional marks of Class Attendance, Class Test, Practical /Sessional, Term Final Examination etc. of a course will be rounded off only once to the next higher number.

**12.5** The Examination Committee will finalize the result and send the tabulation sheet and all other documents to the Controller of Examinations for preservation.

### **13.0 Publication of Results**

**13.1** The Controller of Examinations will publish the final results on Department basis with the approval of the Vice-Chancellor subject to the approval of the Syndicate on recommendation of the Academic Council.

#### **13.2 Re-examination**

Re-examination of any script shall not be allowed.

#### **13.3 Preservation of the Examination Documents**

The Controller of Examinations will preserve all the documents of examination.

### **14.0 Promotion Rules**

**14.1** The minimum passing grade in a theory course shall be 'D' or 2.00 and the minimum passing grade in a Practical or Sessional/Industrial Attachment/ Project and Thesis/Comprehensive Viva course will be 'C' or 2.25.

**14.2** If a student fails to earn minimum grade 'C' or 2.25 in a Practical or Sessional Industrial Attachment Project and Thesis /Comprehensive Viva course will not be promoted to the next Term. He/she shall have to register the same as a regular student.

**14.3.1** A student will be promoted from Term-I to Term-II of any Level when

(i) He/she appears in all the courses of Term-I final examination.

(ii) Passes all the practical/ Sessional Courses of Term-I.

**14.3.2** When a student fails to appear some of the courses in the Term-I Final Examination, he may also be promoted to Term-II, considering his/her previous result & number of absent courses.

**14.4** Those who earn CGPA 2.20 or more and the cumulative total number of failed courses does not exceed the highest limit of 4 (four) will get promotion from Level-1 to Level-2, Level-2 to Level-3 and Level-3 to Level-4.

**14.5** A student who obtains 'F' grade in any theory course in any Term, will have to repeat the course(s) in the next available respective term. When a student repeat a course in which he/she previously obtained 'F' grade, he/she will not be eligible to get a grade better than 'B' in such course. A student will normally get one chance of clearing 'F' grade of a course.

**14.6** 'F' grade will not be counted for GPA calculation but will stay permanently on the grade sheet and transcript. In case of clearing of 'F' grade of a course, the student will get supplementary transcript.

**14.7** The minimum CGPA requirement for the award of B.Sc. in Textile Engineering Degree is 2.25 without 'F' grade/ withheld remaining for any of the courses.

### **15.0 Honours, Dean's List and University Gold Medal**

#### **15.1 Honours**

Candidates for B.Sc. in Textile Engineering will be awarded the degree with Honours if he/she obtains CGPA 3.75 or above.

#### **15.2 Dean's List**

In recognition of excellent performance, the 'names of students who maintain a GPA of 3.75 or above in regular Terms of an academic year may be published in the Dean's list of each faculty. In this regard Dean, will give a certificate to the student confirming his name in the Dean's list. Student who have earned 'F' grade in any course during any of the two regular Terms will not be considered for Dean's list in that year.

### **15.3 University Gold Medal**

University Gold Medal for outstanding graduates will be awarded to the students who secure the 1st position with CGPA not below 3.75 in each Department. The student must have completed his/her undergraduate course work within four consecutive academic years. Student who have earned 'F' grade in any course during any Terms, will not be considered for University Gold Medal.

### **16.0 Improvement of Grade**

**16.1** If a student obtains a grade lower than 'B' in a course, he/she will be allowed to repeat the course only once for the purpose of grade improvement by forgoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'B' in such a course. A student will be permitted to repeat for grade improvement purposes a maximum of four courses in B.Sc. in Textile Engineering.

**16.2** No improvement shall be allowed in Continuous Assessment, Practical/Sessional courses.

### **17.0 Re-admission**

**17.1** A student of Level-I, Term-I, failing to appear in the Term final examination, unless otherwise the clause 20.3 is applicable, maybe allowed to get Re-admission with the Level-I, Term-I of the immediate next batch. A re-admitted student however, shall always be assigned by the original registration number.

**17.2** If a student fails to appear at any Term final examination due to shortage of required percentage of attendance, or failure to pay the dues or expulsion for the University or any other reason as the case may be, she/he shall have to get herself/himself re-admitted to the same Term of the subsequently available batch.

**17.3** If a student fails to fulfill the conditions for promotion from any Term to the next may seek Re admission with the same Term of the subsequent available batch.

**17.4** On Re-admission, Grades earned earlier by a student in any term shall be cancelled automatically and student shall have to retake all the course-works (Such as Class test/Class Attendance / Project and Thesis /Field Work / Viva-Voce and final examinations) of that term. Percentage of class attendance of such students shall be counted from the date of his/her re-admission. Class Test, if completed before her/his Re-admission, the concerned course teacher shall arrange make up class test.

**17.5** A Student shall not get chance for Re-admission more than 3 times during the entire program.

**17.6** For Re-admission, a student shall have to apply within 07 (Seven) working days after publishing result of the concerned term.

### **18.0 Admission for the second and subsequent Terms**

At the beginning of each Term, the students who are promoted will have to take admission for the second/subsequent respective Terms by paying requisite fees as determined by the University authority.

### **19.0 Registration Procedure**

**19.1** Students must register for each Term in which they will participate. Each student will fill up his/her Course Registration form after admission in consultation with and under the guidance of the Course Co-ordinator. The original copy of the Course Registration form will be submitted to the Registrar's Office, and then the requisite number of photo copies will be made by the Registrar's Office for distribution. The date, time and venue will be announced in advance by the Registrar's Office.

**19.2** Every regular student, if he/she wants to study, shall have to register the courses before the beginning of the class of each Term of each Level.

### **20.0 Entry-form fill up**

**20.1** The Entry-form fill up of examination shall have to be conducted by the Academic section of Registrar Office. Each student needs to fill up his/her Entry form to appear at examination. The date, time and venue for filling up the entry forms to appear at the examination will be announced by the Office of the

Controller of the Examinations.

### **20.2 Requirement of Entry-form fill up**

- (a) A student shall be allowed to appear at the Term Final Examination if his/her class attendance is at least 75% in theory/practical course.
- (b) Students having percentage of attendance between 60% and less than 75% in any courses, may be allowed to appear at the Term Final Examination by paying additional fees as determined by the University authority.
- (c) Students having percentage less than 60% in any course, will not be allowed to appear in Term final examination.
- (d) If any student fails in practical/sessional courses, he/she will not allowed to appear in Term final Examination.
- (e) Student having well-disciplined and good manner to be certified by the Head of the Department.
- (f) Clears all dues of Library and Residential Hall.
- (g) Pays requisite fees as determined by the University Authority.

**20.3** Head of the Department will send the list of eligible students or filling up the Entry- form to Registrar Office through Dean.

**20.4** Entry form will be signed by the Chairman of the concerned Examination Committee.

### **21.0 Drop-out (Admission Cancelled)**

- 21.1** A student will be dropped out of the program if he/she cannot pass within 07 (seven) academic years.
- 21.2** If a student fails in the same Term/Level two times, his/her studentship will be stand cancelled.
- 21.3** If a student remains totally absent without any permission from all classes for 2 (two) weeks after the start of Level-I, Term-I classes, his/her admission should be cancelled on the recommendation of the A Head of the concerned Department.

### **22.0 Withdrawal from a Term**

- 22.1** If a student is unable to complete the Term Final Examination due to illness, accident or any other valid reason etc. he/she may apply to the Registrar through the Head of the department for total withdrawal from the Term within five working days after the end of the Term Final Examination. However, he/she may choose not to withdraw any Practical course if the grade obtained in such a course is 'D' or higher and he/she has to indicate that clearly in the withdrawal application. The withdrawal application must be supported by a medical certificate from the University Medical Officer. The Academic council will take the final decision about such application.
- 21.2** Term withdrawal is not allowed for the Level-I, Term-I students.

### **23.0 General**

#### **23.1 Academic Calendar**

Registrar Office will announce the academic schedule for each Term before the start of the class on the approval of the Academic Council.

#### **23.2 Chief Co-ordinator and Course Co-ordinator**

Before starting the classes of each Level, a Course Co-ordinator will be nominated for each level with the approval of Vice-Chancellor. They will look after the academic matters & course progress of the respective Term/Level. They will also meet the failed or weak student on a regular basis and advise them on all academic matters.



### 23.3 Central Monitoring Committee

There shall be Central Monitoring Committee approved by the Vice-Chancellor for monitoring the Academic progress and activities of the University.

### 23.4 Attendance

**23.4.1** All Students are expected to attend classes regularly. The University believes that attendance is necessary for effective learning. The first responsibility of a student is to attend classes regularly, and one is required to attend at least 60% of all classes held in every course;

**23.4.2** The students whose average percentage of attendance fall short of 75% in any of the theory, Practical/Sessional/Field Work courses for which he/she has registered in one academic year shall not be eligible for the award of any type of Scholarship/Stipend /Grant for the following academic session.

### 23.5 Unfair means

**23.5.1** Cases of unfair means and breach of discipline at the University examination shall be dealt with according to the respective rules of the University.

**23.5.2** The examination disciplinary committee shall be composed of the following members:

(i)	Vice-Chancellor	Chairman
(ii)	Dean of the respective faculty	Member
(iii)	One non-salaried member of the Syndicate nominated by Vice-Chancellor	Member
(iv)	Proctor	Member
(v)	Director, Student advisory Affairs	Member
(vi)	Registrar	Member
(vii)	Controller of Examination	Member Secretary

### 23.6 Conduct and Discipline

**23.6.1** A student shall conform to a high standard of discipline, and shall conduct himself, within and outside the precincts of the University in a manner befitting the student of a University of national importance. He/she shall show due courtesy and consideration to the employees of the University and Halls of residence, good neighborliness to his fellow students and the Teachers of the University and pay due attention and courtesy to Visitors.

To safeguard its ideals of scholarship, character and personal behavior, the university reserves the right to require the withdrawal of any student at any time for any reason deemed sufficient.

**23.6.2** Cases of misconduct & breach of discipline (other than examination offences) shall be dealt with according to the respective Rules & Regulations of the University.

**23.7** Student(s) who failed to pass in different course(s) in the previous course system will be absorbed in the new course system of curricula when such situation will arise.

**23.8** The Syndicate on recommendation of Academic Council shall have the authority to decide all matters which are not covered by provision of this Regulation in such manner as it may deem fit.

**23.9** The University shall have the authority to amend the Academic Regulations at any time & in any manner as it may be considered necessary in the interest of the University.

(Kabari Majumder)  
Registrar (Current Charge)

**Level and Term-wise Credit distribution of  
B.Sc. in Textile Engineering Course**

Sl. No	Name of the Course	Level-1		Level-2		Level-3		Level-4		Total Credit
		Term-I	Term-II	Term-I	Term-II	Term-I	Term-II	Term-I	Term-II	
1	B.Sc. in Textile Engineering (Yarn Manufacturing)	20	21	22	20	20	20	19	22	164
2	B.Sc. in Textile Engineering (Fabric Manufacturing)	20	21	22	20	20	20	19	22	164
3	B.Sc. in Textile Engineering (Wet Processing)	20	21	22	20	20	20	19	22	164
4	B.Sc. in Textile Engineering (Apparel Manufacturing)	21	20	20	22	19	21	22	19	164
5	B.Sc. in Textile Engineering (Textile Management & Bussiness Studies)	21	20	20	22	20	20	21	20	164
6	B.Sc. in Textile Engineering (Textile Fashion & Design)	21	20	20	23	18	21	21	18	162

**Department of Yarn Manufacturing Engineering**  
**Course Structure for B.Sc. in Textile Engineering (Yarn Manufacturing)**

**Level-1, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 101	Mathematics- I	3	3	45	105	150
2	AS 105	Physics - I	3	3	45	105	150
3	AS 106	Physics - I (Practical)	3	1	40	10	50
4	AS 109	Chemistry - I	3	3	45	105	150
5	AS 110	Chemistry - I (Practical)	3	1	40	10	50
6	YME 121	Textile Fibers: Natural Fibers	3	3	45	105	150
7	YME 123	Introduction to Textile	2	2	30	70	100
8	AE 181	Engineering Material	2	2	30	70	100
9	AE 182	Machine shop Practice (Practical)	3	1	40	10	50
10	AE 184	Engineering Drawing (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

\*C: Continuous Assessment; F: Final.

**Level-1, Term-II**

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 103	Mathematics- II	3	3	45	105	150
2	AS 107	Physics - II	3	3	45	105	150
3	AS 108	Physics - II (Practical)	3	1	40	10	50
4	AS 111	Chemistry - II	3	3	45	105	150
5	AS 112	Chemistry - II (Practical)	3	1	40	10	50
6	WPE 141	Polymer Science & Engineering	3	3	45	105	150
7	AS 113	Business and Communicative English	3	3	45	105	150
8	AS 114	Business and Communicative English (Practical)	3	1	40	10	50
9	AE 185	Computer Fundamentals	2	2	30	70	100
10	AE 186	Computer Fundamentals (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

### Level-2, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 221	Short Staple Spinning-I	3	3	45	105	150
2	YME 222	Short Staple Spinning-I (Practical)	3	1	40	10	50
3	FME 233	Fabric Manufacturing (Weaving)-I	3	3	45	105	150
4	FME 234	Fabric Manufacturing (Weaving)-I (Practical)	3	1	40	10	50
5	AS 221	Mathematics-III	3	3	45	105	150
6	YME 225	Textile Testing & Quality Control-I	3	3	45	105	150
7	YME 226	Textile Testing & Quality Control-I (Practical)	3	1	40	10	50
8	AE 281	Mechanical Engineering	3	3	45	105	150
9	AE 282	Mechanical Engineering (Practical)	3	1	40	10	50
10	AS 215	Statistics	3	3	45	105	150
		<b>Grand Total</b>	<b>30</b>	<b>22</b>			

### Level-2, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	WPE 243	Wet Processing-I	3	3	45	105	150
2	WPE 244	Wet Processing-I (Practical)	3	1	40	10	50
3	AME 253	Apparel Manufacturing-I	3	3	45	105	150
4	AME 254	Apparel Manufacturing-I (Practical)	3	1	40	10	50
5	AE 283	Electrical & Electronics Engineering	3	3	45	105	150
6	AE 284	Electrical & Electronics Engineering (Practical)	3	1	40	10	50
7	WPE 245	Textile Fiber: Man-Made Fiber	3	3	45	105	150
8	FME 235	Fabric Structure & Design-I	2	2	30	70	100
9	FME 236	Fabric Structure & Design-I (Practical)	3	1	40	10	50
10	YME 227	Textile Physics-I	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-3, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 321	Short Staple Spinning-II	3	3	45	105	150
2	YME 322	Short Staple Spinning-II (Practical)	3	1	40	10	50
3	YME 325	Textile Testing & Quality Control-II	3	3	45	105	150
4	YME 326	Textile Testing & Quality Control-II (Practical)	3	1	40	10	50
5	YME 329	Textile Physics-II	2	2	30	70	100
6	FME 333	Fabric Manufacturing (Knitting & Non-Woven)-II	3	3	45	105	150
7	FME 334	Fabric Manufacturing (Knitting & Non-Woven)-II (Practical)	3	1	40	10	50
8	FME 237	Fabric Structure & Design-II	2	2	30	70	100
9	FME 238	Fabric Structure & Design-II (Practical)	3	1	40	10	50
10	TM 301	Accounting & Cost Management	3	3	45	105	150
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-3, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 327	Long Staple Spinning-II	3	3	45	105	150
2	YME 328	Long Staple Spinning-II (Practical)	3	1	40	10	50
3	WPE 343	Wet Processing -II	3	3	45	105	150
4	WPE 344	Wet Processing -II (Practical)	3	1	40	10	50
5	AME 353	Apparel Manufacturing-II	3	3	45	105	150
6	AME 354	Apparel Manufacturing-II (Practical)	3	1	40	10	50
7	YME 305	Application of Computer in Yarn Manufacturing	2	2	30	70	100
8	YME 306	Application of Computer in Yarn Manufacturing (Practical)	3	1	40	10	50
9	TM 303	Industrial Management	3	3	45	105	150
10	AE 381	Automation & Control Engineering	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-4, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 421	Modern Yarn Manufacturing	3	3	45	105	150
2	YME 422	Modern Yarn Manufacturing (Practical)	3	1	40	10	50
3	YME 423	Process Control in Spinning	3	3	45	105	150
4	YME 424	Process Control in Spinning (Practical)	3	1	40	10	50
5	YME 425	Special Yarn Production	2	2	30	70	100
6	YME 426	Maintenance of Spinning Machinery (Practical)	3	3	45	105	150
7	FME 339	Technical Textile	2	2	30	70	100
8	WPE 447	Environment Studies	2	2	30	70	100
9	AE 481	Industrial Engineering	2	2	30	70	100
10	AE 483	Textile Machine Design	2	2	30	70	100
		<b>Grand Total</b>	<b>25</b>	<b>19</b>			

### Level-4, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 401	Production Planning & Control	3	3	45	105	150
2	TM 403	Quality Management	2	2	30	70	100
3	TM 405	Textile & Apparel Merchandizing	3	3	45	105	150
4	TM 407	Entrepreneurship & Project Development	3	3	45	105	150
5	AS 411	Bangladesh Studies	3	3	45	105	150
6	YME 428	Industrial Attachment	2 months	3	75	75	150
7	YME 420	Project Work		3	75	75	150
8	YME 400	Comprehensive Viva		2	0	100	100
		<b>Grand Total</b>	<b>14</b>	<b>22</b>			

**Department of Fabric Manufacturing Engineering**  
**Course Structure for B.Sc. in Textile Engineering (Fabric Manufacturing)**

**Level-1, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 101	Mathematics- I	3	3	45	105	150
2	AS 105	Physics - I	3	3	45	105	150
3	AS 106	Physics - I (Practical)	3	1	40	10	50
4	AS 109	Chemistry - I	3	3	45	105	150
5	AS 110	Chemistry - I (Practical)	3	1	40	10	50
6	YME 121	Textile Fibers: Natural Fibers	3	3	45	105	150
7	YME 123	Introduction to Textile	2	2	30	70	100
8	AE 181	Engineering Material	2	2	30	70	100
9	AE 182	Machine shop Practice (Practical)	3	1	40	10	50
10	AE 184	Engineering Drawing (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

\*C: Continuous Assessment; F: Final.

**Level-1, Term-II**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 103	Mathematics- II	3	3	45	105	150
2	AS 107	Physics - II	3	3	45	105	150
3	AS 108	Physics - II (Practical)	3	1	40	10	50
4	AS 111	Chemistry - II	3	3	45	105	150
5	AS 112	Chemistry - II (Practical)	3	1	40	10	50
6	WPE 141	Polymer Science & Engineering	3	3	45	105	150
7	AS 113	Business and Communicative English	3	3	45	105	100
8	AS 114	Business and Communicative English (Practical)	3	1	40	10	50
9	AE 185	Computer Fundamentals	2	2	30	70	50
10	AE 186	Computer Fundamentals (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

### Level-2, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FME 231	Weaving Preparatory Process	3	3	45	105	150
2	FME 232	Weaving Preparatory Process (Practical)	3	1	40	10	50
3	YME 223	Yarn Manufacturing-I	3	3	45	105	150
4	YME 224	Yarn Manufacturing-I (Practical)	3	1	40	10	50
5	AS 221	Mathematics-III	3	3	45	105	150
6	YME 225	Textile Testing & Quality Control-I	3	3	45	105	150
7	YME 226	Textile Testing & Quality Control-I (Practical)	3	1	40	10	50
8	AE 281	Mechanical Engineering	3	3	45	105	150
9	AE 282	Mechanical Engineering (Practical)	3	1	40	10	50
10	AS 215	Statistics	3	3	45	105	150
		<b>Grand Total</b>	<b>30</b>	<b>22</b>			

### Level-2, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	WPE 243	Wet Processing-I	3	3	45	105	150
2	WPE 244	Wet Processing-I (Practical)	3	1	40	10	50
3	AME 253	Apparel Manufacturing-I	3	3	45	105	150
4	AME 254	Apparel Manufacturing-I (Practical)	3	1	40	10	50
5	AE 283	Electrical & Electronics Engineering	3	3	45	105	150
6	AE 284	Electrical & Electronics Engineering (Practical)	3	1	40	10	50
7	WPE 245	Textile Fiber: Man-Made Fiber	3	3	45	105	150
8	FME 235	Fabric Structure & Design-I	2	2	30	70	100
9	FME 236	Fabric Structure & Design-I (Practical)	3	1	40	10	50
10	YME 227	Textile Physics-I	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			



### Level-3, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FME 331	Weaving-I	3	3	45	105	150
2	FME 332	Weaving-I (Practical)	3	1	40	10	50
3	YME 323	Yarn Manufacturing -II	3	3	45	105	150
4	YME 324	Yarn Manufacturing -II (Practical)	3	1	40	10	150
5	YME 325	Textile Testing & Quality Control-II	3	3	45	105	150
6	YME 326	Textile Testing & Quality Control-II (Practical)	3	1	40	10	50
7	YME 329	Textile Physics-II	2	2	30	70	100
8	FME 237	Fabric Structure & Design-II	2	2	30	70	100
9	FME 238	Fabric Structure & Design-II (Practical)	3	1	40	10	50
10	TM 301	Accounting & Cost Management	3	3	45	105	150
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-3, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FME 335	Knitting & Non-Woven-I	3	3	45	105	150
2	FME 336	Knitting & Non-Woven-I (Practical)	3	1	40	10	50
3	WPE 343	Wet Processing -II	3	3	45	105	150
4	WPE 344	Wet Processing -II (Practical)	3	1	40	10	50
5	AME 353	Apparel Manufacturing-II	3	3	45	105	150
6	AME 354	Apparel Manufacturing-II (Practical)	3	1	40	10	50
7	FME 337	Application of Computer in Fabric Manufacturing	2	2	30	70	100
8	FME 338	Application of Computer in Fabric Manufacturing (Practical)	3	1	40	10	50
9	TM 303	Industrial Management	3	3	45	105	150
10	AE 381	Automation & Control Engineering	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-4, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FME 431	Weaving-II	3	3	45	105	150
2	FME 432	Weaving-II (Practical)	3	1	40	10	50
3	FME 433	Knitting & Non-Woven -II	3	3	45	105	150
4	FME 434	Knitting & Non-Woven -II (Practical)	3	1	40	10	50
5	FME 435	Special Fabric Production	2	2	30	70	100
6	FME 436	Maintenance of Fabric Machinery (Practical)	3	1	40	10	50
7	WPE 447	Environmental Studies	2	2	30	70	100
8	FME 339	Technical Textile	2	2	30	70	100
9	AE 481	Industrial Engineering	2	2	30	70	100
10	AE 483	Textile Machine Design	2	2	30	70	100
		<b>Grand Total</b>	<b>25</b>	<b>19</b>			

### Level-4, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 401	Production Planning & Control	3	3	45	105	150
2	TM 403	Quality Management	2	2	30	70	100
3	TM 405	Textile and Apparel Merchandizing	3	3	45	105	150
4	TM 407	Entrepreneurship & Project Development	3	3	45	105	150
5	AS 411	Bangladesh Studies	3	3	45	105	150
6	FME 438	Industrial Attachment	2 months	3	75	75	150
7	FME 430	Project Work		3	75	75	150
8	FME 400	Comprehensive Viva		2	0	100	100
		<b>Grand Total</b>	<b>14</b>	<b>22</b>			

**Department of Wet Processing Engineering**  
**Course Structure for B.Sc. in Textile Engineering (Wet Processing)**

**Level-1, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 101	Mathematics- I	3	3	45	105	150
2	AS 105	Physics - I	3	3	45	105	150
3	AS 106	Physics - I (Practical)	3	1	40	10	50
4	AS 109	Chemistry - I	3	3	45	105	150
5	AS 110	Chemistry - I (Practical)	3	1	40	10	50
6	YME 121	Textile Fibers: Natural Fibers	3	3	45	105	150
7	YME 123	Introduction to Textile	2	2	30	70	100
8	AE 181	Engineering Material	2	2	30	70	100
9	AE 182	Machine shop Practice (Practical)	3	1	40	10	50
10	AE 184	Engineering Drawing (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

\*C: Continuous Assessment; F: Final.

**Level-1, Term-II**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 103	Mathematics- II	3	3	45	105	150
2	AS 107	Physics - II	3	3	45	105	150
3	AS 108	Physics - II (Practical)	3	1	40	10	50
4	AS 111	Chemistry - II	3	3	45	105	150
5	AS 112	Chemistry - II (Practical)	3	1	40	10	50
6	WPE 141	Polymer Science & Engineering	3	3	45	105	150
7	AS 113	Business and Communicative English	3	3	45	105	100
8	AS 114	Business and Communicative English (Practical)	3	1	40	10	100
9	AE 185	Computer Fundamentals	2	2	30	70	50
10	AE 186	Computer Fundamentals (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

**Level-2, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	WPE 241	Wet Preparatory Process	3	3	45	105	150
2	WPE 242	Wet Preparatory Process(Practical)	3	1	40	10	50
3	AME 253	Apparel Manufacturing-I	3	3	45	105	150
4	AME 254	Apparel Manufacturing-I (Practical)	3	1	40	10	50
5	AS 213	Applied chemistry	3	3	45	105	150
6	YME 225	Textile Testing & Quality Control-I	3	3	45	105	150
7	YME 226	Textile Testing & Quality Control-I (Practical)	3	1	40	10	50
8	AE 281	Mechanical Engineering	3	3	45	105	150
9	AE 282	Mechanical Engineering(Practical)	3	1	40	10	50
10	AS 215	Statistics	3	3	45	105	150
		<b>Grand Total</b>	<b>30</b>	<b>22</b>			

### Level-2, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 223	Yarn Manufacturing-I	3	3	45	105	150
2	YME 224	Yarn Manufacturing-I (Practical)	3	1	40	10	50
3	FME 233	Fabric Manufacturing (Weaving)-I	3	3	45	105	150
4	FME 234	Fabric Manufacturing (Weaving)-I (Practical)	3	1	40	10	50
5	AE 283	Electrical &Electronics Engineering	3	3	45	105	150
6	AE 284	Electrical &Electronics Engineering (Practical)	3	1	40	10	50
7	WPE 245	Textile Fiber: Man-Made fiber	3	3	45	105	150
8	FME 235	Fabric Structure & Design-I	2	2	30	70	100
9	FME 236	Fabric Structure & Design-I (Practical)	3	1	40	10	50
10	YME 227	Textile Physics-I	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-3, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	WPE 341	Dyeing & printing-I	3	3	45	105	150
2	WPE 342	Dyeing & printing-I (Practical)	3	1	40	10	50
3	YME 323	Yarn Manufacturing-II	3	3	45	105	150
4	YME 324	Yarn Manufacturing-II (Practical)	3	1	40	10	150
5	YME 325	Textile Testing & Quality Control-II	3	3	45	105	150
6	YME 326	Textile Testing & Quality Control-II (Practical)	3	1	40	10	50
7	YME 329	Textile Physics-II	2	2	30	70	100
8	FME 237	Fabric Structure & Design-II	2	2	30	70	100
9	FME 238	Fabric Structure & Design-II (Practical)	3	1	40	10	50
10	TM 301	Accounting & Cost Management	3	3	45	105	150
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-3, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	WPE 345	Wet Processing Machinery	3	3	45	105	150
2	WPE 346	Wet Processing Machinery (Practical)	3	1	40	10	50
3	WPE 349	Color Physics	2	2	30	70	100
4	FME 333	Fabric Manufacturing (knitting & non-woven)-II	3	3	45	105	150
5	FME 334	Fabric Manufacturing (knitting & non-woven)-II (Practical)	3	1	40	10	50
6	AME 353	Apparel Manufacturing-II	3	3	45	105	150
7	AME 354	Apparel Manufacturing-II (Practical)	3	1	40	10	50
8	WPE 347	Application of Computer in Wet Processing	2	2	30	70	100
9	WPE 348	Application of Computer in Wet Processing (Practical)	3	1	40	10	50
10	TM 303	Industrial Management	3	3	45	105	150
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-4, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	WPE 441	Dyeing & Printing-II	3	3	45	105	150
2	WPE 442	Dyeing & Printing-II (Practical)	3	1	40	10	50
3	WPE 443	Textile Finishing	3	3	45	105	150
4	WPE 444	Textile Finishing (Practical)	3	1	40	10	50
5	WPE 445	Special Wet Processing	2	2	30	70	100
6	WPE 446	Maintenance of Wet Process Machinery (Practical)	3	1	40	10	50
7	WPE 447	Environmental Studies	2	2	30	70	100
8	FME 339	Technical Textile	2	2	30	70	100
9	AE 481	Industrial Engineering	2	2	30	70	100
10	AE 483	Textile Machine Design	2	2	30	70	100
		<b>Grand Total</b>	<b>25</b>	<b>19</b>			

### Level-4, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 401	Production Planning & Control	3	3	45	105	150
2	TM 403	Quality Management	2	2	30	70	100
3	TM 405	Textile and Apparel Merchandizing	3	3	45	105	150
4	TM 407	Entrepreneurship & Project Development	3	3	45	105	150
5	AS 411	Bangladesh Studies	3	3	45	105	150
6	WPE 448	Industrial Attachment	2 months	3	75	75	150
7	WPE 440	Project Work		3	75	75	150
8	WPE 400	Comprehensive Viva		2	0	100	100
		<b>Grand Total</b>	<b>14</b>	<b>22</b>			

**Department of Apparel Manufacturing**  
**Course Structure for B.Sc. in Textile Engineering (Apparel Manufacturing)**

**Level-1, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 101	Mathematics- I	3	3	45	105	150
2	AS 105	Physics - I	3	3	45	105	150
3	AS 106	Physics - I (Practical)	3	1	40	10	50
4	AS 109	Chemistry - I	3	3	45	105	150
5	AS 110	Chemistry - I (Practical)	3	1	40	10	50
6	WPE 141	Polymer Science & Engineering	3	3	45	105	150
7	AS 113	Business and Communicative English	3	3	45	105	150
8	AS 114	Business and Communicative English (Practical)	3	1	40	10	50
9	AE 185	Computer Fundamentals	2	2	30	70	100
10	AE 186	Computer Fundamentals (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

\*C: Continuous Assessment; F: Final.

**Level-1, Term-II**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 103	Mathematics- II	3	3	45	105	150
2	AS 107	Physics - II	3	3	45	105	150
3	AS 108	Physics - II (Practical)	3	1	40	10	50
4	AS 111	Chemistry - II	3	3	45	105	150
5	AS 112	Chemistry - II (Practical)	3	1	40	10	50
6	YME 121	Textile Fibers: Natural Fibers	3	3	45	105	150
7	YME 123	Introduction to Textile	2	2	30	70	100
8	AE 181	Engineering Material	2	2	30	70	100
9	AE 182	Machine shop Practice (Practical)	3	1	40	10	50
10	AE 184	Engineering Drawing (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-2, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AME 251	Preparatory Apparel Production Operations	3	3	45	105	150
2	AME 252	Preparatory Apparel Production Operations (Practical)	3	1	40	10	50
3	FME 233	Fabric Manufacturing (Weaving)-I	3	3	45	105	150
4	FME 234	Fabric Manufacturing (Weaving)-I (Practical)	3	1	40	10	50
5	AE 283	Electrical & Electronics Engineering	3	3	45	105	150
6	AE 284	Electrical & Electronics Engineering (Practical)	3	1	40	10	50
7	WPE 245	Textile Fiber: Man-Made Fiber	3	3	45	105	150
8	FME 235	Fabric Structure & Design -I	2	2	30	70	100
9	FME 236	Fabric Structure & Design -I (Practical)	3	1	40	10	50
10	YME 227	Textile Physics -I	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-2, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 223	Yarn Manufacturing -I	3	3	45	105	150
2	YME 224	Yarn Manufacturing -I (Practical)	3	1	40	10	50
3	WPE 243	Wet Processing -I	3	3	45	105	150
4	WPE 244	Wet Processing -I (Practical)	3	1	40	10	50
5	FME 237	Fabric Structure & Design-II	2	2	30	70	100
6	FME 238	Fabric Structure & Design-II (Practical)	3	1	40	10	50
7	YME 225	Textile Testing & Quality Control-I	3	3	45	105	150
8	YME 226	Textile Testing & Quality Control-I (Practical)	3	1	40	10	50
9	AE 281	Mechanical Engineering	3	3	45	105	150
10	AE 282	Mechanical Engineering (Practical)	3	1	40	10	50
11	AS 215	Statistics	3	3	45	105	150
		<b>Grand Total</b>	<b>32</b>	<b>22</b>			



### Level-3, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AME 351	Apparel Manufacturing Process	3	3	45	105	150
2	AME 352	Apparel Manufacturing Process (Practical)	3	1	40	10	50
3	FME 333	Fabric Manufacturing (Knitting & Non-Woven)-II	3	3	45	105	150
4	FME 334	Fabric Manufacturing (Knitting & Non-Woven)-II (Practical)	3	1	40	10	50
5	FME 339	Technical Textile	2	2	30	70	100
6	AME 355	Application of Computer in Apparel Manufacturing	2	2	30	70	100
7	AME 356	Application of Computer in Apparel Manufacturing (Practical)	3	1	40	10	50
8	TM 303	Industrial Management	3	3	45	105	150
9	AS 411	Bangladesh Studies	3	3	45	105	150
		<b>Grand Total</b>	<b>25</b>	<b>19</b>			

### Level-3, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AME 357	Apparel Finishing Process	3	3	45	105	50
2	AME 358	Apparel Finishing Process (Practical)	3	1	40	10	50
3	AME 359	Clothing Comfort	2	2	30	70	100
4	YME 323	Yarn Manufacturing -II	3	3	45	105	150
5	YME 324	Yarn Manufacturing -II (Practical)	3	1	40	10	50
6	YME 325	Textile Testing & Quality Control-II	3	3	45	105	150
7	YME 326	Textile Testing & Quality Control-II (Practical)	3	1	40	10	50
8	WPE 343	Wet processing-II	3	3	45	105	150
9	WPE 344	Wet processing-II (Practical)	3	1	40	10	50
10	TM 301	Accounting & Cost Management	3	3	45	105	150
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

### Level-4, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AME 451	Apparel Washing, Dyeing & Printing	3	3	45	105	150
2	AME 452	Apparel Washing, Dyeing & Printing (Practical)	3	1	40	10	50
3	AME 453	Apparel Production Management	3	3	45	105	150
4	AME 454	Apparel Production Management (Practical)	3	1	40	10	50
5	AME 456	Maintenance of Apparel Machinery (Practical)	3	1	40	10	50
6	TM 401	Production Planning & Control	3	3	45	105	150
7	TM 403	Quality Management	2	2	30	70	100
8	TM 405	Textile and Apparel Merchandizing	3	3	45	105	150
9	TM 407	Entrepreneurship & Project Development	3	3	45	105	150
10	AE 481	Industrial Engineering	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-4, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AME 455	Special Apparel Production	2	2	30	70	100
3	WPE 447	Environmental Studies	2	2	30	70	100
4	TM 409	Economic Issue of Textile & Apparel Business	3	3	45	105	150
5	FD 471	Consumer Behavior in Fashion	2	2	30	70	100
2	FD 473	Fashion Forecasting and Trend Analysis	2	2	30	70	100
6	AME 458	Industrial Attachment	2 months	3	75	75	150
7	AME 450	Project Work		3	75	75	150
8	AME 400	Comprehensive viva		2	0	100	100
		<b>Grand Total</b>	<b>11</b>	<b>19</b>			

**Department of Textile Management & Business Studies**  
**Course Structure for B.Sc. in Textile Engineering (Textile Management)**

**Level-1, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 101	Mathematics- I	3	3	45	105	150
2	AS 105	Physics - I	3	3	45	105	150
3	AS 106	Physics - I (Practical)	3	1	40	10	50
4	AS 109	Chemistry - I	3	3	45	105	150
5	AS 110	Chemistry - I (Practical)	3	1	40	10	50
6	WPE 141	Polymer Science & Engineering	3	3	45	105	150
7	AS 113	Business and Communicative English	3	3	45	105	150
8	AS 114	Business and Communicative English (Practical)	3	1	40	10	50
9	AE 185	Computer Fundamentals	2	2	30	70	100
10	AE 186	Computer Fundamentals (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

\*C: Continuous Assessment; F: Final.

**Level-1, Term-II**

SL No.	Subject Code	Name of Subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 103	Mathematics- II	3	3	45	105	150
2	AS 107	Physics - II	3	3	45	105	150
3	AS 108	Physics - II (Practical)	3	1	40	10	50
4	AS 111	Chemistry - II	3	3	45	105	150
5	AS 112	Chemistry - II (Practical)	3	1	40	10	50
6	YME 121	Textile Fibers: Natural Fibers	3	3	45	105	150
7	YME 123	Introduction to Textile	2	2	30	70	100
8	AE 181	Engineering Material	2	2	30	70	100
9	AE 182	Machine shop Practice (Practical)	3	1	40	10	50
10	AE 184	Engineering Drawing (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-2, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	YME 223	Yarn Manufacturing-I	3	3	45	105	150
2	YME 224	Yarn Manufacturing-I (Practical)	3	1	40	10	50
3	WPE 243	Wet Processing-I	3	3	45	105	150
4	WPE 244	Wet Processing-I (Practical)	3	1	40	10	50
5	AE 283	Electrical & Electronics Engineering	3	3	45	105	150
6	AE 284	Electrical & Electronics Engineering (Practical)	3	1	40	10	50
7	WPE 245	Textile Fiber: Man-Made Fiber	3	3	45	105	150
8	FME 235	Fabric Structure & Design-I	2	2	30	70	100
9	FME 236	Fabric Structure & Design-I (Practical)	3	1	40	10	50
10	YME 227	Textile Physics-I	2	2	30	70	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-2, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 261	Fundamental of Management	3	3	45	105	150
2	FME 233	Fabric Manufacturing (Weaving)-I	3	3	45	105	150
3	FME 234	Fabric Manufacturing (Weaving)-I (Practical)	3	1	40	10	50
4	AME 253	Apparel Manufacturing-I	3	3	45	105	150
5	AME 254	Apparel Manufacturing-I (Practical)	3	1	40	10	50
6	YME 225	Textile Testing & Quality Control-I	3	3	45	105	150
7	YME 226	Textile Testing & Quality Control-I (Practical)	3	1	40	10	50
8	AE 281	Mechanical Engineering	3	3	45	105	150
9	AE 282	Mechanical Engineering (Practical)	3	1	40	10	50
10	AS 215	Statistics	3	3	45	105	150
		<b>Grand Total</b>	<b>30</b>	<b>22</b>			

### Level-3, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 361	Fundamentals of Marketing	3	3	45	105	150
2	TM 363	Managerial Economics	2	2	30	70	100
3	TM 365	Financial Management	2	2	30	70	100
4	WPE 343	Wet Processing-II	3	3	45	105	150
5	WPE 343	Wet Processing-II (Practical)	3	1	40	10	50
6	AME 353	Apparel Manufacturing-II	3	3	45	105	150
7	AME 354	Apparel Manufacturing-II (Practical)	3	1	40	10	50
8	FME 339	Technical Textile	2	2	30	70	100
9	TM 307	Application of Computer in Textile Management	2	2	30	70	100
10	TM 308	Application of Computer in Textile Management (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>26</b>	<b>20</b>			

### Level-3, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 301	Accounting & Cost Management	3	3	45	105	150
2	TM 367	Operations Management	2	2	30	70	100
3	YME 323	Yarn Manufacturing-II	3	3	45	105	150
4	YME 324	Yarn Manufacturing-II (Practical)	3	1	40	10	50
5	YME 325	Textile Testing & Quality Control-II	3	3	45	105	150
6	YME 326	Textile Testing & Quality Control-II (Practical)	3	1	40	10	50
7	FME 333	Fabric Manufacturing (Knitting & Non-Woven)-II	3	3	45	105	150
8	FME 334	Fabric Manufacturing (Knitting & Non-Woven)-II (Practical)	3	1	40	10	50
9	FME 237	Fabric Structure & Design-II	2	2	30	70	100
10	FME 238	Fabric Structure & Design-II (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-4, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 461	Industrial Relations	2	2	30	70	100
2	TM 463	Human Resource Management	3	3	45	105	150
3	TM 465	Bussiness and Industrial Law	2	2	30	70	100
4	TM 401	Production Planning & Control	3	3	45	105	150
5	TM 403	Quality Management	2	2	30	70	100
6	TM 405	Textile & Apparel Merchandizing	3	3	45	105	150
7	TM 407	Entrepreneurship & Project Development	3	3	45	105	150
8	AS 411	Bangladesh Studies	3	3	45	105	150
		<b>Grand Total</b>	<b>21</b>	<b>21</b>			

### Level-4, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	TM 467	Market Research & Product Development	3	3	45	105	150
2	TM 469	International Marketing of Textile and Apparel	2	2	30	70	100
3	TM 409	Economic Issues of Textile and Apparel Bussiness	3	3	45	105	150
4	WPE 447	Environmental Studies	2	2	30	70	100
5	FD 473	Fashion Forecasting and Trend Analysis	2	2	30	70	100
6	TM 468	Industrial Attachment	2 Months	3	75	75	150
7	TM 460	Project Work		3	75	75	150
8	TM 400	Comprehensive Viva		2	0	100	100
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

**Department of Textile Fashion & Design**  
**Course Structure for B.Sc. in Textile Engineering (Fashion & Design)**

**Level-1, Term-I**

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 101	Mathematics- I	3	3	45	105	150
2	AS 105	Physics - I	3	3	45	105	150
3	AS 106	Physics - I (Practical)	3	1	40	10	50
4	AS 109	Chemistry - I	3	3	45	105	150
5	AS 110	Chemistry - I (Practical)	3	1	40	10	50
6	WPE 141	Polymer Science & Engineering	3	3	45	105	150
7	AS 113	Business and Communicative English	3	3	45	105	100
8	AS 114	Business and Communicative English (Practical)	3	1	40	10	50
9	AE 185	Computer Fundamentals	2	2	30	70	100
10	AE 186	Computer Fundamentals (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>29</b>	<b>21</b>			

\*C: Continuous Assessment; F: Final.

**Level-1, Term-II**

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AS 103	Mathematics- II	3	3	45	105	150
2	AS 107	Physics - II	3	3	45	105	150
3	AS 108	Physics - II (Practical)	3	1	40	10	50
4	AS 111	Chemistry - II	3	3	45	105	150
5	AS 112	Chemistry - II (Practical)	3	1	40	10	50
6	YME 121	Textile Fibers: Natural Fibers	3	3	45	105	150
7	YME 123	Introduction to Textile	2	2	30	70	100
8	AE 181	Engineering Material	2	2	30	70	100
9	AE 182	Machine shop Practice (Practical)	3	1	40	10	50
10	AE 184	Engineering Drawing (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>28</b>	<b>20</b>			

### Level-2, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FD 271	Fashion Design-I: Elements of Design (Practical)	3	1	40	10	50
2	FD 272	Fashion Illustration-I (Practical)	3	1	40	10	50
3	WPE 243	Wet Processing-I	3	3	45	105	150
4	WPE 244	Wet Processing-I (Practical)	3	1	40	10	50
5	AME 253	Apparel Manufacturing-I	3	3	45	105	150
6	AME 254	Apparel Manufacturing-I (Practical)	3	1	40	10	50
7	AE 283	Electrical & Electronics Engineering	3	3	45	105	150
8	AE 284	Electrical & Electronics Engineering (Practical)	3	1	40	10	50
9	WPE 245	Textile Fiber: Man-Made Fiber	3	3	45	105	150
10	FME 235	Fabric Structure & Design-I	2	2	30	70	100
11	FME 236	Fabric Structure & Design-I (Practical)	3	1	40	10	50
		<b>Grand Total</b>	<b>32</b>	<b>20</b>			

### Level-2, Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FD 273	Fashion History	3	3	45	105	150
2	FD 274	Fashion Illustration-II (Practical)	3	1	40	10	50
3	YME 223	Yarn Manufacturing-I	3	3	45	105	150
4	YME 224	Yarn Manufacturing-I(Practical)	3	1	40	10	50
5	FME 233	Fabric Manufacturing (Weaving)-I	3	3	45	105	150
6	FME 234	Fabric Manufacturing (Weaving)-I (Practical)	3	1	40	10	50
7	YME 225	Textile Testing & Quality Control-I	3	3	45	105	150
8	YME 226	Textile Testing & Quality Control-I (Practical)	3	1	40	10	50
9	AE 281	Mechanical Engineering	3	3	45	105	150
10	AE 282	Mechanical Engineering (Practical)	3	1	40	10	50
11	AS 215	Statistics	3	3	45	105	150
		<b>Grand Total</b>	<b>33</b>	<b>23</b>			



### Level-3, Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FD 378	Fashion Design-II: Creative Design Analysis & Collection (Practical)	3	1	40	10	50
2	AME 350	Pattern Drafting, Cutting, & Manufacturing (Practical)	3	1	40	10	50
3	WPE 343	Wet Processing-II	3	3	45	105	150
4	WPE 344	Wet Processing-II (Practical)	3	1	40	10	50
5	AME 353	Apparel Manufacturing-II	3	3	45	105	150
6	AME 354	Apparel Manufacturing-II (Practical)	3	1	40	10	50
7	FD 373	Application of Computer in Fashion Design	2	2	30	70	100
8	FD 374	Application of Computer in Fashion Design (Practical)	3	1	40	10	50
9	YME 227	Textile Physics-I	2	2	30	70	100
10	TM 303	Industrial Management	3	3	45	105	150
		<b>Grand Total</b>	<b>28</b>	<b>18</b>			

### Level-3 Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FD 371	Surface Decoration Techniques	2	2	30	70	100
2	FD 372	Surface Decoration Techniques (Practical)	3	1	40	10	50
3	YME 323	Yarn Manufacturing-II	3	3	45	105	150
4	YME 324	Yarn Manufacturing-II(Practical)	3	1	40	10	50
5	YME 325	Textile Testing & Quality Control-II	3	3	45	105	150
6	YME 326	Textile Testing & Quality Control-II (Practical)	3	1	40	10	50
7	FME 333	Fabric Manufacturing (Knitting & Non-Woven)-II	3	3	45	105	150
8	FME 334	Fabric Manufacturing (Knitting & Non-Woven)-II (Practical)	3	1	40	10	50
9	FME 237	Fabric Structure & Design-II	2	2	30	70	100
10	FME 238	Fabric Structure & Design-II (Practical)	3	1	40	10	50
11	TM 301	Accounting & Cost Management	3	3	45	105	150
		<b>Grand Total</b>	<b>31</b>	<b>21</b>			

### Level-4 Term-I

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	AME 351	Apparel Manufacturing Process	3	3	45	105	150
2	FD 474	Professional Studio Practice (Practical)	3	1	40	10	50
3	FD 475	Special Textile Products	2	2	30	70	100
4	FD 477	Sociology of Fashion	2	2	30	70	100
5	FD 479	Fashion Accessories	2	2	30	70	100
6	TM 401	Production Planning & Control	3	3	45	105	150
7	TM 403	Quality Management	2	2	30	70	100
8	TM 405	Textile and Apparel Merchandizing	3	3	45	105	150
9	TM 407	Entrepreneurship & Project Development	3	3	45	105	150
10	AS 411	Bangladesh Studies	3	3	45	105	150
		<b>Grand Total</b>	<b>23</b>	<b>21</b>			

### Level-4 Term-II

SL No.	Subject Code	Name of Subject	Contact Hour/ Week	Credit	Mark Distribution*		
					C	F	Total
1	FD 471	Consumer Behavior in Fashion	2	2	30	70	100
2	FD 472	Fashion Design-III: Product Development, Preparation and Presentation (Practical)	6	2	80	20	100
3	FD 473	Fashion Forecasting and Trend Analysis	2	2	30	70	100
4	WPE 447	Environment Studies	2	2	30	70	100
5	AME 359	Clothing Comfort	2	2	30	70	100
6	FD 478	Industrial Attachment	2 Months	3	75	75	150
7	FD 470	Project Work		3	75	75	150
8	FD 400	Comprehensive Viva		2	0	100	100
		<b>Grand Total</b>	<b>14</b>	<b>18</b>			

**Department of Applied Science**  
**Detailed outline of courses offered for B.Sc. in Textile Engineering**  
(Yarn Mfg. / Fabric Mfg. / Wet Processing / Apparel Mfg./ Tex.Mgt./Fashion & Design)

**AS 101: Mathematics - I**

Credit	Class/ Week	Total Class
3	3	45

**Algebra:**Matrix, Rank of Matrix, Convergence and Divergence, Inequalities.

**Trigonometry:** Demoiver's Theorem, Deductions from Demoiver's Theorem; Complex Number, Gregory’s series, Summation of Series, Hyperbolic Functions.

**Three-Dimensional Geometry:** Co-ordinates, Direction cosines, Projections; The plane; The Straight Line, The Sphere.

**Differential Calculus:** Functions; Limits; Continuity, Simple Differentiation; Successive Differentiation; General Theorem and Expansions; Role’s Theorem; Mean value Theorem, Taylor’s series, Machlaurin’s series; Indeterminate forms; Partial Differentiation; Maximum and Minimum; Tangent and Normal; Curvature.

**AS 103: Mathematics - II**

Credit	Class / Week	Total Class
3	3	45

**Integral Calculus:** Method of Substitutions; Special type of Integration; Integration of Rational Fractions; Integration by parts; Integrals of Special Trigonometric Function; Reduction formulae for Trigonometric function; Miscellaneous Integral; Definite Integral.

**Differential Equations:** Variables Separable; Homogeneous Equation; Reducible to Homogeneous form; Exact Differential Equations, Linear differential equations. Linear equations with constant Coefficients; Inverse operators,  $f(D)y = x$ ,  $f(D)y = e^{ax}$ ,  $f(D)y = \sin ax$  or  $\cos ax$ ,  $f(D)y = e^{ax}.v$ . Particulars Integrals; Linear Homogeneous Equation with variable coefficients; Equation of the first order but of higher degree, Equation solvable for y, Equation solvable for x, Clairaut’s equation.

**Vector Analysis:** Scalar product or Dot product of two, three, four vectors, Vector product or Cross product of two, three, four, vectors. Solution of vectors equations, Applications of Vectors in Geometry.

**Mathematical Methods:** Fourier series and Fourier integral; Vector calculus, Vector function of scalar variables, Differentiation of vector functions partial derivatives of vector, Vector operator gradient, Divergence and curl, Vector integration, The line integral, The surface integral, The volume integral, Green’s theorem, Gauss’s divergence theorem, Beta and gamma functions. Numerical analysis iteration methods.

### AS 105: Physics –I

Credit	Class / Week	Total Class
3	3	45

#### Part-A:Mechanics

**Fluid Mechanics:** Fluid, Rate of flow, Uniform motion, Non-uniform motions, Steady motion, Unsteady motion, Streamline motion, Turbulent motion, Equation of continuity, Bernoulli's equation, Speed of efflux, Torricelli's theorem, Sprayer, Venturimeter.

**Viscosity:** Viscosity, Velocity gradient, Newton's law of viscous flow, coefficient of viscosity, Units & dimensions of viscosity, Critical velocity, Poiseuille's equation, Corrections of Poiseuille's equation, Determination of coefficient of viscosity of a liquid by the capillary flow method.

**Surface tension:** Molecular forces of cohesion & adhesion, Molecular range, sphere of influence, Surface tension, Dimensions of surface tension, Surface tension & free energy of a surface, Excess pressure across a curved film or membrane, Capillarity & the angle of contact, Capillary rise, determination of surface tension, Determination of surface tension of water.

**Elasticity:** General properties of matter, Elasticity, Load, Stress, Strain, Hooke's law, Rigid body, Perfect elastic body, Plastic body, Elastic limit, Breaking weight and breaking stress, Different types of elasticity, Poisson's ratio, Shear is equivalent to compression and extension, Equivalence of a shearing stress to an equal tensile & an equal compressive stress at right angles to one another, Relations among the elastic constants, Work done in a strain, Deformation by bending, Bending moment, The cantilever.

**Dynamics of circular motion:** Angular momentum, Torque, Moment of Inertia, Relations Between them, Radius of Gyration, Theorem of perpendicular axes, Theorem of parallel axes, Moment of Inertia of a ring, Moment of Inertia of a uniform circular disc, Moment of Inertia of an annular disc, Moment of Inertia of a hollow cylinder, Moment of Inertia of a solid sphere, Moment of inertia of a spherical shell, Moment of Inertia of a Flywheel.

#### Part-B: Optics

**Interference:** Wave front, Huygens's principle, Interpretation of law reflection and refraction by Huygens's principle, Interference, Young's experiment, Determination of wave length of light by Fresnel's Bi-prism, Newton's ring, Colors of thin films.

**Diffraction:** Diffraction, Fresnel & Fraunhofer diffraction, Diffraction grating and its use, Resolving power of a grating, Dispersive power of a grating, Half period zone, Zone plate, Difference between zone plate & convex lens, X-ray diffraction, Bragg's law.

**Polarization:** Polarization, Polarization by reflection, Brewster's law; Double refraction, Nicol prism, Malus law, Retardation plates, Specific rotation, Laurent's half shade polarimeter.

### AS 106: Physics - I (Practical)

Credit	Class / Week	Total Class
1	3	45

#### **A. General Physics:**

Determination of "g" by compound pendulum.

Determination of moment of inertia of a flywheel.

Determination of Young's modulus of the material of a wire by Vernier method.

Determination of Young's modulus of the material of a wire by Searle's method.  
 Determination of the rigidity modulus of the material of a wire by oscillation or dynamical method.  
 Determination of surface tension of water by capillary tube.  
 Determination of the density of water of various temperatures by specific gravity-bottle.  
 Determination of the co-efficient of viscosity of a liquid by its flow through a capillary tube.  
 Determination of surface tension of mercury and the angle of contact by Quincke's method.  
 Determination of Young's modulus, rigidity modulus and Poisson's ratio of a short wire by Searle's dynamic method.

### B. Optics:

Determination of the focal length of a convex lens by conjugate foci method with the help of an optical bench.  
 Determination of the focal length of a convex lens by displacement method.  
 Determination of the refractive index on liquid by using plane mirror and convex lens.  
 Determination of the refractive index of the material of a prism by spectrometer.  
 Determination of radius of curvature of a lens by Newton's rings.  
 Determination of wavelength of sodium light by means of Fresnel's bi-prism.  
 Determination of wavelength of light from a discharge tube by diffraction grating.  
 Determination of specific rotation of the plane of polarization in sugar solution using a polarimeter.

### AS 107: Physics – II

Credit	Class / Week	Total Class
3	3	45

**Electricity:** Coulomb's law. Electric field (E). Gauss's law and its application. Capacitors and capacitance, Capacitors with dielectrics. Charging and discharging of a capacitor. Ohm's law; Kirchhoff's law, Application of Kirchhoff's law to Wheatstone's bridge, Growth and decay of current in L-R circuit. A.C. current, Flow of A.C through inductor, capacitor and resistance in series, Resonance in parallel circuit. Choke-coil.

**Magnetism:** Magnetic Induction, Magnetic force on a current carrying conductor, Torque on a current carrying loop, Hall effect, Faraday's law of electromagnetic induction, Lenz's law of self-induction, Mutual induction, Classification of magnetic materials, Hysteresis curve, Electromagnetic Oscillation, L-C oscillations & its analogy to simple harmonic motion.

**Thermometry:** Heat, Effects of heat, Temperature, Platinum resistance thermometer, Constant volume hydrogen gas thermometer.

**Calorimetry:** Newton's law of cooling, Isothermal & adiabatic process, Adiabatic relations for a perfect gas.

**Kinetic theory of Gases:** Fundamental postulates of kinetic theory of gas, Expression of pressure from kinetic theory of gas, Relation between pressure & kinetic energy of gas, Degrees of freedom, Mean free path.

**Equation of state:** Ideal gas & real gas, Van-der Waals' equation of state, Inter-relations between Van-der Waals' constants & Critical constants, Critical coefficient, Determination of a & b, Defects of Van-der Waals' equation.

**Thermodynamics:** System & thermodynamic function, Internal energy, Work done by the gas at constant pressure, First law of thermodynamics, Thermodynamic process, Mechanical equivalent of heat, Cyclic process, Generalization of equation of the difference between two specific heats of gas, Reversible and irreversible process, Second law of thermodynamics, Distinction between 1st & 2nd law of thermodynamics, Efficiency of heat engines, Carnot's cycle and Carnot's engine, Carnot cycle is a reversible cycle, Carnot's theorem.

**Entropy:** Entropy, Change of entropy in reversible & irreversible process, 2nd law of thermodynamics in terms of entropy, Entropy and unavailable energy, Entropy and molecular disorderness, Entropy of a perfect gas, Change of entropy is independent of path chosen for the transformation, Clausius's theorem, Clausius-Clapeyron equation or 1<sup>st</sup> latent heat equation.

**Thermodynamic functions and relations:** Thermodynamic functions, 3<sup>rd</sup> law of thermodynamics, Application of 3<sup>rd</sup> law of thermodynamics, Maxwell's mathematical relation in thermodynamics, Maxwell's relations from thermodynamic functions.

**Radiation theory:** Properties of radiation, Blackbody & blackbody radiation, Emissive power, Absorptive power, Reflecting power, Transmitting power, Kirchhoff's law, Stefan-Boltzmann law.

**Modern Physics:** Quantum theory of radiation, Photoelectric effect, Compton Effect.

### AS 108: Physics - II (Practical)

Credit	Class / Week	Total Class
<b>1</b>	<b>3</b>	<b>45</b>

#### A. Electricity:

Determination of resistance of Galvanometer by half deflection method.

Determination of the end-correction of a meter bridge.

Determination of specific resistance of a wire by meter Bridge.

Determination 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.

Determination of the horizontal component of the earth's magnetic field and the magnetic moment of a magnet by magnetometers.

Determination of a high resistance by the method of deflection.

Determination of the value of low resistance by the method of fall of potential.

#### B. Heat:

Determination of coefficient of linear expansion of solid.

Determination of thermal conductivity of metals.

Determination of Specific heat of solid by the method of mixture with radiation correction.

Determination of specific heat of liquid by the method of cooling.

Determination of Specific heat of liquid by the method of mixture with radiation correction.

Determination of the true temperature of a mixture by radiation correction.

Determination of the boiling point of a liquid by platinum Resistance thermometer.

Determination of the pressure coefficient of a gas at constant volume by constant volume air thermometer.

### AS 109: Chemistry - I

Credit	Class / Week	Total Class
3	3	45

#### General and Inorganic Chemistry

**Periodicity of the elements:** Mendeleev's periodic law and periodic table, Distribution of electron in the atoms of elements Pauli Exclusion Principle Aufbau principle, Heisenberg uncertainty principle, Hund's rule, writing electron configuration using the periodic table. Some periodic properties - such as Atomic and Ionic radii, Ionization potential, Electron affinity.

**Chemical bonding:** Electronic theory of chemical bond, Nature of covalent bond. Valence bond theory (VBT), Molecular Orbital theory (MOT), Bond order or bond multiplicity.

**Complex Compounds:** Types of ligands, Sidgwick theory, Werner theory, Crystal field theory, structure, isomerism and applications.

**Acid and Bases:** Various concept of acid and bases, Neutralization, Reaction, Strength of acid and bases, Hard and soft acid and bases. Acid bases properties of oxides, hydroxide and salt. Effect of structure on acid bases properties.

**Analytical analysis:** Instrumental methods and their classification, Advantage of Instrumental method & Chemical method, Limitations of instrumental and chemical method, Sampling, Precision and accuracy mean and median, types of errors, Significant figure convention.

#### Physical Chemistry

**Theory of dilute solution:** - Colligative properties

- i) Lowering of vapor pressure
- ii) Elevation of boiling point
- iii) Depression of Freezing point
- iv) Osmosis and osmotic Pressure, Deduction of their formulae and mol. wt. from Raoult's law and their experimental determination.

**Chemical Equilibrium:** Law of mass action, Equilibrium constant, Application of law of mass action to some chemical reaction, Heterogeneous equilibrium, Le-Chatelier principle and its application to industrial reactions.

**Chemical Kinetics:** Rate of reaction, order and molecularity, Zero order, reaction 1<sup>st</sup> and 2<sup>nd</sup> order reaction with its mathematical formulation, Determination of order of reaction, Effect of temperature on rate of reaction. Theories of chemical reaction rate, Activation Energy, Activation complex etc.

**Colloids and Colloidal solution:** Classification, Preparation and purification, Properties, Protective action and application of colloids. Emulsion, Types of emulsion, Role of emulsion.

**Photochemistry:** Laws of photochemistry, Quantum yield, Decomposition of hydrogen halide, photosensitized reaction, Fluorescence and phosphorescence, Luminescence and Chemiluminescence's.

### AS 110: Chemistry - I (Practical)

Credit	Class / Week	Total Class
1	3	45

Qualitative analysis of inorganic mixtures containing not less than three radicals including insoluble and interfering radicals. Analysis include the following:

Dry test for acid radicals ( $\text{CO}_3^{2-}$ ;  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$  etc.)

Dry test for basic radical.

Preparation of stock solution & wet test for acid radicals ( $\text{CO}_3^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ),  
 Separation of group I, II, IIIA, IIIB, IV, V.  
 Analysis of group I (Pb, Ag, Hg).  
 Analysis of group II (Pb, Cu, Cd, Hg, Sb, Sn).  
 Analysis of group IIIA (Al, Fe, Cr).  
 Analysis of group IIIB (Co, Ni, Zn, Mn).  
 Analysis of group IV (Ca, Ba, Sr).  
 Analysis of group V (Mg, Na, K,  $\text{NH}_4^+$ ).

#### **Volumetric Analysis:**

Preparation of 1M. HCl and standardization.  
 Preparation of 1M. NaOH and standardization.  
 Conversation of 98%  $\text{H}_2\text{SO}_4$  or 37% HCl into suitable concentration.  
 Preparation of 1M.  $\text{H}_2\text{SO}_4$  & standardization.  
 Preparation of 1M.  $\text{CH}_3\text{COOH}$  & standardization.  
 Preparation of 1M. KOH & standardization.

#### **Inorganic preparation:**

Preparation of Chrome Alum.  
 Preparation of Ferrous Ammonium Sulphate.  
 Preparation of Potassium dichromate.  
 Preparation of Potassium Permanganate.  
 Variation of  $\text{P}^{\text{H}}$  of different solution (Acidic, Basic, Neutral)

### **AS 111: Chemistry – II**

Credit	Class / Week	Total Class
<b>3</b>	<b>3</b>	<b>45</b>

#### **Isomerism**

**Structural isomerism:** Chain isomerism, positional isomerism, Functional group isomerism, Metamerism etc.  
**Stereo-isomerism:** Geometrical isomerism and optical isomerism. Configuration and conformation.

**Organo-metallic Compounds:** Importance and structure.

**Grignard reagent:** Preparation, Important reactions and application in organic Synthesis.

**Organo-zinc compound:** Preparation, properties, reactions and uses.

**Tetraethyl lead (TEL):** Preparation, reactions and uses.

#### **Hydroxy compounds**

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

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

#### **Carbonyl Compounds**

**Aliphatic aldehydes and ketones:** Structure, Nomenclature, isomerism, general methods of preparation and important reactions.



**Aromatic aldehydes and ketones:** Structure, Nomenclature, general methods of preparation and important reactions.

### **Carboxylic Acids**

**Mono-carboxylic Acids:** Structure, Nomenclature, general methods of preparation, physical properties & reactions.

**Functional derivatives of mono-carboxylic acids:** Acid chloride, Acid anhydride, Ester & Acid Amide.

**N.B.** A brief study of preparations, reactions and uses of the above derivatives.

### **Amines**

**Aliphatic Amines:** Classification, structure, Nomenclature, isomerism, general methods of preparation, and reactions.

**Aromatic Amines:** Structure, preparation and reactions. Diazonium salt and Azo-compounds.

### **Carbohydrate**

**Classification, Nomenclature & Monosaccharaides:** D-Glucose & Fructose

**D-Glucose:** Open structure, Cyclic Structure, physical properties and reactions.

**Disaccharides:** Structure of sucrose, Manufacturing process, reactions and uses.

**Poly saccharide:** Starch and cellulose.

**Cellulose:** Preparation, structure, Derivatives and uses.

**Starch:** Source, structure, Derivatives and uses.

**Stereo:** Chemistry and inter conversion of carbohydrate.

### **Amino Acids and Proteins**

**Amino Acids:** Classification, Nomenclature, optical activity, synthesis, properties and reactions.

**Proteins:** Peptide linkage, composition of proteins, C-terminal and N- terminal residue, identification of C-terminal and N-terminal residue.

### **Color, Dyes and Pigments**

**Color:** Theories of color, color and conjugated system.

**Dye:** Nomenclature, classification, structure, Raw materials for synthesis of Dyes, Dye intermediates and Non-textile uses of Dyes.

### **AS 112: Chemistry - II (Practical)**

Credit	Class / Week	Total Class
1	3	45

### **Identification of organic compounds containing one functional group out of the following:**

**Alcohols:** Methyl Alcohol, Ethyl Alcohol, Isopropyl Alcohol & Tert-butyl Alcohol.

**Carboxylic Acids:** Formic acid, Acetic Acid, Oxalic Acid, Benzoic Acid, Salicylic Acid, Picric Acid etc.

**Carbonyl Compounds:** Formaldehyde, Acetaldehyde, Acetone, Benzaldehyde, Acetophenone etc.

**Miscellaneous:** Phenols, Aniline, Nitro-benzene, Chloro-benzene, Urea Benzamide, Acetanalide, Acetamide etc.

### **Various types of titration:**

Standardization of  $\text{KMnO}_4$  Solution with Standard Oxalic acid or Sodium oxalate.

Estimation of  $\text{Fe}^{2+}$  with Standard  $\text{KMnO}_4$  Solution.

Standardization of Sodium Thio Sulphate Solution with standard  $K_2Cr_2O_2$  Solution.  
 Determination of available Chlorine in bleaching powder by Iodometric method.  
 Determination of  $Na_2CO_3$  content of Washing Soda.  
 Determination of Strength of  $H_2O_2$ .  
 Determination of total Acid and Alkali in Soap.  
 Determination of hardness of water.  
 Removal of hardness by different methods.

### **AS 113: Business and Communicative English**

Credit	Class / Week	Total Class
<b>3</b>	<b>3</b>	<b>45</b>

**Language:** Its function as a primary means of communication to the technologist; writing, speaking, listening and reading; difference between written and spoken language. Language appropriate to task.

Planning-format, paragraph heading, context, vocabulary etc.

**Listening, understanding and speaking Skill:** Effective Communication between speaker and listener, Techniques of description, Uses of Visual aids.

**Reading skill:** Technical literature, Books, Magazines, Scientific Journals etc.

**Definition of Communication:**

Sender- Message + Encoding- Medium- Receiver + Decoding - Feed back

**Different types of Communication:**

- Intrapersonal Communication
- Interpersonal Communication
- Small group Communication
- Organizational Communication
- Intercultural Communication
- Mass Communication etc.

**Significance of Communication:**

Special significance of Communication incorporate and multi-national business organizations.

**Use of Communication by Management:**

- Written notice
- Face-to-face conversation
- Group meeting
- Seminar/conferences

**Organizational Communication Net-work:**

- Vertical Communications - Down-ward Communication and Up- ward Communication
- Horizontal Communication

**Systems of Communication:**

- Stimulus to Communication
- Communication Components

**Letter Writing:**

Drafting private letters, Applications, Letters of complaint, Letters to the press, Apology and Explanation, Request letters, Business letters- Planning your letters, selecting formats, using short-cuts, Evaluating letters.

**Characteristics of Business letters:**

Kinds of letter, purpose of letters, Functions of a First, Middle and Last Paragraph(s), Characteristics and drafting process of Positive letters, Negative letters, persuasive letters, Routine letters and Memos.

**Report Writing:**

Types of report, Characteristics and importance of different types - Purpose - Scope - different styles of writing reports. The process of preparing informal and formal reports, Drafting reports, Progress reports, Technical reports, Industrial reports etc.

**Proposals:**

For new equipment, Increasing production, Description of visits, Experiments etc.

**Explaining:**

Process explaining, Complaining, Reporting damage etc.

**AS 114: Business and Communicative English (Practical)**

Credit	Class / Week	Total Class
1	3	45

**Grammar:** Tense, article, preposition, subject-verb agreement, clause, conditional and sentence structure

**Developing reading skill:** Strategies of reading-skimming, scanning, predicting, inferencing: Analyzing and interpreting variety of texts; Practicing comprehension from literary and nonliterary texts.

**Developing writing skill:** Sentences, sentence variety, generating sentences: Clarity and correctness of sentences, dialogue making, writing paragraphs, essays, reports, formal and informal letters.

**Listening in practice:** Recognizing sounds & words; Catching information; Finding central information in sentences; Listening at conference or seminar; Roll- play dialogue; Answering questions; Note taking

**Developing speaking skill:** Situational talks (formal, semi-formal, informal).

**Pronunciation practice:** IPA transcription.

Visual description.

**AS 211: Mathematics-III**

Credit	Class / Week	Total Class
3	3	45

**Integral Calculus:** Integration by the method of successive reduction, properties of definite integrals and uses, Wally's formula, Area under plane curves in Cartesian and polar co-ordinates, Area of the region enclosed by two curves in Cartesian and polar co-ordinates, parametric, pedal and intrinsic equation, volume of solid of revolution.

**Co-ordinate Geometry:** Transformation of co-ordinates and identification of conics three-dimensional co-ordinate system, Ellipsoid, hyperboloid of one sheet, hyperboloid of two sheets, tangent planes, normal lines. condition of tangency.

**Laplace:** Definition of Laplace transforms, Elementary transformation and properties, convolution. Solution of differential equation by Laplace transforms, Evaluation of integrals by Laplace transforms.

**Complex Variables:** Complex differentiation and the Cauchy-Riemann Equation, complex integration and Cauchy's theorem, Cauchy's integral formula and related theorems.

### AS 213: Applied Chemistry

Credit	Class / Week	Total Class
3	3	45

**Solution:** Types of solutions, Units of concentration, Solution of gas in liquid, Henry's law, solution of solid in liquid, solubility curve, Distribution law and its application, solvent extraction.

**Acid base Equilibrium:** Theories of indicator, pH and pH measurements Buffer solution, Acid base titration, solubility product and its applications of common ion effect.

**Caustic and chlorine Industries:** Important of caustic soda, soda ash, chlorine, bleaching powder in textile industry, Manufacture of bleaching powder and high test. hypochlorite, method of treatment of wastes of caustic-chlorine plants.

**Surface chemistry:** Adsorption and absorption, mechanism of adsorption on solid surface Adsorption at gas solid interface, physical and chemical adsorption, Langmuir, BET theory, surface area determination, Gibbs adsorption isotherm.

**Oils, Fats and Waxes:** Chemical Composition, Extraction and reforming of vegetable oils, Animal fats and oils, Hydrogenation, Inter-esterification, waxes and their application in textile.

**Chromatographic method of analysis:** General theory and classification, paper Chromatography, thin layer Chromatography, Gas- liquid Chromatography, HPLC.

**Spectral method of analysis:** Molecular and atomic spectroscopy, Interaction of electromagnetic radiation with matter, Beer-Lambert law, UV/Visible absorption spectroscopy, Photometric titration, IR absorption spectroscopy, Fluorescence, Phosphorescence and chemiluminescence methods, Atomic spectroscopy- atomic absorption spectrometry.

### AS 215: Statistics

Credit	Class / Week	Total Class
3	3	45

Historical development of the subject. Collection of data - Primary data and secondary data.

**Frequency distribution** - Grouped frequency distribution and their presentation in the form of frequency polygon, Histogram and Pie diagram.

**Measures of central tendency:**

(i) Mean: (a) Arithmetic Mean (b) Geometric Mean, (c) Harmonic mean

(ii) Median

(iii) Mode. Their definition, computation, Advantage, Disadvantage and uses.

**Measures of dispersion:**

(i) Absolute measure. (a) Range (b) Mean deviation (c) Quartile deviation (d) standard deviation.

(ii) Relative measure. (a) Coefficient of variation. Their definition, computation and uses.

**Moment, skew ness and kurtosis** - Their definition, computation and uses.

**Probability:** Simple idea of probability. Different definitions related to probability. Addition law of probability for mutually exclusive and not- mutually exclusive events. Multiplication law of probabilities for dependent and independent events. Probability distribution (i) Binomial, (ii) Poission, (iii) Simple idea about normal distribution and its probability curve.

**Estimation:** Simple idea about estimation: Estimation of population mean and proportions, sample size and related mathematical problem.

**Correlation and Regression:**

- (a) Correlation - Ideas of correlation. Measurement of correlation. Pearsonian correlation co-efficient. and spearman’s Rank correlation co-efficient.
- (b) Multiple correlation
- (c) Regression - Ideas about simple regression. Equation of the regression line. Estimation of the parameters of the regression line.
- (d) Multiple regression.

**Test of significance:** some definitions related to test of significance

- (i) t - test.
  - (a) Comparison of a sample mean with a known population mean when S.D. is known and when S.D. is not known.
  - (b) Comparison of two sample means when S.D. is known and also when it is unknown.
  - (c) Paired t test, its practical use in Textile Industry.
- (ii) X2 test - Simple application and its practical use in Industry.
- (iii) Test related to proportions.

**Sampling:** Definition of population, sample, parameter, census etc.

- (i) Simple Random Sampling,
- (ii) Stratified random sampling.
- (iii) Cluster sampling
- (iv) Systematic sampling,

Their definition, computation, use, advantage, disadvantage and related mathematical problems.

**Design of experiment:** Basic principles of experimental design. Ideas about CRD, RBD and related mathematical problems.

**Time series analysis:** General idea about time series, different types of time series their construction and computation.

**Index Number:** General idea about index number, different types of index number, different tests related to index number and its mathematical interpretation.

**Demand Analysis:** General idea about demand analysis, mathematical interpretation and problems.

**AS 411: Bangladesh Studies**

Credit	Class / Week	Total Class
3	3	45

Topological and demographic features of Bangladesh;

Historical background of Bangladesh;

Social, Economic and political life in Bangladesh;

**Natural resource of Bangladesh:** Land and forest, Water and Fishes, Minerals etc.

Art and Literature of Bangladesh

Role of Education in human resource development;

Administrative setup- Central and local governments;

Empowerment of women in Bangladesh;

**Environmental Challenges:** Floods, Drought, Arsenic in ground water, Deforestation and others pollution;

**Industries of Bangladesh:** Importance, Principal of industries export Oriented industries, Small & Cottage industries, industrial policy, Future Trend of industries structure. Challenges and opportunities facing specially for the Textile & RMG sector;

**Bangladesh Economy and development:** GNP and per capital income, Service Sector, Role of NGO's, Informal Service, Financial institution and their accountability ADB, WB, IMF, IDB, Trends in human development indicators, Trends in birth rate, death rate and population growth, Economic grow in Bangladesh and comparisons with other countries, Various Development Strategies and policies of Bangladesh; Effect of free market and globalization in Bangladesh.

**Department of Yarn Manufacturing Engineering**  
**Detailed outline of courses offered for B.Sc. in Textile Engineering**  
**(Yarn Mfg./Fabric Mfg./Wet Processing/Apparel Mfg.)**

**YME 121 Textile Fiber: Natural Fibers**

Credit	Class/Week	Total Class
<b>3</b>	<b>3</b>	<b>45</b>

**Introduction to textile fibers:** Historical background of textile, Definition of Textile, Textiles & Textile fibers, Classification of textile fibers with example, World production & consumption of textile fiber.

**Study of cellulosic fibers:**

**Cotton:** Cultivation and harvesting, Growth, composition, physical and chemical structure and properties, Geographical distribution, Ginning, grading and classification, End uses.

**Bast fibers:** Cultivation and harvesting of different types of bast fibers with special reference to Jute, Flax, Hemp and Ramie Growth, composition, physical and chemical structure and properties, study of fiber properties ultimate's, sorting, grading and classification, End uses.

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

**Study of Protein fibers:**

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

Sources and types of animal hair fibers.

**Silk:** Growth, composition, physical and chemical structure and properties, Sericulture and methods of production, Geographical distribution, End uses.

**Mineral fiber:** Asbestos.

**YME 123: Introduction to Textile**

Credit	Class/Week	Total Class
<b>2</b>	<b>2</b>	<b>30</b>

**Historical background of textile industry in Bangladesh, Structure of textile**

**Industry in Bangladesh:** No. of spinning/weaving/knitting/dyeing and printing/Garments industry, production capacity, products manufactured, manpower involved, imported machinery, export and local demands, importance of textile industry in socio-economic aspects of Bangladesh.

**Introduction to fiber and textile fibers:** General properties, introduction to textile manufacturing and coloration, introduction to technical textiles, General manufacturing flowchart from fiber to garments, role of textile engineer in textile industry, present scopes and challenges in textile sector.

### YME 221: Short Staple Spinning-I

Credit	Class/Week	Total Class
3	3	45

Characteristics of Fiber considered by a spinner.

Flow chart for the production of carded and combed yarns.

Importance of mixing, blending, different mixing and blending techniques.

**Blow Room:** Principles of opening and cleaning, study of blow machines for blending, opening, cleaning and control of regularity of mass per unit length, extraction and control of waste, settings for waste, blow room lines for different purposes, use of suitable sequences of machines, different chute feeding system, advantages and disadvantages of chute feeding to cards, safety, prevention of fibers, methods of extraction of metal, dust and foreign material; main settings, speeds, cleaning efficiency, production. Different types of opener and beater, its characteristics, nature with fiber, change points, regulating system and its development. Air current, role, generation, supply and controlling in blow room line. Transport and supply system of fiber through blow room line.

**Carding:** Principles and objects of carding; Detailed study of therevolving flat card; Function of different parts and design of card. Fiberflow and draft distribution between rollers. Types and care of wire, stripping, grinding, doffing mechanism. extraction and control of waste and dust, can coiling. speeds, productions, settings, cleaning efficiency, control of nep and fiber damage. Variation in sliver mass per unit length. Modern tend of carding machine. Role of auto-leveler in card. Mechanism of hooked ends created in carding.

**Draw Frame:** Principles of roller drafting; different types of drafting arrangement. Role of different parts at drafting system. Drafting forces; Fiber control; Drafting wave and effect of short fibers and fiber orientation in sliver, reduction of fiber hook end. Mechanical faults causing periodic variation in sliver. Minimum theoretical variation, Effects of doubling and drafting, Study of draw frame, drafting systems, Stop mechanisms, Can coiling, Roller setting, Production, Introduction to auto-levelers. Role of draw frame as a total quality of yarn.

### YME 222: Short Staple Spinning-I (Practical)

Credit	Class/Week	Total Class
1	3	45

Detailed practical study of Mixing, Blow room, Carding and Draw frame of Cotton Spinning.

### YME 223: Yarn Manufacturing-I

Credit	Class/Week	Total Class
3	3	45

Characteristics of fiber considered by a spinner.

Flow chart for the production of carded and combed yarn.

Importance of mixing and blending.

**Blow Room:** Study on Modern Blow Room line, advantages and disadvantages of chute feeding to cards, production.



**Carding:** Principles and objects of carding; study of the revolving flat card; card clothing, Production calculation, cleaning efficiency.

**Draw Frame:** Principles of roller drafting; Drafting wave and effect of short fibers; Effects of doubling and drafting, Study of draw frame, Drafting systems, Roller setting, Production, introduction to auto-levelers.

**Comber:** Objects of the combing process. Methods of comber lappreparation and Principle of comber, Cycle of operations. Comber waste and waste control, production.

**Speed frame:** Objects of speed frame. Study of types of drafting systems, amount and distribution of draft. Twisting and amounts of twist for different materials, use of false twist, speeds and production.

**Ring frame:** Function of ring spinning process, description of main working parts.

Drafting systems, types of spindle, ring and travelers, speeds and production. End breaks. Introduction to Winding and Yarn conditioning.

### YME 224: Yarn Manufacturing-I (Practical)

Credit	Class/Week	Total Class
1	3	45

Practical study of Mixing, Blow room, Carding and Draw frame, Simplex, Ring frame of Cotton Spinning.

### YME 225: Textile Testing & Quality control -I

Credit	Class/Week	Total Class
3	3	45

Introduction to Textile Testing and quality control, importance of Textile Testing, Sampling methods.

**Moisture:** Moisture content and moisture regain; Standard moisture regain of different fibers. Effects of Moisture on textile. Relative humidity, measurement of relative humidity, standard conditions for testing, importance of moisture regain, methods of measurement of moisture in Textiles.

**Fiber Testing:**

**Fiber length:** Length, staple length, effective length, span length, fiber length dispersion. short fiber percentage, methods of fiber length measurement.

**Fineness & maturity of cotton:** Definition, importance, relationship between fineness & maturity, methods of measurement and expressions of results. maturity ratio.

**Neps:** Definition, causes of nep formation, measurement of neps.

**Trash and Foreign matters:** Measurement of trash and foreign matters in fiber.

**Tensile strength:** Single fiber & fiber bundle test, comparison between single fiber & bundle test.

**Modern Fiber Testing Equipments:** Scope of AFIS & HVI for fiber testing. Calibration system and basic working principle of AFIS & HVI

**Yarn Testing:**

Measurement of linear density of lap, sliver, roving & yarn. Different methods of numbering yarn. Interrelationship among different yarn numbering systems.

**Twist in yarn:** Definition of twist, different types of twist, measurement of twist. Effect of twist on yarn properties.

**Yarn Testing:**

Sample and different Sampling methods, 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.

Sliver, roving and yarn irregularity; measurement by cutting and weighting methods, thickness under compression, capacitance and other methods; length variance curves. Use of spectrogram for analysis of periodic, random and drafting wave variation, Measurement of imperfections. Comparison of results with Uster statistics. Procedure for correction and implementation of result.

Classification of yarn faults. working principle of Classmate tester, yarn clearer, typical quality requirement of knit and woven yarn for exporttextile manufacturing.

**Measurement of yarn hairiness**

**YME 226: Textile Testing & Quality Control -I (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Determination of moisture regain and moisture content of cotton,

Fiber length and length characteristics. Fiber fineness, Maturity ratio of cotton fiber.

Determination of trash content in cotton, Fiber strength by pressley strength tester, hank of sliver and roving,

Count of yarn by wrap reel and balance in different counting systems.

Count of yarn by (i) Knowles balance

(ii) Beesley's balance

(iii) Quadrant balance

Twist of single and double yarn.

Determination of fiber properties by AFIS and HVI.

Determination of neps of raw cotton and sliver.

Determination of (i) Single yarn strength by single yarn strength tester

(ii) Lea strength and C.S.P of yarn

(iii) Irregularity of sliver, roving & yarn by evenness tester (Uster Tester)

(iv) Analysis of yarn fault by classmate

(v) Analysis of load elongation curve for yarn and fabric strength.

**YME 227: Textile Physics -I**

Credit	Hour/Week	Total Hour
2	2	30

**The Physical structure of fiber:** Crystallinity, orientation and amorphousness, Basic concepts of methods for investigating of fiber structures, e.g. X-ray diffraction method, Optical and electron microscopy, infrared radiation absorption. Advantages of infrared radiation method over x-ray diffraction method.

**Detailed study of fiber properties:**

**Mechanical properties:** Tensile properties, analysis of stress strain curve, elastic and plastic behavior of textile fiber, factors affecting the tensile properties of fiber. Creep and relaxation, method of measuring tensile properties, CRL, CRE method, work factor, work of rupture, Torsional properties, Flexural properties.

**Swelling properties:** Importance of swelling phenomenon in textile, Different types of swelling, relation among different types of swelling, methods for measurement of volume swelling.

**Frictional properties:** Importance of friction, different types of friction, amounton law of friction, Effect of lubricant on friction, different methods for measurement of friction, effect of friction in different stages of textile processing, problem of friction in textile, directional frictional effect, felting properties of Wool.

**Optical properties:** Bi-refringence properties, Refraction, Methods for measurement of bi-fringence, Dichriism, Dichriotic constant, Reflection, lusture. Factors affecting the lusture of Textile.

**Thermal properties:** Thermal conductivity, Melting temperature, Glass transition temperature, Heat setting, Structural changes due to heat setting, Effect of heat setting in textile wet processing.

**YME-305: Application of Computer in Yarn Manufacturing**

Credit	Hour/Week	Total Hour
2	2	30

**System Analysis & Design:** System analysis; System design; Differencebetween analysis and design; System analysis and their role; Systemdevelopment life cycle (SDLC) - SDLC stages, feasibility study, cost/benefit analysis, Data flow diagram (DFD); Introduction to project management.

**Database Management System:** Basic concepts - character, field, record, file, database; Benefits and limitations; Levels of abstraction; Instances andschemas; Data manipulation language (DML) Data definition language(DDL); Structured query language (SQL); Entity-relationship (ER) model; Transaction management; Database administrator. Relational database-concept, definition, properties; Basic SQL statements - CREATE, DROP, SELECT, INSERT, UPDATE, DELETE, COMMIT, ROLLBACK; Database connectivity.

**Automation:** Basic automation terminologies; Quality control; Software testing, Verification; Validation; Computerized production planning and control.

**Applications:** Critical path analysis; Linear programming. Introduction to CAD/CAM; Linear programming for cotton mixing; Softwaredevelopment & application for Bale management, detection of foreignmaterial in fiber; Spin plan preparation, Yarn count measurement, Continuous quality control & process control in yarn manufacturing; Ring data analysis; Inventory control.

**YME-306: Application of Computer in Yarn Manufacturing (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

- Cost/benefit analysis using spreadsheet;
- Drawing DFD using drawing software;
- Installation of Database management software;
- Creation and dropping of database table;
- Retrieving records from database tables in different ways;

Adding new records to the database tables in various ways;  
 Changing existing values of records in database tables fulfilling the condition;  
 Removing records from database tables;  
 Completing and revoking transactions;  
 Connect database through programming;

Usage of CAD/CAM software;  
 Bale management technique,  
 Write a program for detection of foreign material,  
 Make a spin plan with visual basic.  
 Make Program for Automatic measurement of Yarn Count, Strength, Elongation, Evenness, Imperfection and Hairiness. Quality Control & Process control, Ring data and analysis of spectrogram.

**YME 321: Short Staple Spinning - II (Theory)**

Credit	Hour/Week	Total Hour
3	3	45

**Lap former:** Object of comber lap formation, methods of lap preparation, type of lap former machine, material passage diagram, and specification of lap former machine.

**Comber:** Object of combing, principle of combing, specification of comber, material passage, function of different parts of comber, cycle of combing operation, type of combing, comber waste and control of waste, setting of comber machine, effect of setting on waste, sliver quality and amount of waste. Drafting system of comber, sliver coiling arrangement and production calculation.

**Simplex:** Object and function of simplex, material passage, specification of simplex, function of different parts of simplex, drafting system of simplex, detail study about drafting system, total draft, setting and distribution of draft, Twist, false twist and amount of twist for different material, building mechanism, winding and bobbin building. Object and action of cone drum and differential mechanism. Drive to bobbin, spindle and flyer. Setting, Speed and production calculation.

**Ring:** Object and function of ring spinning system, material passage, specification and working principle of ring spinning, different drafting system and its specification, type of ring, traveller and spindle, yarn tension, different forces acting on traveller. Twisting, winding and bobbin building mechanism. End breaks, wastage, yarn fault, setting, production and speed and change pinions, limitations & advantages of ring spinning & steps taken to overcome these limitations. Property and end uses of ring yarn. Theory of ring spinning.

**Winding:** Object and function of winding, principle of auto-coner, yarn fault detection and cutting of yarn fault, auto splicing mechanism.

**Doubling:** Different type of doubling and twisting system of ply yarn, sewing thread.

**Yarn Conditioning:** Object and function of yarn conditioning, procedure and method of conditioning. Yarn finishing.

**Packing:** Yarn package, reeling, bundling and bailing.

### YME 322: Short Staple Spinning - II (Practical)

Credit	Hour/Week	Total Hour
1	3	45

Material passage diagram, gearing, setting, and draft, twist & production calculation of comber, simplex, Ring frame and Winding machine.

Study of the drafting system

Selection & Adjustment of comber, parameters to achieve required % of short fiber removal.

Selection & adjustment of simplex, Ring and winding machine parameters for spinning yarn of required count.

### YME 323: Yarn Manufacturing- II

Credit	Hour/Week	Total Hour
3	3	45

**Long Staple Spinning:** Flow-chart of jute spinning, Object, material passage, working procedure, different parts and production of jute softener, spreader, breaker card, finisher card, 1st, 2nd, 3rd of jute drawing different jute spinning machine. Different types of jute yarn and its uses,

**Modern Spinning:** Modern spinning systems. Brief outline, production, limitation and advantages of rotor, air-jet, air-vortex, friction and wrap, spinning. Yarn property and end uses of rotor, air-jet air-vortex, friction and wrap yarn. Modern long-staple spinning systems.

**Spinning of Man-made fibers & their blends:** Detailed study of processing man-made staple fibers, viz, viscose rayon, polyester, acrylic and their blends with cotton on cotton processing machines, changes in machine speeds, settings and productions, properties of blended yarn.

**Special Yarn:** Production, character and end-uses of special yarn (core-spun, slub, siro, compact, chenille, textures, fancy and different composite). Special Jute yarn.

### YME 324: Yarn Manufacturing-II (Practical)

Credit	Hour/Week	Total Hour
1	3	45

Practical study of jute spinning machinery.

Material passage diagram gearing, setting and draft, twist & production calculation

Practical study of Rotor and Air-jet Spinning machine.

Material passage diagram and production calculation.

### YME 325: Textile Testing and Quality Control- II

Credit	Hour/Week	Total Hour
3	3	45

**Fabric Testing:** Fabric dimensions, 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 of woven and knit fabric, Relationship among fiber, yarn and fabric strength.

Measurement of fabric stiffness and its relation to crease, handle and drape, factor effect on stiffness, handle, crease and drape of fabric.

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

Measurement of fastness to light washing, rubbing and perspiration, Estimation of damage to materials caused by physical & chemical treatments viz, singeing scouring, bleaching, Determination of size and residue of size on fabric.

**Garments Testing:** Garments inspection system, Seam strength, Button pull test, Zipper test and other garments tests.

**Carpet Testing:** Carpet thickness, Compression and durability tests.

**Identification of fibers:** Identification of different natural & Man-Made fibers from a yarn/fabric sample, Estimation of constituent fiber percentage from blended sample.

Assessment of yarn, fabric & dyeing quality of a sample. Comparison of yarn, fabrics & dyeing quality of more than one supplied sample.

Tests methods & international quality standard. BSTI, PO, ASTM, British, Indian & Pakistani standard for textile & Jute materials.

### YME 326: Textile Testing and Quality Control-II (Practical)

Credit	Hour/Week	Total Hour
1	3	45

Determination the dimension, weight/unit length, thickness, porosity, strength (tensile, tearing, ballistic and bursting), abrasion, pilling, handle, drape, crease, crease recovery, water absorption, water repellency dimension stability carpet testing.

Determination of size percentage, fastness to light, fastness to wash, fastness to rubbing, fastness to perspiration of woven and knit fabric.

Determination of seam strength, button strength, Garments inspection.

Identification of fibers. Estimation of constituent fiber content of a blended material.

Assessment of yarn, fabric and dyeing quality of a sample. Comparison of yarn, fabric and dyeing quality of more than one supplied sample.

### YME 327: Long Staple Spinning

Credit	Hour/Week	Total Hour
3	3	45

**Bale Management:** Selection of jute for different quality of yarn, mixing of different grade of jute.

**Jute Softening:** Emulsion, type of emulsion, quality of emulsion, ingredients of emulsion, function of different ingredients, object, function, working procedure and different parts of softener and Spreader machine.

**Breaker and Finisher Card:** object, function, working procedure, different parts and control of sliver quality of breaker and finisher card machine. Effect of pin density and r.p.m of different roller on Sliver quality, production and wastage.

**1st , 2nd and 3rd Drawing Machine:** object, function, working procedure, different parts, drafting arrangement, control of sliver quality of 1st , 2nd and 3rd Drawing Machine.

**Jute Spinning Machine:** object, function, working procedure, different parts, drafting system, twisting procedure, lifting mechanism, yarn tension and package building of flyer spinning machine, modern jute spinning machinery.

**Quality of yarn:** quality parameter, control of yarn quality at different stages. Standard quality parameter of different jute products.

**Diversification of jute:** Geo-jute, modification of jute, sulfonation process, different diversified jute products.

**Long staple:** Manufacturing of jute blend yarn using long and short staple spinning method. Properties and end-uses of jute blend yarn.

### YME 328: Long Staple Spinning (Practical)

Credit	Hour/Week	Total Hour
1	3	45

Material passage diagram, Gearing and Draft, twist & Production calculation of Jute softener, Breaker, Finisher Card, 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Drawing and Jute Spinning Machine.

### YME 329: Textile Physics - II

Credit	Hour/Week	Total Hour
2	2	30

**Electrical properties:** Electronic properties of solids, conductors & insulators, capacitance, di-electric constant, effect of moisture, Measurement of di-electric 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.

**Fiber & Yarn structure and their properties:** Engineering approach to fiber structure. Mechanics of simple yarn structure, effects of fiber properties and yarn twist on torsional and flexural rigidity. Effect of fiber length, fineness, strength and moisture on yarn strength.

**Yarn Geometry:** Yarn geometry, effect of yarn twist on yarn strength (obliquity effect), Luster, yarn diameter and handle.

**Fiber Migration in Yarn:** Fiber migration, theory and causes of migration of fibers to surface or core of yarn.

**Fabric Geometry:** Geometry of plain woven fabric, calculation knowing crimp ratio and thread spacing, Geometry of jammed conditions, crimp interchange, effect of yarn flattening, deformation of 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.

### YME 421: Modern Yarn Manufacturing

Credit	Hour/Week	Total Hour
3	3	45

**Detail study of compact spinning:**

**Modern Spinning:** Historical background and basic concept of modern spinning. In depth study of Rotor Spinning, Air-jet and Air-vortex: Friction spinning, Wrap, Twill, Anti-static, Twist less and other different new spinning

system. Comparison of different spinning method, twisting capacity, yarn quality, productions and economics with ring spinning system.

**Spinning of Man-made fibers & their blends:** Detail study of processing man-made fiber, i.e. Viscose Rayon, Polyester, Polyamide, Acrylic and their blend with cotton on cotton processing machines. Changes required in machine speeds and different setting. Properties of blended yarn, analysis of blend, Effects of blend proportion, fiber length, fineness and surface characteristics of fiber on yarn properties.

**YME 422: Modern Yarn Manufacturing (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Detail practical study of Rotor and Air-jet Spinning.  
 Material passage diagram, Gearing and Production calculation.  
 Study on slub and core spun attachment of ring spinning.  
 Study the machine of Two for one twister, Texturizing and waste opener.

**YME 423: Process Control in Spinning**

Credit	Hour/Week	Total Hour
3	3	45

**Process Control:** Importance and scope for process control in spinning; Considerations for evolving a system for process control, Key variable for process control, Establishing norms and standards for process control.  
**Control of Mixing quality and cost:** Control of Mixing Quality Through Fiber Characteristics, Simultaneous Control of Mixing Cost and quality.  
**Control of yarn Realization:** Norms for yarn realization, Factors affecting yarn realization, Control of waste & Cleaning in Blow room and card, Control of comber waste.  
**Control of yarn Quality:** Count, Strength & their variability. Yarn unevenness and imperfections, Yarn Hairiness, neps, classmate, faults. Analysis of spectrogram. Control of yarn faults and package defects.  
**Machinery Audit:** Impact of machine conditions on processing performance and yarn quality. Implementation of the system of machinery Audit, Test instruments for Machinery Audit.  
**Measurement and analysis of productivity:** Definition of indices of productivity, Measurement of productivity, Productivity analysis, productivity and profitability, means to improve productivity, maximizing machine efficiency in ring spinning, Controlling end breakage rate in ring spinning. Energy conservation in spinning.  
**Control of stores expenditure:**  
 Implementation of process control in cotton spinning.  
 Implementation of process control in Jute spinning.



### **YME 424: Process Control in Spinning (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Hour</b>
<b>1</b>	<b>3</b>	<b>45</b>

Identification of the key variable for process control in spinning.

Establishing norms and standards for process control.

Production of Lap, Sliver, Roving and yarn, Evaluation of Lap, Sliver, roving and yarn, quality. Effect of different speed, settings of blow room and card on product quality. Effects of drawing on noil extraction of comber.

Study on end breakage rate, Effect of yarn clearer setting on yarn quality, Spectrogram analysis. Compare of quality of the products with USTER quality.

Prepare a plan to implement process control in spinning.

To practice Machinery audit.

Productivity analysis of different spinning machinery.

### **YME 425: Special Yarn Production**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Hour</b>
<b>2</b>	<b>2</b>	<b>30</b>

Define composite, ply and cord Yarn

Raw material, Property, end use and manufacturing system of compact, Core spun, Slub, Siro, wrap, bobtex, chennile and different fancy yarn.

Texturization: basic principle, type and different methods. Property and end uses of texturized yarn. Conversion of tow to top

### **YME 426: Maintenance of Spinning Machinery (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Hour</b>
<b>1</b>	<b>3</b>	<b>45</b>

To become familiar with maintenance tools and their function.

Safety practice

To prepare schedule for routine maintenance for all spinning machinery.

To practice operations/activities carried out during routine maintenance. (including cleaning, oiling, lubricating & creasing tighten & loosening of nut bold, fitting of belts, setting change etc.).

Dismantling and reassembling of machine parts.

Replacement strategies for different spares & accessories.

Practice of overhauling and erection of spinning machine.

Computer control of maintenance management.

Practice of inventory management.

Practice of preventive and corrective maintenance.

**YME 428: Industrial Attachment**

<b>Credit</b>	<b>Hour / Week</b>
<b>1</b>	<b>2 month</b>

The students must undergo 2(two) months intensive of Industrial Training programing the relevant area of specialization after completion of Level-III, Term-II.

**YME 420: Project Work**

<b>Credit</b>
<b>3</b>

During the Level-IV of study each student will be required to complete a Project Work in the relevant field of their specialization. For such a workthe students will be guided by a Supervisor of the concerned Department.

**YME 400: Comprehensive Viva**

<b>Credit</b>
<b>2</b>

The Comprehensive Viva will cover the entire 4 years courses of study. 60% weightage will be on the departmental subjects. 40% weightage willbe on all other subjects. No specific class hour will assigned for the comprehensive Viva.

## Department of Fabric Manufacturing Engineering

Detailed outline of courses offered for B. Sc in Textile Engineering  
(Yarn Mfg./Fabric Mfg./Wet Processing /Apparel Mfg./ Tex.Mgt/Fashion & Design)

### FME 231: Weaving Preparatory Process

Credit	Hour/Week	Total Hour
3	3	45

Introduction and historical background of fabric manufacturing, flow chart for Weaving, Introduction to yarn preparation.

**Winding:** Definition, parameters, Requirements, Types of winding packages with uses, Methods of driving the packages - Precision & non-precision winding. Yarn tensioning devices, modern conception of winding, package hardness, Ballooning, cop, cheese, pirn and cone winding machines, winding defects and their remedies. Calculations regarding winding.

**Warping:** Techniques of warping - direct and sectional warping, different parts of warping machines with detailed function and controlling points, Warping plan for a particular fabric, Faults in Warping and their remedies. Calculations regarding warping.

**Sizing:** Definition and types of sizing. Size materials and their functions& requirements, Technological changes due to sizing, typical recipes, Techniques of sizing, Mechanism of size take-up, Methods and factors of drying, dressing of jute yarn, Warp sizing and weaving efficiency, Sizing of blended and synthetic yarn. Attempts to substitute sizing process, Defects in sizing and their remedies, Calculations regarding sizing.

**Looming:** An introduction on Drafting, drawing, denting, pinning, tying -in and gaiting Processes, Machineries involved in these processes, mathematical calculation regarding them.

### FME 232: Weaving Preparatory Process (Practical)

Credit	Hour/Week	Total Hour
1	3	45

**Winding:** Practical study of cone, Cheese Flanged bobbin, Cop and pirn winding machines.

**Warping:** Practical study of different warping machines.

**Sizing:** Detailed study on sizing machine.

**Looming:** Introductory study on related machines.

### FME 233: Fabric Manufacturing (Weaving) -I

Credit	Hour/Week	Total Hour
3	3	45

Introduction and historical background of fabric manufacturing. Flow chart for weaving.

#### **Weaving Preparation:**

Introduction to yarn preparation.

**Winding:** Types of winding package. Precision and non precision winding, Yarn tensioning device, cop, cheese, pirn and cone winding machines, winding defects, and their remedies,

**Warping:** Direct and Sectional warping, Warping machines, warping plan for a particular fabric, Faults in Warping and their remedies.

**Sizing:** Size materials and their function, Technological changes due to sizing, typical recipes, Mechanism of size take-up, Methods and factors of frying, dressing of jute yarn, Warp sizing and weaving efficiency, Sizing of blended and synthetic yarn, Defects in sizing and their remedies.

**Weaving:**

**Looming:** Drafting, drawing, denting, pinning, tying-in and gaiting, Machineries involved in these processes. Introduction to the historical/ Development of looms, Classification of looms and description of various types of conventional looms. Motions of looms.

**Sheds and Shedding:** Various types of shed. Objective and classification of shedding, Tappet shedding: timing and dwell period. Dobby shedding mechanisms, Peg plan. Types and basic principles of jacquard shedding mechanisms,

**Picking:** Classification, over and under picking mechanisms. Controlling factors of picking, picking faults.

**Beating:** Classification, Principles of crank and crank arm, double beat-up mechanisms, sley eccentricity ratio and its effects.

**Take-up Let-off Mechanisms:** Classification, pick spacing and its controlling factors, calculations of take-up constant, picks/cm and rate of let-off.

**Automatic Conventional Weaving:** Features automatic looms. Weft replenishments. Methods of warp and weft patterning, warp protector motion. Causes of warp and weft breakage in weaving, warp stop motions, side and centre weft fork mechanism.

**Jacquard weaving:** Different Jacquard looms. Systems of harness mounting methods of increasing the figuring capacity.

**Modern weaving:** Features of modern looms. Brief study of projectile.

Rapier. Air-jet. Water-jet and Multiphase weaving machines with modern shedding and beat-up systems.

Loom efficiency with controlling factors, Layout of a particular weaving floor, Utilities required for weaving.

Fabric faults-their causes and remedies. Standard commercial fabrics (jute/cotton/synthetic).

**FME 234: Fabric Manufacturing (Weaving)- I (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Practical study of Cone, Cheese, Cop and Pirn winding machines.

Practical study of different warping machines.

Study of sizing machine.

Detailed study of relevant mechanisms and operation of weaving machinery.

Study of fabric defects, visit to manufacturing plants.

**FME 235: Fabric Structure & Design-I**

Credit	Hour/Week	Total Hour
2	2	30

**Woven Fabric Structure:**

**Introduction:** Classification of woven fabrics, Plain weave fabric and its representation, Factors affecting the fabric structure, Elements of fabric design-drafting, lifting and denting plan.

**Plain Weave Fabrics:** Features and classification of plain weave. Derivatives of plain weave and their characteristic, Ornamentation of plain weave fabrics by varying set, yarn linear density, crimp, twist and material etc. Commercial plain fabrics and uses.

**Twill-weaves:** Features and classification of twill weave, Definition of the terms balanced, warp-faced and weft-faced twill weaves. Derivatives of twill weaves and their characteristics, developed twill weaves, i.e. waved, herringbone and diamond and elongated. Influence of yarn twist on the twill lines. Angle of inclination of twill weaves. Commercial twill fabrics and their uses.

**Satin and sateen weaves:** Features of satin weaves classification, move number selection. Derivatives of satin weaves with Drafts, denting and pegging plans, Advantages and disadvantages of satin wave. Commercial fabric made by satin construction with their uses.

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

### **Knitted Fabric Structure:**

**Introduction:** Notation, types, clear concept about verbal notation, line diagram or looping diagram, diagrammatic notation or chain and symbolic, Rules of needle and cam arrangement

**Single Jersey Structure:** Notation and characteristics of plain single jersey structure, Non-jacquard single jersey derivatives with notation, needle and cam arrangements.

**Double knit structure:** Notation and characteristics of 1\*1 Rib and 1\*1 interlock structure. Non-Jacquard Rib and interlock derivatives with needle and cam arrangements.

**Purl Structure:** Notation and characteristics of 1\*1 Purl structure and purl derivatives.

### **FME 236: Fabric Structure & Design-I (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

General procedure for the analysis of Woven fabric.

Determination of specifications for the reproduction of fabric samples of all types.

Calculations relevant to the production of different types of woven fabric.

General procedure for the analysis of Knit fabrics.

Determination of specifications for the reproduction of fabric samples of all types.

Calculations relevant to the production of different types of knit fabric.

### **FME 237: Fabric Structure & Design-II**

Credit	Hour/Week	Total Hour
2	2	30

### **Woven Fabric Structure:**

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

**Color & Weave effects:** Stripe and check effects using basic and simple fancy weaves. Color in combination with weave effects, i.e. pinstripe, crow's foot, dog's tooth, shepherds check etc.

**Double Cloth:** Designing of double width, tubular, multiply and stitched double cloth, designing of double equal plain fabrics figured by inter change.

**Pile Fabrics:** Brief idea on different types of pile fabrics.

**Knitted Fabric structure:**

**Weft knitted:** Jacquard structures of Single jersey, Rib and Interlock with notations.

**Warp knitted:** Tricot structures knitted with two full set guide bars. Multi guide bar fabrics.

**FME 238: Fabric Structure & Design-II (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

General procedure for the analysis of woven fabrics including double cloth and pile fabrics.  
Determination of specifications for the reproduction of fabric samples of all types.  
Calculations relevant to the production of different types of woven double cloths.

General procedure for the analysis of knitted jacquard design and warp knitted fabrics.  
Determination of specifications for the reproduction of fabric samples of all types.  
Calculations relevant to the production of different types of knit fabrics.

**FME 331: Weaving-I (Theory)**

Credit	Hour/Week	Total Hour
3	3	45

Introduction to the Historical / Chronological Development of looms.

Different types of shed, Classification of looms and brief description of Primitive, pit, frame fly shuttle, Chittaranjan and hattersley looms.

Classification and definition of motions of loom, loom drive and brakes.

**Shedding:** Objective & Classification of shedding

**Tappet shedding:** Scope, types of tappet, advantages and disadvantages,

Construction of shedding tappet and conditions for good shedding.

**Dobby Shedding:** scope & classification, Negative, Positive & cross-border doobby, peg plan, timing & dwell period of doobby.

**Jacquard Shedding:** Scope, types and Basic principle of jacquard shedding mechanism.

**Picking:** Objective, classification, Over & under picking mechanisms, Construction of picking tappet, picking faults,

**Beating:** Classification, principle of crank & crank arm beating Double beat-up mechanism, Sley eccentricity ratio and its effects,

**Take-up and let-off mechanisms:** Objects, classification, calculation of take-up constant, picks/cm and rate of let-off. Variations in pick spacing. Necessary calculations.

**Automatic conventional weaving:** Features of automatic looms. Weft replenishment, methods of warp & weft patterning, warp protector motion. Side & centre weft fork motion. Causes of warp & weft breakage in weaving.

**FME 332: Weaving-I (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Practical Study of involved machinery.

Dismantling & reassembling of various parts, operation of machinery.

Visit to manufacturing plants.

**FME 333: Fabric Manufacturing (Knitting and Non-woven)-II (Theory)**

Credit	Hour/Week	Total Hour
3	3	45

**Knitting:**

**Introduction** and historical background of Knitting Technology, Raw materials for knitting.

**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.

**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.

Stitches produced by varying the timing of the needles, loop intermeshing.

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

**Tricot two full set guider bar m/c** and its product, Rules for product, Rules for locknit, Tricol, Sharkskin etc.

Fabric production, surface interest, Relief and open work fabrics, Calculations related to weft and warp knitting

**Crochet warp knitting machine:** feature, knitting action and end use etc

**Knitted fabric faults** with causes and their remedies

**Non-woven:**

Definition and classification.

**Identification** of nonwoven fabrics

**Methods of web formation:** Conventional method of non-Woven fabric formation, Modern techniques for the production of non-woven.

**Properties and uses** of non-woven fabrics.

**Faults and remedies** of non-woven fabrics.

**Environmental problems** caused by non-woven fabrics.

Detailed study on Non-woven film and felt.

### FME-334: Fabric Manufacturing (Knitting and Non-woven)-II (Practical)

Credit	Hour/Week	Total Hour
1	3	45

Practical study of the machinery involved.

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

Practical study of different mechanisms feeding, drawing-off, winding and receiving, driving, & stopping mechanisms.

Operational technique of knitting machinery.

Detection of fabric specification from given samples.

### FME 335: Knitting & Non Woven - I (Theory)

Credit	Hour/Week	Total Hour
3	3	45

Introduction and historical background of knitting Technology.

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.

**Weft knitting:** Basic weft knitted structures, stitches produced by varying the timing of the needle loop intermeshing.

**Study on weft knitting machines:** Fabric machine, garment length machine. 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. Purl knitting cam system.

**Production of weft knitted fabrics:** simple tuck and float stitch single jersey fabrics.

**Flat knitting:** Principles and structures.

**Hosiery machines:** Mechanism for wells, heels and toe production. Hosiery stitch control mechanism.

**Warp Knitting:** Basic warp knitting principles - Terminology mechanism.

Classes of warp knitting machinery, Tricot and Raschel machines,

Stitch formation on bearded and compound needle tricot warp knitting machine.

Stitch formation on latch needle and compound needle Raschel warp Knitting machine.

Calculations related to weft and warp knitting.

#### Nonwoven-I

Definition, detailed classification, raw material for nonwoven production, properties and specialties of nonwoven fabric, web formation methods, brief discussion on web bonding methods, manufacturing process of felt and film production, faults and remedies of non-woven fabric



**FME-336: Knitting & Non-Woven -I(Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Practical study of the machinery involved.

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

Practical study of different mechanisms- feeding, drawing-off, winding and receiving, driving, & stopping mechanisms.

Operational technique of knitting machinery.

Detection of fabric specification from given samples.

**FME-337: Application of Computer in Fabric Manufacturing (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

**System Analysis & Design:** System analysis; System design; Difference between analysis and design; System analysts and their role; System development life cycle (SDLC) - SDLC stages, feasibility study, cost/benefit analysis. Data flow diagram (DFD); introduction to project management.

**Database Management System:** Basic concepts - character, field, record, file, database; Benefits and limitations; Levels of abstraction; instances and schemas; Data manipulation language (DML); Data definition language (DDL) Structured query language (SQL); Entity-relationship (ER) model; Transaction management; Database administrator; Relational database - concept, definition, properties; Basic SQL statements - CREATE, DROP, SELECT, INSERT, UPDATE, DELETE, COMMIT, ROLLBACK; Database connectivity.

**Automation:** Basic automation terminologies; Quality control; software testing; Verification: Computerized production planning and control.

**Applications:** Critical path analysis; Linear programming; Introduction to CAD/CAM; Software development & application for weave plan, Calculation of yarn consumption, Fabric structure analysis, color & weave effect, etc.) Inventory control.

**FME-338: Application of Computer in Fabric Manufacturing (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Cost/benefit analysis using spreadsheet;

Drawing DFD using drawing software;

Installation of database management software;

Creation and dropping of database tables;

Retrieving records from database tables in different ways;

Adding new records in to the database tables in various ways;

Changing existing values of records to the database tables faulting the conditions;

Removing records from database tables;

Completing and revoking transactions;

Connect database through programming;  
 Usage of CAD/CAM software; Critical path analysis; Linear programming; Introduction CAD/CAM;  
 Application of Computer in Fabric Manufacturing. (Software development for weave plan, Calculation of yarn consumption, Fabric structure analysis, color & weave effect, etc.) Inventory control

**FME-339: Technical Textile (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

Introduction to Technical Textiles; Definition; Classification of technical textiles; properties, functions; applications; Construction, Manufacturing Process, uses & variety of application of Agro Textiles, Construction Textiles, Eco Textiles, Geo-Textiles, Home Textiles, Industrial Textiles, Medical Textiles, Protective Textiles, Sport Textiles, Transport Textiles etc, and their environmental effects and recycling process.

**FME-431: Weaving-II (Theory)**

Credit	Hour/Week	Total Hour
3	3	45

**Jacquard Weaving:** D.L.S.C. & D. L. D. C. Open shed, center shed fine pitch & cross border Jacquard shedding mechanisms. Systems of harness mounting. Methods of increasing the figuring capacity of Jacquard, casting out, Card cutting & lacing. Jacquard calculations.

**Introduction to modern looms:** its features and Classifications. Differences between conventional & modern looms-its features and classifications. Differences between conventional and modern looms. Manufacturers of some modern looms. Positive tappet shedding mechanism.

Detailed study on cam and multilink beat-up mechanisms.

Some important tertiary motion of looms such as auto pick finding device, readily design changing, feeler motion etc. Timing diagram of a particular loom.

Production calculation, factors affecting production and efficiency of a loom and a plant.

**Warping and Weaving plant**

Fabric Properties. Various selvages & calculation of well waste percent.

Fabric Faults and their remedies, Four point system for woven fabric.

Some standard commercial fabrics.

Current issues in weaving.

**FME 432: Weaving-II (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Detailed study of relevant mechanisms and machinery.

Dismantling & reassembling of various parts, operation of machinery.

Visit to manufacturing plants.

Study of fabric defects.

Seminar on latest development on weaving mechanisms.

**FME 433: Knitting and Non-woven - II (Theory)**

Credit	Hour/Week	Total Hour
3	3	45

**Colored stitch designs in weft knitting:**

**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.

**Non-jacquard double jersey fabric:** Production of non-jacquard double jersey fabric, Double Jersey inlay.

**Loop transfer stitches:** plain loop, fancy lacing, Rib loop, eyelet. Welts, Garment sequences and knitting to shape calculation of fashioning frequencies.

**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, yam let-off, weft knitted fabric relaxation, knitted fabric geometry, Tightness factor, robbing back

**Straight bar frame:** Fully fashioned article, knitting action of straight bar frame, Rib to plain machine.

**Tricot two full set guide bar machine and its product:** Rules for locknit, Tricot. Sharkskin etc. fabric production.

**Crochet warp knitting machine:** feature knitting action Knitting action, End-use etc.

**Multiple guide liar warp knitting machines:** Feature, Knitting action and their products.

**Specialty weft 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:** Causes and their remedies.

**Multi-axial knitting:** Fabric construction and Multi-axial Raschel machine

**Non-woven-II:**

Detailed description of web bonding technique, Identifications of nonwoven fabrics, Testing and evaluation of nonwoven fabrics, recent developments of nonwoven production techniques, Environmental problem caused by nonwoven fabric production.

**FME 434: Knitting and Non-woven - II (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

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

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

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.

### **FME-435: Special Fabric production (Theory)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Hour</b>
<b>2</b>	<b>2</b>	<b>30</b>

Definition, Construction, Manufacturing process, Properties & End-uses of Narrow fabrics, Braid, Lappet weaving, swivel weaving; velvets & velveteen, Pile Fabric, Tufted carpet, Terry Towel; Biaxial Fabrics, Triaxial Fabrics; Quilted fabric, Flocked fabric, Lace.

### **FME-436: Maintenance of Fabric Machinery (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Hour</b>
<b>1</b>	<b>3</b>	<b>45</b>

To become familiar with maintenance tools and their function

Safety practice

To prepare schedule for routine maintenance for all preparatory weaving and knitting machinery.

To practice operations/activities carried out during routine maintenance. (including cleaning, oiling, lubricating & creasing tighten & loosing of nut bold, fitting of belts, setting change etc.).

Dismantling and reassembling of machine parts.

Replacement strategies for different spares & accessories.

Practice of overhauling and erection of preparatory, weaving and knitting machine.

Computer control of maintenance management.

Practice of inventory management.

Practice of preventive and corrective maintenance.

### **FME 438: Industrial Attachment**

<b>Credit</b>	<b>Duration</b>
<b>3</b>	<b>2 month</b>

The students must undergo 2 (two) months intensive of Industrial Training program in the relevant area of specialization after completion of Level-III, Term-II.

### **FME 430: Project Work**

<b>Credit</b>
<b>3</b>

During the Level-IV of study each student will be required to complete a Project Work in the relevant field of their specialization. For such a work the students will be guided by a Supervisor of the concerned Department.

### **FME 400: Comprehensive Viva**

<b>Credit</b>
<b>2</b>

The Comprehensive Viva will cover the entire 4 years courses of study. 60% weightage will be on the departmental subjects. 40% weightage will be on all other subjects. No specific class hour will assigned for the comprehensive Viva.

**Department of Wet Processing Engineering**  
**Detailed outline of courses offered for B. Sc in Textile Engineering**  
**(Yarn Mfg./Fabric Mfg./Wet Processing /Apparel Mfg.)**

**WPE 141: Polymer Science and Engineering**

Credit	Hour/Week	Total Class
3	3	45

Introduction and historical development of polymer chemistry.

Basic concept of polymer science (Terms, definitions and scope)

Classification of polymers and their description (Linear, branched, cross-linked, homo-polymers, co-polymers etc.),

Raw materials (sources and their derivatives).

Synthesis of Polymers (Mechanism of polymerization, Methods of polymerization)

Types of molecular weights (number average molecular weight, weight average molecular weight), distribution and measurements of molecular weights and study of molecular weight dependent properties (end-groups, viscosity etc.).

Chemical and geometrical structure of polymer molecule (crystallization and melting of polymers, amorphous state-rheology, glass transition temperature, crosslinking, stereochemistry, transition, entropy elasticity etc.).

Evaluation, characterization and analysis of polymers (chemical, spectroscopic, scattering, thermal, surface analyses etc.)

Properties of polymers (mechanical, thermal, chemical, electrical, degradability etc.).

Study of commonly used fiber forming polymeric materials (Nylon, PET etc.)

Depolymerization, Polymer recycling.

**WPE 241: Wet Preparatory Process**

Credit	Hour/Week	Total Class
3	3	45

**Introduction:** Introduction of wet-chemical processing of textile materials, Impurities in fibers and greige fabrics (Cellulose, Regenerated cellulose, Protein and man-made fibers), Overview of different preparatory sequences required for their removal, preparation of different textile materials, prelims of preparation: greige testing-stamping-mending-stitching.

**Water and its softening:** Importance, sources, quality and different water softening treatments, Consumption and re-use of water in wet processing.

**Chemical and auxiliaries used in different preparatory wet process:** General concept, classification and chemistry of detergent and surface active agents, concept of micelle, critical micelle concentration, HLB value, cloud point, specific gravity, their classification- according to chemical nature, action, mechanism of wetting, detergency and emulsification.

Chemistry, properties and use of acid, alkali, salt, oxidizing agent, reducing agents, and different auxiliaries used in textile wet processing.

**Preparatory wet processing equipment:** Working principles and function of different machines used for yarn, woven and knit fabric preparatory wet processes in batch wise and continuous method including paddler, J-box, washing machine, kiers, different mercerizing machines, equipments for water removal - contact and non-contact type of dryer, Dewatering; their construction, schematic diagram, speed, capacity etc.

**Preparatory wet processes:** Chemistry and technology of different preparatory wet processes:

- Shearing
- Singeing
- Desizing
- Scouring (Bio-scouring)
- Bleaching (Protonic treatment, Combi-bleach)
- Mercerization
- Enzymatic pretreatment of textiles
- Pretreatment of different textile materials

**Preparation of Cellulose and regenerated cellulose:** Impurities present, degumming/scouring, bleaching, optical whitening of Cellulose and regenerated cellulose.

**Preparation of silk and wool:** Impurities present, degumming/scouring, bleaching, optical whitening of wool and silk.

**Preparation of jute:** Impurities present, scouring, bleaching, optical whitening

**Preparation of synthetic fibers and blends:** Impurities present, heat-setting, singeing of manmade fibers, their blends; scouring, bleaching,

**Optical whitening:** objectives, methods, merits and demerits of different methods, wherever applicable.

Faults in different preparation process and impact of improper preparation of fabric on dyeing, printing and finishing process. Methods used for determination of degradation during scouring and bleaching.

Determination of oxi-cellulose and hydrocellulose.

**Effectiveness/Competitive Preparatory process:** Estimation of effectiveness of scouring and bleaching process. Combined preparatory processes and energy conservation. Economics of preparatory processes.

#### **WPE 242: Wet Preparatory Process (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>1</b>	<b>3</b>	<b>45</b>

Study different preparatory process on cellulose, protein and man-made fibers.

Evaluation of pre-treated textile materials (Absorbency, Whiteness, Residual chlorine, Peroxide etc.)

#### **WPE 243: Wet Processing-I**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>3</b>	<b>3</b>	<b>45</b>

Introduction of textile wet processing treatment and its process flow.

**Water:** Importance of water in wet processing, Water treatment (Estimation and Removal of Hardness), Purification of water.

**Detergents & auxiliaries:** General concepts and classification of detergent and surface active agents. Properties and uses of various acids, alkalis, salts, oxidizing agents and reducing agents and different auxiliaries in textile wet processing.

Pretreatment: Chemistry of various impurities in fibers and their removals, singeing, desizing, Scouring and Bleaching, Methods of scouring and bleaching of woven and knit fabric. Pretreatment of cellulose, regenerated cellulose and protein fiber.

Study of different pretreatment machineries.

Estimation of effectiveness of scouring and bleaching process. Faults and damages in Scouring and bleaching.

**Dyeing:** Elementary concepts of Color, Constitution of Dyestuffs, Classification of Dyes and Pigments.

Theory of dyeing, aggregation, interaction of dyes and fibers. Mechanism and application of Direct, Acid, Basic, Sulphur, Azoic, Reactive, Vat and Disperse dyes on different fibers and their blends. Dyeing with pigment, natural colors on different fibers. Stripping Discussion about different process of dyeing (continuous, semi-continuous and discontinuous.)

Dyeing machinery used for dyeing in different form (for loose Fibers, Yarns, Packages, Woven and knit fabrics and garments).

Color Matching and assessment of color-fastness. Faults in dyeing and their remedies.

Effectiveness of wet processing (dyestuff selection, comparative study of cost, fastness and other quality parameter.)

#### **WPE 244: Wet Processing-I (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>1</b>	<b>3</b>	<b>45</b>

Singeing, Desizing, Scouring and Bleaching of cotton, Jute, Wool and Silk fiber.

Identification of dyes, Color fastness test (sample dyed with different dyes).

#### **WPE 245: Textile Fiber: Man-Made Fibers**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>1</b>	<b>3</b>	<b>45</b>

Definition and classification of Chemical fibers, Principles of different spinning systems, Different fiber structures and their effects on fiber properties, Global trends and consumption of man-made fibers.

Composition, structure, classification, manufacturing process, properties, uses and application of:

- i) Regenerated fibers: Viscose, Acetate rayon, derivatives of cellulose and regenerated protein fibers.
- ii) Synthetic fibers: Polyolifin, Polyester, Polyamide, Polyacrylic, Polyvinyl derivatives Polyurethane etc.
- iii) High Performance fibers: Aramid, Carbon, Glass, Polyethylene derivatives, Ceramic and other commonly used high performance fibers.
- iv) High functional fibers: Bi / Multicomponent fibers etc.

Latest development in man-made fiber production and their economic and social aspects.

### WPE 341: Dyeing & Printing-I

Credit	Hour/Week	Total Class
3	3	45

**Dyeing:** Elementary concept of color (chromophore, chromogen, auxochrome)- Dyestuff, Pigments & their classification.

Structure, Properties & application of Direct, Acid, Basic, Vat & Reactive dyes on different fibers- Natural (Vegetable) dyes and their application.

Dyeing machinery used for dyeing in different form (loose fibers, yarns, yarn packages, fabrics and garments).

Different types of dyeing faults & their remedies.

**Printing:** Flow chart of printing process, Printing ingredients and their functions, thickeners, preparation of thickener paste.

Special types of thickeners (Synthetic Polymers, Emulsion thickeners), Preparation of print paste.

**Methods and styles of Printing:** Printing processes for printing in different styles. Printing processes for fabrics of different fibers with Direct, Acid, Basic, Vat, reactive & Natural dyes and their after-treatment. Study of different Printing machine, dryer, steamer and washing machine. Methods of screen and roller preparation. Detail study on screen printing.

### WPE 342: Dyeing & Printing-I (Practical)

Credit	Hour/Week	Total Class
1	3	45

**Dyeing:** Dyeing of related textile substrate with direct, Acid, Basic, Vat, Reactive and natural dyes & their after treatments.

**Printing:** Printing on related textile substrate with Direct, Acid, Basic, Vat & Reactive dyes in different styles and by different methods, Screen preparation.

### WPE 343: Wet Processing-II

Credit	Hour/Week	Total Class
3	3	45

**Printing:** Flow chart of printing process, Printing ingredients and their functions, Thickeners, Types of Thickeners, preparation of thickeners paste. Special types of thickeners (Synthetic Polymers, Emulsion thickeners), Preparation of print paste.

**Methods and styles of Printing:** Printing processes for printing in different styles.

Printing processes for fabrics of different fibers with Direct, Acid, Basic, Vat, Reactive, Azoic & Disperse dyestuffs and their after-treatments,

Printing with pigment. Study of different Printing machine, dryer, steamer and washing machine. Methods of screen and roller preparation. Detail study on screen printing.



Printing of synthetic and blend fabrics with related dyes. Special printing methods (Transfer Printing, Jet printing, Flock printing, Burn-out printing).

Faults in printing and their remedies.

**Finishing:** Definition and classification of finishing.

**Physical and Mechanical:** Different types of calendaring raising shearing, sanforising etc.

**Chemical finishing:** Mercerization and parchmentization, resin finishing, water repellency, flame retardancy.

Softening agents (different types, applications). Special finishing treatments (rot-proofing, mildew proofing, insect and bacterial finishes, soil lease, anti-state finishes).

**Knit Finishing:** Hydro-extraction, dewatering, slitting, compacting, stentering etc.

### WPE 344: Wet Processing-II (Practical)

Credit	Hour/Week	Total Class
1	3	45

**Printing:** Preparation of different thickeners paste. Preparation of printing paste. Printing on different fibers (Cotton, Jute, Wool, Silk, nylon, polyester) with direct, Acid, Basic, Vat, reactive, Azoic, disperse dyes & pigments with block, transfer, screen printing process.

**Finishing:** Production of mercerized cotton fabric, Estimation of mercerized effect, Production of crease resistant cotton fabric, Testing of crease resistant fabric, Production of water repellent, flame retardant, parchmentized fabric.

### WPE 345: Wet processing Machinery (Theory)

Credit	Hour/Week	Total Class
3	3	45

#### WPE - Wet Processing Machinery

Working Principles, mechanisms, types, different parts, capacity & features of the following wet processing machinery.

**Preparatory:** Boiler, singeing, desizing, scouring, bleaching & washing machine.

**Dyeing:** Different discontinuous, semi continuous & continuous dyeing machine.

**Printing:** Different types of screen, transfer, injet, flock, printing machine, Steamer.

**Finishing:** Padding mangle, dryer, stenter, mercerizing machine. Calendar machine, folding machine. Raising machine, suedding machine, sanforising machine.

**Laboratory equipment:** Different types of lab-dyeing machine, computer color matching equipment, different types of color fastness testing, equipment, wascator for shrinkage test, Automatic dye solution preparation, lab dispensing system.

### **WPE 346: Wet processing Machinery (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>1</b>	<b>3</b>	<b>45</b>

Practical Study of different pretreatment machinery (Boiler, Singeing, Desizing, Scouring, Bleaching, Washing), Study on different type of dyeing machine (Winch, zigger, jet), printing machinery (Screen, transfer), various type of finishing machine (Padding mangle, dryer, steamer, stenter, mercerizing machine calendaring and folding machine), Practical Study & application of Color matching equipments and lab dyeing machine, Color fastness testing equipments study.

### **WPE-347: Application of Computer in Wet Processing (Theory)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>2</b>	<b>2</b>	<b>30</b>

**System Analysis & Design:** System analysis; System design; Difference between analysis and design; System analysts and their role; System development life cycle (SDLC) - SDLC stages, feasibility study, cost/benefit analysis, Data flow diagram (DFD); Introduction to project management.

**Database Management System:** Basic concepts - character, field, record, file, database; Benefits and limitations; Levels of abstraction; Instances and schemas; Data manipulation language (DML); Data definition language (DDL); Structured query language (SQL); Entity-relationship (ER) model; Transaction management; Database administrator; Relational database - concept, definition, properties; Basic SQL statements - CREATE, DROP, SELECT, INSERT, UPDATE, DELETE, COMMIT, ROLLBACK; Database connectivity;

**Automation:** Basic automation terminologies; Quality control; Software testing; Verification; Validation; Computerized production planning and control.

**Applications:** Critical path analysis; Linear programming; Introduction to CAD/CAM; Development & application of textile wet processing related software for inventory control, recipe formulation, machine/process control (in pretreatment, dyeing, printing & finishing section) system analysis, system design. Documentation & planning.

### **WPE 348: Application of Computer in Wet Processing (Practical)**

<b>Credit</b>	<b>Hour/Week</b>	<b>Total Class</b>
<b>1</b>	<b>3</b>	<b>45</b>

Cost/benefit analysis using spreadsheet;  
Drawing DFD using drawing software;  
Installation of database management software;  
Creation and dropping of database tables;  
Retrieving records from database tables in different ways;  
Adding new records to the database tables in various ways;  
Changing existing values of records in database tables fulfilling the conditions;  
Removing records from database tables;  
Completing and revoking transactions;

Connect database through programming;  
 Usage of CAD/CAM software; Critical path analysis; Linear programming; Introduction to CAD/CAM;  
 Development & application of textile wet processing related software for inventory control, recipe formulation, machine/process control (in pre-treatment, dyeing, printing & finishing section) system analysis, system design.  
 Documentation & planning.

### WPE-349: Color Physics

Credit	Hour/Week	Total Class
2	2	30

**Light wave & color:** Nature of light and its interaction with matters, light sources, absorption and scattering concept.

**The physics of color:** color wheel, color spectrum, color space, color scales, color difference etc.

**Colorimetry & color specification system:** properties and principle of additive & subtractive color mixing, observer, color matching functions, tristimulus values, color appearance, color specification systems, the CIE system, metamerism, color constancy, chromatic adaption & color rendering. Means and mechanism of human color vision, modeling of color vision process, attributes of colors, defective color vision. Instrument for measurement of color, computer match prediction of dyes, pigments and recipe calculation. Lecture on recently published research & development in color physics.

### WPE 441: Dyeing & Printing-II

Credit	Hour/Week	Total Class
3	3	45

**Dyeing:** Dye aggregation, interaction of dyes & fibers, Mechanism Of dyeing, Dyeing kinetics (Diffusion, pore model, free volume model), Thermo dynamics of dyeing (Dyeing Isotherms, affinity). Commercial Dye-stuff production (Powder, paste, lump, solution etc.).

Properties, structure and application of Sulphur, Azoic & Disperse dyestuffs, Pigments. Detailed study on their application. Dyeing of synthetic and blended fabrics with related dyes.

**Quality of Dyeing:** causes of different types of faults in dyeing and their remedies. Precautions for non-standard batches. Shade correction and levelling of dyed fabric. Stripping and washing off for redyeing.

**Color fastness:** Importance, Greyscale, Measurement of different types of color fastness by ISO & other international standards. Identification of dyes. Selection of dyestuffs and dyeing process for commercial production considering cost, quality & other related factors.

**Printing:** Printing process for fabrics of different fibers with Azoic & Disperse dyestuff and their after treatments. Detail study of printing with pigment and its after-treatments. Printing of synthetic and blended fabrics with related dyes. Special printing methods (transfer printing, Jet printing, Flock printing, Burn-out printing, plastic printing etc). Faults in printing and their remedies.

### WPE 442: Dyeing & Printing-II (Practical)

Credit	Class/Week	Total Class
1	3	45

**Dyeing:** Dyeing of related textile substrate with Sulphur, azoic, disperse dyes and pigments. Dyeing of combination shade, shade matching and stripping process. Dyeing of blended synthetic and fabric, dye identification.

**Printing:** Printing for different fibers with azoic, disperse dyes and pigments. Application of special printing methods (Transfer printing, jet printing, flock printing & bum-out printing).

**Color fastness:** Measurement of Different color fastness for dyed & printed goods. Comparison of fastness properties of fabrics dyed with different dyes.

### WPE 443: Textile Finishing

Credit	Class/Week	Total Class
3	3	45

Definition and classification of finishing. Physical and Mechanical

Finishing of cotton, Jute, Wool and Silk fabrics.

**Physical or Mechanical Finishing:** Shearing and cropping, calendaring, raising, sueding, beetling, breaking, folding, sanforising.

**Chemical finishing:** Mercerization parchmentization, resin finishing, water repellency, flame retardancy, softening(different types, application),detail study of special finishing treatments (rot-proofing, mildewproofing, insert and bacterial finishes, soil release, anti-static finishes.

**Knit finishing:** Hydro-extraction, dewatering, slitting, compacting and stentering in knit finishing.

Low-wet pic up finishing and its importance, application of optical brightening agents, lectures on recently published research and development in wet processing.

### WPE 444: Textile Finishing(Practical)

Credit	Class/Week	Total Class
1	3	45

Production of water repellent and flame retardant effects on different fabrics, production of rot-proofing, soil release, antistatic, bacterial finishes, production of crease resistant cotton fabrics with different types of cross-linking agents, softening of fabrics, Hydro-extraction & various drying system in wet processing, knit finishing, testing of flame retardant, water repellent and crease resistant fabrics.

**Printing:** Flow chart of printing, Printing ingredients and their functions, thickener, (Types of thickener, Structure and Preparation of thickener paste. Methods and styles of printing, application process of different fibers with direct, acid, basic & vat dyes.

### WPE 445: Special Wet processing

Credit	Class/Week	Total Class
2	2	30

Foam technology in wet processing (foam generation, application, advantages and disadvantages).  
Solvent dyeing (properties of different types of solvent used, application, advantages and disadvantages).  
Dyeing under hypercritical conditions.  
Solvent scouring  
Ammonia Mercerization.  
Bio-polishing.  
Phthalogen Blue dyeing.  
Shear suckur finishing.  
Development of various special effects by different types of chemical treatments.  
Lectures on recently published research and development in wet processing.

### WPE 446: Maintenance of wet process machinery (Practical)

Credit	Class/Week	Total Class
1	3	45

To become familiar with maintenance tools and their functions.  
Safety practice  
To prepare schedule for routine maintenance for all wet processing preparatory, dyeing, printing, finishing and lab equipment.  
To practice operations/activities carried out during routine maintenance (including cleaning, oiling, lubricating & creasing tighten & loosening of nut bold, fitting of belts, setting change etc.).  
Dismantling and reassembling of machine parts.  
Replacement strategies for different spares & accessories.  
Practice of overhauling and installation & erection of wet preparatory, dyeing, printing, printing, finishing machine.  
Computer control of maintenance management.  
Practice of inventory management.  
Practice of preventive and corrective maintenance.

### WPE 447: Environmental Studies

Credit	Class/Week	Total Class
3	3	45

**Environmental challenges:** Definition of environment, Soil erosion; Desertification; pest control, Biodiversity loss, deforestation; Water pollution, fisheries resources, Large dam projects; climate change, urbanization; Effluents and their effects on environment, Related health issues.

**Pollution and its effects on the Living World:** Definition of pollution, the atmosphere and its structure, Types of pollution and pollutants, Greenhouse effect.

**Types of Textile Pollution and their Control/Treatment:**

**Industrial air pollution:** Emission and control technology, air quality pollution, and criteria setting.

**Noise Pollution:** General consideration, Industrial noise source evaluation, methods and techniques to control and reduce noise level.

**Water Pollution:** Effluent in wet processing, various types of effluent treatments. (Physical, Chemical and aerobic biochemical) and disposal systems, Use of electro-chemical technology to remove color and other contaminants from textile mill effluents.

**Solid Waste management and costing:** Composition of wastes, collection systems and alternatives for treatments and re-use. Reduction of textile waste water using automatic process control, recycle, filtration and waste water analysis. Determination for waste treatments costing.

**Regulatory Issues:** Environmental policy and law: Environmental law of Bangladesh, Role of the governmental and non-governmental organizations in the protection and conservation of environment in Bangladesh. International treaties (Health and industrial safety, environmental regulatory affairs for dyes and pigment, Risk VS Hazard communication, penalties and compliance).

Reference Books:

1. Environmental Chemistry of dyes of Pigments, Edited by Abraham Reife & H.S Freeman, John Wiley & sons, IIVC 1996.
2. Environmental Chemistry, 4th Edition, By Anil Kumar De, Newage, International publications Ltd.
3. Environmental Awareness Series: Air and Water, By Anil Kumar De.
4. Textile Dyeing Waste water, "Characterization and treatment" US Environmental Protection Agency, Washington, DC, 1998.
5. Waste treatment of soluble AZO, Acid, Direct and Reactive dyes by A Reife, Philadelphia.
6. Chemical Reduction and oxidation combined with Bio-degradation for the treatment of a textile dye waste-water by M.W. Me curdy, 1991
7. Anaerobic/Aerobic Degradation of a Textile dye-waste-water, By K.C Loyd
8. Environmental Science by Richard T. Wright, Bernard, J Nebel, New Jersey, USA

**WPE 448: Industrial Attachment**

Credit	Duration
3	2 month

The students must undergo 2 (two) months intensive of Industrial Training program in the relevant area of specialization after completion of Level-III, Term-II.

**WPE: Project Work**

Credit
3

During the level-IV of study each student will be required to complete a project work in the relevant field of their specialization. For such a work the students will be guided by a supervisor of the concerned department.

**WPE: Comprehensive Viva**

Credit
2

The comprehensive viva will be cover the entire 4 years' courses of study. 60% weightage will be on the departmental subjects. 40% weightage will be on all other subjects. No specific class hour will be assigned for the comprehensive viva.

**Department of Apparel Manufacturing Engineering**  
**Detailed outline of courses offered for B. Sc in Textile Engineering**  
**(Yarn Mfg./Fabric Mfg./Wet Processing /Apparel Mfg.)**

**AME 251: Preparatory Apparel Production operations**

Credit	Class/ Week	Total Class
3	3	45

Historical development of apparel industrial in Bangladesh and other countries of the world.

Apparel terms and definitions.

Apparel Manufacturing sequences.

Sample apparel making.

Fabric used in Apparel sector.

**Components** of shirt, trouser and their types, standard body measurement for gents, standard body measurement for ladies, sizing system and sizing ranges.

**Pattern Making:** General discussion on pattern making, Principle of pattern making for shirt, trouser, pattern grading.

**Marker Making:** Definition of making marker, marker efficiency, objects, constrains, method drawing, duplication and wastage in marker making.

**Fabric Spreading:** Requirements, Fabric Packages, methods, machines and splices.

**Fabric Cutting:** Requirements, Methods, Machines and quality in cutting.

**AME 252: Preparatory Apparel Production (Practical)**

Credit	Class/ Week	Total hour
1	3	45

Study on layout plan of Apparel Manufacturing Laboratory.

List and draw the components of a basic shirt and study on standard body measurement with sketch.

Preparation of production pattern of a basic shirt/Different types of product.

Front Part

Back Part

Sleeve, Collar, Yoke and Cuff

Grading of Production Pattern

Marker making

Study on plan sewing machines and practices

Study on different industrial lock stitch machine and production of stitch sample

Study on different industrial chain stitch machine and production of stitch sample

Study on straight knife and band knife fabric cutting machine.

Apparel Production: Basic shirt by using industrial sewing machine

Industrial Visit.

### AME 253: Apparel Manufacturing-I

Credit	Hour/ Week	Total Class
3	3	45

Historical development of apparel industry in Bangladesh and other countries of the world.

Apparel terms and definitions

Apparel Manufacturing sequences

Sample apparel making

Fabric used in apparels sector.

**Components** of shirt, trouser and their types, standard body measurement for gents, standard body measurement for ladies, sizing systems and size rangers.

**Pattern making:** General discussion on pattern making, principle of pattern making for shirt, trouser, pattern Grading.

**Marker making:** Definition of marker making, marker efficiency objects, constrains, method.

**Fabric spreading and cutting:** spreading objectives, requirements, fabric packages, method; machines and fabric cutting objects, requirements, machines.

**Trimmings:** Definition, Trimmings, discussion on label and motifs, zippers, Button, lining, Interlining, Hook and loop fastening, shoulder pad, lace, braid and elastic, performance of trimmings.

**Stitch and seam:** Definition of stitch and seam, Different types of stitches and seams.

Garments inspection

### AME 254: Apparel Manufacturing-I (Practical)

Credit	Class/ Week	Total Class
1	3	45

Study on layout plan of Apparel Manufacturing Laboratory

List and draw the components of a basic shirt and trouser and study on standard body measurement with sketch.

Preparation of Production pattern of a basic shirt

Front Part

Back Part

Sleeve, Collar, Yoke and Cuff

Grading of production of pattern.

Marker Making

Study on different industrial lock stitch machine, chain stitch machine and production of stitch sample.

Apparel Production: Basic shirt by using industrial sewing machine.

Production of different types of stitch and seam

Prepare a Trimming List of shirt trouser and jacket

Study of the international care labeling code.

Study on straight knife, band knife fabric cutting, metal detector machine

Industrial Visit.



### AME 350: Pattern Drafting, Cutting and Manufacturing (Practical)

Credit	Class/ Week	Total hour
1	3	45

Practical study on model from measurements, Horizontal measurement, front and back, vertical measurement, front and back, stander measurement chart.

#### **Practical on basic dress foundation:**

- Front bodice draft
- Back bodice draft
- Fitting the bodice fitting the neckline
- Fitting the armhole

**Skirt:** basic skirt dart, front and back

**Sleeve:** basic sleeve draft, adjusting sleeve to armhole of bodice.

#### **Dart:**

- Dart manipulation
- Center front waist dart
- French dart
- Single dart
- Side dart
- Mid armhole dart
- Shoulder-tip dart
- The back neck dart
- Center front neck and west dart

**Designing with darts:** Tuck darts, pleats, flares and gathers, asymmetric dart.

#### **Style lines:**

- Classic princess style line variation
- Armhole princess style line variations

#### **Collar:**

- Peterpen collars
- Sailor collar
- mandarin collar
- Roll collars

**Cutting for different fabrics**

**Manufacturing processes**

### AME 351: Apparel Manufacturing Process (Theory)

Credit	Class/ Week	Total Class
3	3	45

**Sewing Technology:** elements of sewing machine: Needle feed dog ,etc.; seam properties ,types and usages; stitch properties ,types and usages.

**Sewing Machinery:** principles of lock stitch and chain stitch formation;

**Sewing Threads:** fiber type and properties, constructions, finishes, sizing, packages, costs.

**Sewing problems and remedies:** problems of stitch formation, puckering, damages to the fabric along the stitch line.

**Work aids:** objectives, types and applications.

Alternative methods of sewing: fusing, requirements, fusing conditions, equipment, methods, quality control in fusing, welding, adhesives, moulding and their comparison.

**Interlining:** definition, advantages. types, properties, methods of coating.

### AME 352: Apparel Manufacturing Process (Practical)

Credit	Class/ Week	Total Class
1	3	45

Producing different types of seams.

Producing different types of stitches.

Pattern making for basic trouser.

Front part

Back part

Waist band pocket facing, fly piece and pocket bag of trouser,

Pattern grading for trouser.

Trouser making with industrial sewing machine.

Study of thread path, main adjustment points of different industrial sewing machine and practice: Overlock sewing machine, Flat lock sewing machine, Bartack sewing machine, Blind stitch sewing machine, Button holing sewing machine, Button attaching sewing machine, Feed off the Arm sewing machine.

Practical study of the working Aids.

Industrial Visit.

### AME 353: Apparel Manufacturing-II (Theory)

Credit	Class/ Week	Total Class
3	3	45

Production system in Apparel industry.

Inventory Control.

Material Management.

Cutting Room Management.

**Sewing room management:** Layout Planning, Line Balancing.

**Introduction to Apparel washing:** Types of washes.

**Introduction to Apparel Dyeing:** Concept, importance of apparel dyeing ,Application.

**Finishing room management:** AQL and Final inspection.

**Apparel Costing:** Direct and Indirect cost.

Special Apparel Production.

Test for Garments.

**AME 354: Apparel Manufacturing-II (Practical)**

Credit	Class/ Week	Total Class
1	3	45

Practical study on sewing machinery in apparel production.

Practical study on Fusing m/c.

Practical study on Computerized Embroidery m/c.

Practical study on Apparel washing.

Practical study on Apparel Dyeing.

Practical study on CAD / CAM for Apparel.

**AME-355: Application of Computer in Apparel Manufacturing (Theory)**

Credit	Class/ Week	Total Class
2	2	30

**System Analysis & Design:** System analysis; System design; Difference between analysis and design; System analysts and their role; System development life cycle (SDLC) - SDLC stages, feasibility study, cost/benefit analysis, Data flow diagram (DFD); Introduction to project management.

**Database Management System:** Basic concepts - character, field, record, file, database; Benefits and limitations; Levels of abstraction; Instances and schemas; Data manipulation language (DML), Data definition language (DDL); Structured query language (SQL); Entity-relationship (ER) model; Transaction management; Database administrator.

Relational database- concept, definition, properties; Basic SQL statements – CREATE, DROP, SELECT, INSERT, UPDATE, DELETE, COMMIT, ROLLBACK; Database connectivity;

**Automation:** Basic automation terminologies; Quality control; Software testing, Verification; Validation; Computerized production planning and control.

**Applications:** Critical path analysis; Linear programming; Introduction to CAD/CAM; Development and application of software for production, planning, consumption of fabric, accessories & sewing thread inventory control.

**AME-356: Application of Computer in Apparel Manufacturing (Practical)**

Credit	Class/ Week	Total Class
1	3	45

Cost/benefit analysis using spreadsheet;  
Drawing DFD using drawing software;  
Installation of database management software;  
Creation and dropping of database tables;  
Retrieving records from database tables indifferent ways;  
Adding new records to the database tables in various ways;  
Changing existing values of records in database tables fulfilling the conditions;  
Removing records from database tables; Completing and revoking transactions;  
Connect database through programming;  
Usage of CAD/CAM software; Critical path analysis; Linear programming; Introduction to CAD/CAM;  
Development and application of software for production, planning, Fabric accessories & sewing thread consumption,  
Inventory control.

**AME 357: Apparel Finishing Process (Theory)**

Credit	Class/ Week	Total Class
3	3	45

Trimmings and Accessories:  
Definition, trim list, discussion on labels and motifs, button, zippers, linings, interlinings, lace braid and elastic, hook and loop fastening.  
International Care labeling codes.  
Pressing: Definition, purpose, categories, equipment and methods.  
Folding and packing: Types, methods, equipments, symbols and markings.  
Quality control in Apparel Manufacturing: Basic concept, Raw material control, In process control, final inspection, Duties and responsibilities of quality control officers.  
Accessories costing.  
Testing for Apparel.

**AME 358: Apparel Finishing Process (Practical)**

Credit	Class/ Week	Total Class
1	3	45

Prepare Trim lists for shirt, trouser, jackets.  
Practices on different care labeling code.  
Practical study on sewing and embroidery threads.

Apparel Inspection: Basic shirt, T-shirt, P-shirt, trouser, jacket etc.  
 Practical Study on Hashima fusing machine.  
 Practices with Pressing equipments.  
 Finished apparel inspection using metal detector.  
 Practices on computerized embroidery machine.  
 Factory visit.

**AME 359: Clothing Comfort (Theory)**

Credit	Class/ Week	Total Class
2	2	30

Introduction to clothing and comfort.  
 Process of maintaining constant body temperature and role of clothing.  
 Measurement of thermal resistance of clothing.  
 Psychology and comfort.  
 The Basis of sensory perceptions.  
 Thermal physiology and comfort.  
 Moisture management.  
 Water and wind resistance clothing.  
 Breathable fabrics and comfort in clothing.

**AME 451: Apparel Washing, Dyeing and Printing (Theory)**

Credit	Class/ Week	Total Class
3	3	45

Introduction to apparel washing and dyeing.  
 Necessity of Apparel washing.  
 Different types of apparel washing.  
**Wet Process:** Caustic wash, Bleach wash, pigment wash, Enzyme wash, stone wash, stone wash, acid wash, super white wash, sand blasting etc.  
**Dry Process:** Whiskering, Hand scrapping, Laser Whiskering, 3D wrinkles, Tagging, PP spray etc.  
**Apparel Dyeing:** Concept, Necessity / Importance of apparel dyeing, Application.  
 Apparel wash costing.  
**Apparel printing:** Concept, various styles, methods, applications.

**AME 452: Apparel Washing, Dyeing and Printing (Practical)**

Credit	Class/ Week	Total hour
1	3	45

Practical Study on apparel washing machinery.

Practical study on various washes- Enzyme wash, Stone wash, Bleach wash, Normal wash, Caustic wash, Acid wash, Super white wash,

Practical study on Apparel Dyeing, using Direct dyes and Reactive dyes.

Factory Visit.

**AME 453: Apparel Production Management (Theory)**

Credit	Class/ Week	Total Class
3	3	45

**Apparel Production Engineering:**

Concept of production planning, production control and production management for apparel industry.

Line Balancing.

Production systems in apparel industry.

Productivity.

**Work study:** Work measurements, Time Study motion study and method study in apparels, calculating SMV and setting target production in apparel manufacturing.

Material management.

**Apparel Management production:**

Material handling and transportation systems of apparel components.

Cutting room management.

Sewing room management.

Store management.

Principles of purchasing

Waste management in apparel production.

**Apparel costing:**

Systems of apparel costing, determination of fabric consumption, thread consumption and trimmings.

USA, EEC and other countries categories for apparels.

**Compliance issue** for apparel industry

**Latest trends in apparel manufacturing, Research and Development.**

**AME 454: Apparel Production Management (Practical)**

Credit	Class/ Week	Total Class
1	3	45

Practical study on CAD / CAM for Apparel.

Practical study on Apparel costing.

Practical study on line Balancing.  
 Practical study on Modern Machinery in Apparel industry.  
 Practical study on Computerized Embroidery Machine.

**AME 455: Special Apparel Production (Theory)**

Credit	Class/ Week	Total Class
2	2	30

**Introduction to Special Apparel:**

**Fashion Apparel:** Basic concept, materials, Accessories, Fashion trends; Theory of Fashion, Fashion cycles, The raw materials of fashion, Fashion marketing.

**Protective clothing:** The need for protection, Thermal characteristics and combustion, Flame retardant fiber suitable for protective clothing, Heat, Water proof breathable fabrics, Ballistic protection, Antimicrobial protection, Fire fighters suit, Rain coats, Racing driver’s apparels, chemical hazards. Miscellaneous applications.

**AME 456: Maintenance of Apparel Machinery (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

To become familiar with maintenance tools and their function

Safety practice

To prepare schedule for routine maintenance for all types of sewing, embroidery, fusing & apparel dying machinery.

To practice operations/activities carried out during routine maintenance. (including cleaning, oiling, lubricating & creasing tighten & loosening of nut bold, fitting of belts, setting change etc.).

Dismantling and reassembling of machine parts.

Replacement strategies for different spares & accessories.

Practice of overhauling and erection of Apparel machine.

Computer control of maintenance management.

Practice of inventory management.

Practice of preventive and corrective maintenance.

**AME 458: Industrial Attachment**

Credit	Duration
3	2 month

The students must undergo 2(two) months intensive of Industrial Training program in the relevant area of specialization after completion of Level-III, Term-II.

**AME 450: Project Work**

<b>Credit</b>
<b>3</b>

During the Level-IV of study each student will be required to complete a Project Work in the relevant field of their specialization. For such a work the students will be guided by a Supervisor of the concerned Department.

**AME 400: Comprehensive Viva**

<b>Credit</b>
<b>2</b>

The Comprehensive Viva will cover the entire 4 years courses of study. 60% weightage will be on the departmental subjects. 40% weightage will be on all other subjects. No specific class hour will assigned for the comprehensive Viva.



**Department of Textile Management & Business Studies**  
**Detailed outline of courses offered for B. Sc in Textile Engineering**  
**(Textile Management)**

**TM 261: Fundamentals of Management**

Credit	Hour/Week	Total Hour
3	3	45

**Introduction:** Definition of Business, nature & scope of business, different forms of business organization, ownership & their formation, social responsibility of business & business ethics.

Definition of Management, Nature, Scope, Principles of Management, Need for Management, organizations & Managers, Managerial Responsibility, Types of Manager, Management Process, Skills, Roles, Productivity, Effectiveness, Efficiency, Managerial & Organizational Performance.

Organizational Culture, changing the culture, Factors affecting the OC, Corporate Etiquette.

**Environment of Management:** Internal and external environment of organization, components of environment, International environment and managing environment

**Objectives:** Nature of objectives, Vision, Mission, MBO, Process of MBO, Benefits & Weakness of MBO

**Planning:** Nature of Planning, Types of Planning, Steps in Planning, Tools & Techniques of Planning, etc.

**Decision Making:** Decision Making Process, Problems & Opportunity finding, Nature, of Managerial Decision Making, Other factors of decision making, Decision Support System

**Organizing:** Organizational Structure, Division of Works, Span of Management, departmentation, Line & Staff Management, Delegation of Authority, Centralization & Decentralization, Coordination, Committee and group decision making, staffing the organizational structure

**Leading:** Direction-importance & Principles of Direction, Consultative Direction. Communication & its importance, main element & process, requirements of successful communication, Human Factors in Managing, Relevant theories of Motivation and leadership, creativity & innovation

**Controlling:** Meaning importance of Controlling, Types of Controlling, Controlling process, Requirement of effective controls, Information System & Control.

**TM 301: Accounting & Cost Management**

Credit	Hour/Week	Total Hour
3	3	45

**(A) Accounting:**

Definition of Accounting, User of Accounting Data, The Accounting Profession, Financial, Cost & Management accounting, Accrual vs. Cash.

Basis of Accounting, Generally Accepted Accounting Principles, Accounting Assumptions

**The Accounts** - Debits and Credits, Basic Accounting Equation, Expansion of Basic Equation, along with Transaction Analysis

**Steps in the Recording Process-** The Journal; the Ledger, Cash book, the Trial Balance, Adjusting the Entries for Prepayments & Accruals.

**Accounting for Merchandising Operations-** Recording Purchases of Merchandise; Determining Cost of Goods Purchased; Determining Cost of Goods on Hand; Computing Cost of Goods Sold; Gross Profit; Trading Account,

Profit & Loss Account

**Accounting for Manufacturing Operations** specially differences arising from Cost of Goods Sold/manufactured Calculation and its sub components

**Preparing Financial Statements-** Income Statement, balance sheet, cash-flow statement, statement in changes in owner's equity, financial disclosures, Reading the financial statements including Ratio analysis

**(B) Cost Management:**

Meaning, scope, objective, advantages Financial Accounting vs. Cost Accounting, Factors influencing the design of a cost limitation of costing system- steps, difficulties, Measures to overcome the difficulties, Cost unit, Methods of costing types, Development of Cost Accounting.

**Cost Behavior and Terminology:** Basic cost behavior patterns, Economic, Accounting and other cost pattern, product Costing Concept Need for Knowledge of cost behavior, Methods of estimating cost relationship.

**Cost Elements-** Costing for materials, Costing for labor, and costing for Overheads

**Cost Accounting system-** Job order costing, Contract Costing and Process costing

**Costing Techniques:** Standard Costing, Costing of by products and joint products, Direct Costing

**Analysis of Cost Behavior-** variable, Fixed and mixed

**Cost - Volume - Profit Analysis**

**Analyzing cost for Pricing and short run decision-** BEP Analysis, Cost for decision making, Differential cost analysis.

**TM 303: Industrial Management**

Credit	Hour/Week	Total Hour
3	3	45

**Management & Organization:** Definition, Function and role of management, Nature and scope of business, Direction and Communication-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 labor/ management reactions from different types of companies.

**Personal 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, Labor Welfare, Disputes, Job specifications, Job descriptions, Disciplinary actions show cause, charge sheet etc. Health, safety and working conditions.

**Production Economics:** Basic concepts in economics- utility of goods, wealth, value, price and want, Theory of utility of supply and demand, Elasticity of supply and demand. Problems of allocation and study capital. Production- factors of production -division of labor, location of industries, specialization. The economics of small scale and large scale production. Production 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.

**Marketing Basics:** Concept of Market and Marketing; Marketing Process; Marketing Mix; Marketing Environment-Inland & Foreign; Buyers' Behavior; Market Segmentation, Targeting, Positioning; Product & its Life Cycle management, Branding; Pricing; Distribution Channel, Promotion.

**Legal issues for Industrial Management:** Contract Act, 1872- definition of contract, agreement, promise, essential of ‘a valid contract, offer, acceptance, consideration and other relevant issues. Industrial policy 201(prevaling one)-definition & classification of industries, thrust sector, investment incentives, diversification of industries, etc. Bangladesh Labor Law 2006, conditions of service & employment, health & hygiene, welfare & safety, working hours & leave, trade union & industrial relations, etc.

**TM: 307: Application of Computer in Textile Management**

Credit	Hour/Week	Total Hour
2	2	30

**System Analysis & Design:** System analysis; System design; Difference between analysis and design; System analysts and their role; System development life cycle (SDLC) SDLC stages, feasibility study, cost/benefit analysis, Data flow diagram (DFD).

**Project Management:** Introduction; Critical path analysis; Linear programming; Computerized production planning and control.

**Database Management System:** Basic concepts- character, field, record, file, database; Benefit and limitation; Levels of abstraction; instances and schemas; Data manipulation language (DML); Structure query language (SQL); Basic SQL statements - CREATE, DROP, SELECT, INSERT, UPDATE, DELETE, COMMIT, ROLLBACK; Database connectivity;

**Information Technology:** Introduction to IT; Scope and importance of IT in business and management; Security issues in data management an networking; Management Information System: Basic concepts; Advantages; Types of management information system (MIS) - manufacturing information system, transaction processing system, human resource information system, marketing information system, financial information system' E-commerce and E-business: Introduction to e-commerce and e-business; Benefits of e-commerce and e-business, current trends.

**TM: 308: Application of Computer in Textile Management (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

Cost/benefit analysis using spreadsheet;

Drawing DFD using drawing software;

Installation of database management software;

Creation and dropping of database tables;

Retrieving records from database tables in different ways;

Adding new records to the database tables in various ways;

Changing existing values of records in database tables fulfilling the conditions;

Removing records from database tables; Completing and revoking transactions;

Connect database through programming;

Developing MIS application;

Usage of e-commerce and e-business software.

### TM 361: Fundamentals of Marketing

Credit	Hour/Week	Total Hour
3	3	45

**The Field of Marketing:** Nature and scope of marketing - Historical development of marketing. Marketing management and its evolution - Marketing concept - Role of marketing in the society.

**Marketing Systems and the Marketing Environment:** System approach to marketing - External environment of marketing systems- Internal variables of marketing systems.

**Marketing and Buyer's Behavior:** Definition - Market segmentation, targeting and positioning Classifications of market - Psychological influences on buyer behavior - Cultural and social-group influences of buyer behavior - Model of buyer behavior.

**Elements of Product Planning:** Definition of product- Classification of product – Marketing considerations of product - New product development - Product life cycle - Understanding of branding, packaging, labelling. Place and Distribution Structure: Retailing - Wholesaling - Channels of distribution and logistics Management,

**Price System:** Pricing objectives and price determination - Methods of setting price.

**Promotional Activities:** Promotion Mix Integrated Marketing Communications strategy, Advertising Sales Promotion, Personal Selling and sales management. Direct and on line marketing New marketing model.

**Managing Marketing:** Competitive strategies, Attracting, Retaining and growing customers. Marketing and society: Social Responsibility & Marketing ethics.

### TM 363: Managerial Economics

Credit	Hour/Week	Total Hour
2	2	30

**Basic Concepts in Economics-** Utility 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. Managerial Economics defined; Managerial Economics model; interrelationship with other disciplines; Role of Managerial Economics.

**Objective/Goal of the firm:** Profit defined; Profit maximization objectives; multiplicity of objectives; Profit and non-profit objectives; Economic analysis and managerial efficiency in growth; survival.

**Theory of Demand:** Demand Schedule; Demand Curve; Demand Function, Shift in demand; Income effect and substitution effect; Elasticity of Demand-Types and measurement; Managerial implication of elasticity of demand in practice.

**Demand Estimation:** Methods of demand estimation; Estimating the demand of consumer and industrial goods in macro and micro level.

**Theory of Cost:** Meaning and measurement of cost; Cost function; Long run and Short run cost function; Total, Average and Marginal Cost; Managerial implication of marginal cost.

**Theory of Production:** Production defined; Production functions; Production elasticity; Law of Diminishing return; Stage of production; Production function with one and more variable inputs; Determination of optimum use of input variables; Managerial implication of production function; Scale of production; Measurement of returns to scale.

**Price and Output Determination:** Price and output determination under monopoly, monopolistic competition and Perfect Competition-Short run; Long run price and output determination; Determining optimum selling and

promotion expenses, Condition required for successful price determination.

**Macro economic analysis:** Introduction to macro-economics, Aggregate supply and demand, Measuring economic activities, National income determination.

Macro Economic policy. Monetary policy; Fiscal policy; Inflation and banking policy.

Aggregate income and spending policy for growth and stability National budget and public debts.

**National Income:** Definition of National Income; Concepts of National Income, Gross National Product (GNP); Net National Production (NNP), Gross Domestic Product (GDP); National Income Computation; Problems faced in National Income Computation (Reference should be made to Bangladesh)

### TM 365: Financial Management

Credit	Hour/Week	Total Hour
2	2	30

**Introduction:** The function of financial Manager; The Goal of the Financial Management, Value maximization as a goal; the Agency problem - Financial Decisions, Functions of the financial officers.

**The Time Value of Money:** Future value; Present value, Future value vs. Present value, Future value of an annuity; Present value of an annuity; Installment payment of Accumulation of a future sum.

**Risk and Return:** Risk, uncertainty and return; Probability distribution and Expected return; Total Risk analysis for assets in isolation; Variance, Standard Deviation and Coefficient of variation; Introduction to Portfolio theory and Capital Asset Pricing Model (CAPM) to analyze risk.

**Cost of Capital:** Capital components and their costs: Cost of debt, Cost of preferred stock, Cost of Common Equity; Cost of Retained Earnings- The Dividend Discount Model Approach and the CAPM Approach; Cost of Newly issued Common Equity; Weighted Average Cost of Capital (WACC), Rationale for WACC, Marginal Cost of Capital.

**Financial Institutions:** Roles, functions and interrelationship of the monetary authorities of Bangladesh and commercial banks. Credit policy and public debt management, Problems of commercial banking with respect to lending, investment, deposit taking check clearance.

### TM 367: Operations Management

Credit	Hour/Week	Total Hour
2	2	30

**Basic concepts of Operational Production management:** Definition of OM, Objectives, Functions, Challenges, Process of OM, Scope/ Area of OM, Product and service organization, OM related professional societies

**Operations Strategy and Process Management:** Definition of OS, Competitive priorities, Components of operation strategy, Flow strategy, Link between flow strategy and competitive priorities, Process management, Service and operations relationships, Tools and techniques of process improvement, Issue of virtual factory.

**Operations Management Areas:** Value Creation, Quality Service Delivery, Efficient Service Delivery, Performance Measurement, Role of Technology, Supply Chain. Software, Logistics and Distribution, Risk. And Decision Analysis, Lean Six Sigma.

**Product and Service Design and Process Selection Management:** Concept of PD, its process, Approaches of PD, Process selection, Nature of service, Contemporary view of service management, Service strategy, Approaches of service strategy, Designing Service organization.

**Inventory Control and Material Management:** Definition, purpose and cost of inventory, Inventory system, EOQ and its assumption, Constructing inventory model, Price break model, Solution of some mathematical problems. Material Management, its objectives, functions, types of materials

**MRP and Aggregate Planning:** MRP definition and its systems, Purpose, advantages and disadvantage of MRP, Bills of Materials, Aggregate planning and its process, Techniques for AP, MRP inputs, Benefits and requirements of MRP, Enterprise Resource Planning (ERP) and its hidden cost.

**TM 401: Production Planning & Control**

Credit	Hour/Week	Total Hour
<b>3</b>	<b>3</b>	<b>45</b>

Functions and types of production; production life cycle; capacity planning, process planning; process design-; PPC functions - Forecasting, loading; scheduling, dispatching; plant layout; Plant location, purchasing principles - make or buy decisions.

**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 performances, Hot; (operator hours per 100 kg production). Machine interference.

**Inventory Control:** Inventory and Inventory control, objects of inventory control, benefits of inventory control, types of inventory, costs associated with inventory, safety stock, economic order quantity (EOQ).

**Production cost concept and break-even analysis:** Costs of production, concept of cost, cost center, cost unit, classification of cost, analysis of production cost, break-even analysis, break-even point, cost-volume-profit (CVP) analysis.

**Material requirement planning (MRP) & Enterprise resource planning (ERP):** MRP objectives, function served by MRP, MRP system, MRP inputs & outputs, Enterprise resource planning (ERP), working area of ERP, function, benefits.

**TM 403: Quality Management**

Credit	Hour/Week	Total Hour
<b>2</b>	<b>2</b>	<b>30</b>

**Introduction:** Meaning and measurement of quality; quality assurance, duties & responsibilities of quality control officer, emergence of modern quality & its management, Deming Principle on quality & productivity, quality cost & their interpretation.

**Management approaches:** Management approaches, concepts, and techniques for the monitoring and improvement of product and process quality; developing standards for quality of product, process, and service.

**Control & Measurement:** Control & measurement concept of quality, elementary SPC tools-PDCA cycle, Pareto's law, cause & effect (fishbone), control charts- attribute control charts & variable control charts, measurement of variation & process capability analysis, design of experiments - identification of key variables for major variations.

**Total Quality Management:** Concept of total quality management (TQM); origins and growth of TQM, Benefits of TQM, and Philosophies of TQM-quality circle approach, developing a corporate orientation for TQM

**Quality & Reliability:** Quality & Reliability, Survival probability, hazard rate, components and system reliability and its prediction, failure mode and fault tree analysis, reliability testing

**Continuous Improvement:** Benchmarking, Continuous Improvement, Lean Management, Operational Quality Management, Six Sigma, Quality Management System

**Standards and compliance:** Quality standards and their compliance, ISO Standards, ISO 9000 - Quality management, Quality management principles, ISO 26000 - Social responsibility, ISO 14000 and other relevant ISOs.

### TM 405: Textile & Apparel Merchandising

Credit	Hour/Week	Total Hour
3	3	45

**Introduction to apparel business:** Global scenario of apparel business, introduction to apparel and textiles industries, International trade.

**Marketing:** Functional organization of an apparel firm, Responsibilities of a marketing division-marketing objectives and strategies -marketing research- types of markets: retails and wholesales strategies for merchandise distribution, retailer, sourcing flow and practices.

**Introduction to fashion marketing:** Apparel retailing and marketing, importance of apparel marketing, the marketing mix, fashion seasons. & user occasions, modern seasonal trading, market position, marketing strategy, marketing planning.

**The role of the fashion buyer and garments technologist:** buying and merchandising, structures, the role & responsibility of a buyer, negotiation skills, garments technology.

**The role of merchandising;** definition, A background to merchandising, the structure of merchandising, main area of merchandising, the role and responsibility of merchandiser, the key merchandising competence. Art of order negotiation. International commercial terminology (incoterms) and L/C commercial documentation.

**Fashion designing and fashion trend:** Definition, the role of fashion designer, the key tasks of a designer, contribution of fashion designer, designing benefits into fashion customers, fashion trends, tapping into the changing external environment, technological innovations in fibers and fabrics, fashion forecasting, the importance of shows, lead-time.

**Merchandising Planning:** Importance of planning, planning and profitability, creating the initial seasonal sales patterns, sales planning and fashion business.

**Apparel production planning and control:** Functions of PPC, calculation of production capacity, productivity in apparel industry, line planning, line loading, Efficiency calculation of a production batch or line, calculation of machine our rate. Product development and sample management,

**Consumption and Costing:** Garment measurement, yarn & fabric consumption of woven and knit garments, Accessories consumption, cost, sheet preparing and pricing.

**Sourcing strategy:** Sourcing definition, need for sourcing, sourcing materials, Materials requirement planning (MRP), principles of MRP, Material management for quick response, HT technology, overseas sourcing, different way to buying a garment, general agreement on Tariffs and Trade, general sourcing issue. Critical path management and order follow-up.

**Supply chain management:** definition of supply chain management, global apparel Supply chain, supply chain

Structure and tier, logistics and SCM, Integrating supply and demand, benefits of SCM.

**TM 407: Entrepreneurship & Project Development**

Credit	Hour/Week	Total Hour
3	3	45

**Concept and Meaning of Entrepreneurship:** Theories of Entrepreneurship; Characteristics of Entrepreneurs; Entrepreneurial Motivation; Environment of Entrepreneurship; History of Entrepreneurship Development. Japan, USA, UK, India, Pakistan, Philippine; Bangladesh. Sources and Procedures of Government and Private assistance; Government Regulations Concerning Entrepreneurship Development, Problems of Entrepreneurship Development in Bangladesh.

**Entrepreneurship and Small Business:** Definition of small business- Small business and economic development- Problem an aid to small business - Different schemes of training- Problems in small business.

**Entrepreneurship and Small Business in Bangladesh:** A review of attempts - Success and failures - Different schemes of small business development - Existing schemes and future plans. Preparation of Business Plan. Case studies of entrepreneurs.

**Project Identification and selection:** Meaning of project, project classification, project identification, project selection.

**Project Formulation:** Meaning of project report, significance of project report, contents of a project report, Formulation, Planning, commissions, guideline, project profile, common errors in project formulation. 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 Payback period, Net present value, internal rate of return, Benefit cost ration. Project Management through CPM/PERT.

**TM 409: Economic Issues of Textile and Apparel Business**

Credit	Hour/Week	Total Hour
3	3	45

**Economic issues affecting Textile & Apparel business:** Interest on different types of Capital, Cost of Utilities, Road communication & other infrastructure, Transport facilities and cost, Port Facilities, Clearing and fm-warding formalities, Banking and Exchange rate, Law and order situation, Bi-lateral /Multi-lateral trade agreement, Cash incentives/Export incentive. The role of EPB & EPZ for promotion of export business. Export Policy and Import Policy, Damping, anti-damping. GDP. & GNP, Growth rate of GDP, Inflation & its measurement, wages and productivity labor, Availability & cost of raw material, Social compliance's in environmental issues, Availability of skill manpower & latest Technology. Effect of global issues & other related issues.

**Taxation:**

**Income Tax:** Statutory Definition; Income Tax Authorities; Charge of Income Tax, Income tax Base and Income tax rate; Type of Assesses and Their Residential Status; Heads of Incomes; Income from Securities; Income from House Property, Agricultural' Income; Income from Business or Profession; Share of Profit in a Firm; income of the Spouse or Minor Child; Capital Gains & income from other sources, Foreign Income. Exemption, (Tax holiday and other tax incentive) Allowances, Return and Payment of income tax.



**Value Added Tax:** Scope of VAT, Registration and De-registration, Exemption and Zero Rating, Tax Point of VAT, Taxable Value for VAT, VAT Computation; incentive Turnover Tax(TT) & Supplementary Duty (SD) Books of Accounts to be maintained under the VAT Laws, Piling of VAT Return; Tax Authorities under the VAT Laws, Payments, Refund and Recovery of Taxes under the VAT Laws.

**Custom Duty:** Authorities, Customs Port, Customs. Airports, Land Customs Stations & Customs- House; Warehousing Stations, & Public/Private Warehouses, Prohibited Goods or Piece-Goods. Goods Dutiable; Exemptions from Customs Duty; PSI, Value of Imported and Exported Goods for Imposing Customs Duty, General Customs Duty, Countervailing Duty, Anti-dumping Duty and Safeguard Duty, Duty Drawback, Infrastructure Development Surcharge, Offences and Penalties; Prevention of Smuggling-Powers and Search, Seizure and Arrest-Adjudication of Offences; Appeals and Revisions.

**Excise Duty:** Goods and Services subject to Excise Duty; Level of Excise Duties; Regulatory Duty under the Excise and Salt Act; Determination of Value for Imposing Excise duty, License Necessary for Certain Operations, Offences and Penalties; Recovery of Sums Due to Government, Exemptions from Excise Duty.

**Gift Tax:** Statutory Definition of Gift; Valuation of Gift; Tax-Exempted Gifts, Return of Gifts; Assessment and Recovery of Gift Tax; Penalties and Prosecution, Gift tax Authorities.

Taxes Vat, and duty applied to Textile & Apparel in Bangladesh & other countries.

### **Insurance**

Insurance Contracts: Essentials - Principles - Insurance and Wagering - Insurance Contingencies - Reinsurance - Types of reinsurance Application of reinsurance to various branches of insurance – Double insurance - Brief history of Insurance Business.

**Life Assurance:** Life assurance contract - Types of policies – Certain Aspects of Life Assurance.

**Fire Insurance Contract:** Material Loss Insurance - Consequential Loss Insurance - Settlement of Claims-Extent of loss by fire in Bangladesh - Moral Hazard - Management Problems of Fire insurance.

**Marine Insurance:** Marine Insurance Contract - Types of Policies - Marine Losses - Settlement of Claims - Act of God.

**Other Insurance:** Crop Insurance - Cattle Insurance-Civil Aviation Insurance-Export Credit Guarantee Insurance-Group Insurance-Self Insurance etc. - Fidelity Insurance - Bank Deposit Insurance.

### **TM 461: Industrial Relations**

Credit	Hour/Week	Total Hour
2	2	30

**Industrial Relations:** Concept - Definition - Significance - Objectives - Scope- Approaches - Principles of good industrial relations - Role of State Employers and the Unions in industrial relation.

**Trade Unionism and Industrial Relations:** Labor movement – Concepts -Trade union movement - Development of trade unionism in Indian - Functions and problems of trade unions.

**International Labor Movement** - International Confederation of Free Trade Unions (ICFTU) - World Federation of Trade Unions (WFTU) – International Labor Organizations (ILO) - Origin, history, Objectives and functions.

**Industrial Disputes:** Meaning - Causes - Forms - Industrial relations machinery - Joint consultation - Works committee - Conciliations – Court of Enquiry - Voluntary arbitration - Adjudication.

**Employee Discipline:** Definition - Causes of indiscipline - Code of discipline - Disciplinary procedure - Code of conduct.

**Grievance Handling:** Meaning of grievances - Causes of grievances- Guidelines for grievance handling - Grievances redressal procedures.

**Worker's Participation in Management:** Meaning - Significance – Form - Situations in India. Collective

Bargaining: Meaning - Significance – Principles - Process - Training methods - Evaluation of training and retraining.

**Wage Administration and Industrial Relations** - Wage policy - Objectives - Wage regulation machinery - Wage Board: Growth and development - Composition and functions - Evaluation of wage bonds.

**Employee Communication:** Meaning - Significance - Types - Barriers - Methods of overcoming barriers - Principal of effective communication Employee Education and Training - Concept - features- Aims and Objects - Contents - Teaching techniques - Training Schemes.

**Employee health, safety and security:** Meaning -Significance - Programmers - Employee Counseling: Meaning - Significance - Types and Process - Conflict management: Meaning - TYPES of Barriers episode, management of conflict - Quality circle: Meaning – Objectives - Techniques.

### TM 463: Human Resource Management

Credit	Hour/Week	Total Hour
3	3	45

**The Development of Human Resource Management:** The concept of human resource management - Early stages of development Contemporary developments - Human resource management as a profession.

**Organization Considerations in Managing Human Resources:** The organization as a system Responsibility and authority within the organization- Organization structures- The human resource department in an organization- The personnel program.

**Job Requirements:** The role of jobs- Job design -Job analysis - Job Requirements: and personnel functions- Job descriptions.

**Human Resource Planning and Recruitment:** Human resource planning recruiting within the organization - Recruiting outside the organization - EEO/AA in recruitment.

**Recruitment and Selection:** The steps in recruitment- The exit interview - Reaching a selection decision - Considerations that shape selection policies.

**Job Evaluation:** The reasons of job evaluation schemes- Problem areas - Procedure-Techniques-Non-Analytical Methods-Analytical Methods-New Methods-Other methods.

**Compensation Systems:** Job choice-The influence of compensation on behaviors- "Compensation and Satisfaction-Administration- Types of systems- Compensation evaluation - Incentive pay systems.

**Training and Development:** The purpose of training - The identification of need - Training programs- Types of training - Management development - Evaluation - Government intervention - Psychological principles of teaming.

**Career Development:** Phases of a career development program- Career development programs for special groups - Personal career development.

**Evaluation and Improving Performance:** Objectives- Performance evaluation programs- Performance evaluation methods- Feedback of evaluations-I improving performance.

**Motivation:** Objects, Characteristics of motivation. Motivations, Satisfaction, Sources: ‘of motivation. Different? theories of motivation. Special motivation techniques.

**Safety and health Management:** Concepts, programs, Occupational diseases & their preventive measures. CSR. in the factory, CSR as occupational safety & health.

### TM 465: Business and Industrial Law

Credit	Hour/Week	Total Hour
2	2	30

#### A. Commercial Law:

**Low of contract:** Definition, rules of offer and acceptance, consideration, type of contract breach of contract, contract through agents.

Lows relating to sales of goods, negotiable instruments, carriage of goods by land and sea, Law of insolvency.

The Companies Act 1994, Partnership act other Acts, Trade Marks Act 1940, Patent Design Act, 1911, Standard Weight and measure Ordinance, 1982

#### B. Industrial Law:

**Factories Act, 1965:** Health, Hygiene, Welfare and Safety measures, working Hourse. Employment of young persons, Leave and Holidays, etc.

**Industrial Relations Ordinance, 1969:** Importance of study of Industrial Relations, Trade Unions, Unfair Labour practice, Collective Bargaining Agent(CBA), Strikes and Lock-out, Labour Court and Labour Appellate Tribunal.

**Employment of Labour (Standing Orders Act, 1965:** Conditions of Employment, Recruitment procedure, Classification of workers, Leave and Holidays, Stoppage of work, Calculation of period of continuous service, Lay-off, etc. Retrenchment, Dismissal, Punishment, Termination, Penalties and Provident Fund Rules.

**The Payment of Wages Act, 1936:** Difference between Salary and Wages, Wages calculation; Responsibility of wage payment; Deductions, Fines, etc.

**Workmen; Compensation Act, 1923.**

**Companies Profits (Workers; Participation) Act, 1968.**

**Maternity Benefit Act, BFPZ Act.**

### TM 467: Market Research and Product Development

Credit	Hour/Week	Total Hour
3	3	45

#### (A) Marketing Research

**Introduction to Marketing Research:** The Nature of Marketing Research, A Classification of Marketing Research, The Role of Marketing Research, in MIS and DSS, Marketing Research Suppliers, Selecting a Research Supplier, Marketing Research Process.

**Defining the Marketing Research:** The Process of problem, Developing an Approach to the Problem, Environmental Context of the problem, Management Decision Problem and Marketing Research Problem, Developing the Marketing Research Problem, Components of the Approach.

**Research Design:** Exploratory, Descriptive and Causal Research Relationships among Exploratory, Descriptive, and Causal Research; Potential Sources of Error, Budgeting and Scheduling the Project, Marketing Research Proposal.

**Questionnaire and Form Design:** Questionnaire Design Process: Overcoming Inability to Answer, Overcoming Unwillingness to Answer, Choosing Question Structure, Choosing Question Wording, Determining the Order of Question; From and Layout, Reproduction of the Questionnaire, Pre-testing; and Observational Forms.

**Sampling: Design and Procedures:** The Sampling Design Process, A Classification of Sampling Techniques, Nonprobability Sampling Techniques and Probability Sampling Techniques, Choosing Nonprobability versus Probability Sampling, Uses of Nonprobability and Probability Sampling.

**Field Work:** The Nature of Field Work, Field Work and Data Collection Process, Selecting Fields Workers, Training Fields Workers, Supervising Fields Workers, Validating Fields Work, and Evaluating Fields Workers.

**International Marketing Research:** Marketing Research International Context, A Framework for International Marketing Research.

**(B) Product Development:**

**Introduction to Product Management:** Marketing Organizations, The Role of the Sales Force, Marketing Organization Implications of Global Marketing, Product Management; Fact Versus Fiction, Changes Affecting Product Management, Changes in Marketing Organizations.

**Marketing Planning:** The Planning Process, Components of the Marketing Plan. Market Potential and Sales Forecasting: Definitions, Market Potential, Methods of Estimating Market and Sales Potential, Area Potential, Sales Forecasting.

**Developing Product Strategy:** Elements of a Product Strategy, Setting Objectives, Selection of Strategic Alternatives, Positioning: Choices of Customer Targets, Positioning; Choice of Competitor Targets, Positioning; The Core Strategy, Managing Brand Equity, Customer Strategy, Product Strategy Overt the Life Cycle.

**New Product Development and Management :** Overview Introduction, Innovation; Strategy Strategic Planning for New Product, Process and Management; Organization Concepts and Options Implementation of Concepts; Generation Creative Process and People New Product; Concept- Generating Process, Stimulating Techniques, Collecting and handling new Product Ideas, Evaluation Concepts, Tools, Economic Analysis, Commercialization Prelaunch Control, The Launch Cycle, New Product Marketing Plan, Commercialization Tolls, Controls.

**TM 469: International Marketing of Textile and Apparel**

Credit	Hour/Week	Total Hour
3	3	45

**Definition of International trade:** Importance of international trade in the World economy- Trend of international trade with reference to Bangladesh.

**International Trade and the Theory of Comparative Advantage:**

Economic basis for international trade, The source of international trade. The principle of comparative advantage, Economic gain from trade, Effects of trade quotas - Heckscher - Ohilion Theorem.

**Protectionism and Free Trade:** Arguments/economics of protectionism - Instruments of protectionism - Multilateral trade negotiation – Removing barriers to free trade - GATT as an initiative for liberalizing trade. Controlling the international business.

**The economics of foreign exchange:** Balance of international trade - International financial system.

**International Trade Transaction:** International transfer of bank deposits resulting from international transactions-How foreign trade is carried out - Export and import transactions.

**Foreign exchange markets** - Equilibrium exchange rates – Determinants of foreign exchange rates Nominal and real exchange rates - Appreciation and depreciation of currencies. International balance of payments - Current accounts, capital accounts.

**Export and Import Practices:** Export Strategy, Export intermediaries, Locating foreign markets, Freight forwards and their Functions, Export Financing, Other government Incentives.

**Import & Export Procedure:** Registration procedure, Procedure in export import trade Import procedure of industrial goods and commercial goods.

**Documentation:** Invoice, packing list, bill of exchange, bill of lading types of B/L, certificate of origin, certificate of analysis. Pre-shipment inspection(PSI), Shipments, Import strategy, Delivery and negotiation, retirement of documents from bank, clearing agent and their functions in customs clearance. Technology transfer, Technical/assistance. Procedure for realization of export incentives, Back to back L/C,

**Issues of International Economics:** The Bretton Woods System -The International Monetary Fund (IMF) - The World Bank (WE) - World Trade Organization (WTO) & other institutional arrangement.

**Bangladesh and International Textile & Apparel Trade:** World Textile & Apparel Trade & Production trends, International Trade in Textile Clothing, Trends of export & import of Bangladesh with special Reference to Textile & apparel. Bangladesh's position in the World USA, EU, & community of developing countries - Trade intensity and terms of trade of Bangladesh with the SAARC countries - Trends and composition of exports and imports of Bangladesh - Major trade partners of Bangladesh.

**Export Processing Zone in Bangladesh:** Bangladesh Export Processing Zone Authority (BFPZA) - Reasons for setting EPZ in Bangladesh - Performance of the EPZ in Bangladesh.

**TM 468: Industrial Attachment**

Credit	Duration
3	2 Months

The students must undergo 2(two) months intensive of Industrial Training program in the relevant area of specialization after completion of Level-III, Term-II.

**TM 460: Project Work**

Credit
3

During the Level-IV of study each student will be required to complete a Project Work in the relevant field of their specialization. For such a work the students will be guided by a Supervisor of the concerned Department.

**TM 400: Comprehensive Viva**

Credit
2

The Comprehensive Viva will cover the entire 4 years courses of study. 60% weightage will be on the departmental subjects. 40% weightage will be on all other subjects. No specific class hour will be assigned for the comprehensive Viva.

**Department of Textile Fashion & Design**  
**Detailed outline of courses offered for B.Sc. in Textile Engineering**  
**(Fashion & Design)**

**FD 271: Fashion Design-I: Elements of Design (Practical)**

Credit	Hour/Week	Total Hour
1	3	15

The course provides the students with the basic introductory look into the Fashion. It includes the elements and principles of design. The basic drawing is necessary as a foundation for Fine Art. Introduction to all design courses, visualization skills: line, perspective, 2D, 3D, texture, individuality and the sources of creativity. Design as creative thinking and problem solving, the basic design process. Introduction to color and color dimension, color wheel. The students have to take personal project aimed to understand individuality and sources of creativity.

**FD 272: Fashion Illustration-I (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

This course introduces fashion sketching techniques to communicate the ideas, concepts and details of garments by visually interpreting fashion apparel.

**Fashion Terminology:** Area and Scope; sources for ideas, fashion figure and proportion; introduction to seam and balance lines; Fashion figure basic block figure for female, male and child; regular vs fashion figure; ball joint figure; fleshing out free hand drawing.

Type of line and tone practice; movement; figure analysis; poses static and action; face, hands, feet, head and hair styles, mood and style of garment and relevant poses.

**FD 273: Fashion History**

Credit	Hour/Week	Total Hour
3	3	45

This course is an informative journey through the costume and fashion from the ancient time to today's historical, Social and cultural contexts in fashion of both national and international aspect (1916 to till present).

**Effect of Historical Evolution on Culture, Local Craft & Heritage during the key movements of:** Early Greek, Roman, Medieval, Renaissance, Chinese, Mughal, Shonatan religious time, Islamic religious key movements. Political history of South Asian zone (Different times: Ancient time, pre-British period, British period and Liberation period of Bangladesh & other neighboring countries) and its effect on fashion and culture.

The emphasis will be given on the evolution of dress, costume silhouette recognition and vocabulary of historical clothing. The geological, Social and political aspects and the influences on fashion and trends. Understanding the period of fashion within the context of artistic, cultural and religious attitudes of the period. Also have to examine the fabrics, hairstyle and accessories of the period accordingly.

**History of the Handloom Industry of Bangladesh:** History of Muslin, Dhakkai, Jamdani, Tangail Taant, Mirpur Benarash1 & Katan, Rajshahi Silk, khaddi of Comilla, Monipuri Textiles of Sylhet, Bain Textiles of Chittagong hill-tract areas, Home textile products of Narshingdi & Kustia, Nakshi Kantha Stitch & Jessore Stitch products. Have to study these different types of traditional weaving belongs to various indigenous races and elements of their distinctive culture related to the products.

Philosophical and Historical background of casual, official, occasional and festive dresses of men, women and children of Bangladesh and the background of its continuous changes till today. (Sari, Blouse, Dhuti, Lungi, Pajama, Panjabi, Salwar, Kamij, Kurta, Fatua, Fusion dresses & Western dresses).

**FD 274: Fashion Illustration-II (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

**Fashion Texture:** Four types of texture, black & white color, color wheel, different texture & techniques, sheer and cotton fabric (matte) and silk (smooth, glossy) lines and silhouettes. Fashion details, trousers, necklines and collars, sleeves and skirts, blouses and tops, jackets and formal suits. Stylization-garments and pose together, detail of drapes, frills and other details. Specification drawings-shirt, formal trousers. Presentation methods, presentation mood board, color board, layout planning and presentation.

**FD 371: Surface Decoration Techniques (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

**Introduction of Surface Ornamentation of fabric and apparel:**

Assessing the nature of product, Assessing the scope.

**Motif and Tools:** Block print tools, Coloration, Batik process, Screen Printing Tools & Techniques, Hand Printing, Brush Painting and techniques, Color Preparation Process, Tools Making Process, Applique, Embroidery, Beading. Quilting & Felting, Techniques of Presentation.

**FD 372: Surface Decoration Techniques (Practical)**

Credit	Hour/Week	Total Hour
1	3	45

This course introduces surface decoration techniques, ideas and concepts. Print Technology: Block Print, Traditional Techniques, modern interpretations, Boutique, Tie-Dye, Dispersion, screen print, Transfer Print, computerized Digital printing, Natural Dyeing; computerized Digital printing, Natural Dyeing Techniques, Furnishing Fabrics, wallpaper patterning Repeat, Design layout, Drop devices, Abstract, decorative geometrical nursery, shirting's, scarves, saris, western dress.

**Embroidery Techniques:**

Bangladesh craft Industries- design and manufacturing parameters and constrains professional practices. Embroidery and surface decoration Hand and machine, metallic, Mirrored work, appliqué and surface Decoration-Hand and Machine, metallic, Mirrored work, Appliqué, Decouple, cut-work, Bead-work. contemporary designers-Asia, Cultural influences Bangladesh cultural scene, Embroidery for Fashion, Theatrical costume, Liturgical and conservation.

### FD-373: Application of Computer in Fashion & Design (Theory)

Credit	Hour	Total Hour
2	2	30

**System Analysis & Design:** System analysis, System design; Difference between analysis and design; System analysts and their role; System development life cycle (SDLC) - SDLC stages, feasibility study, cost/benefit analysis, Data flow diagram (DFD); Introduction to projectmanagement.

**Database Management System:** Basic concepts - character, field, record, file, database; Benefits and limitations.

**Fashion Image: Fashion image:** types, construction, usage, format, export and Import process, Image manipulation, image masking, color adjustment, color mode, layer masking, vector masking, image resolution, scanning process;

**Fashion Design:** Creative fashion design concept; Digital fashion design process; Difference between manual and digital process; Dress illustration, figure illustration and fabric, fabric motif design; Custom vector shapes, color swatches, symbols and variety of brushes; Gradient color and gradient mesh color; Path segment and its modification by different Process, Presentation types and personal profile making process.

### FD-374: Application of Computer in Fashion & Design (Practical)

Credit	Hour/Week	Total Hour
1	3	45

Implementation of the creative design concept for fashion; Exploring the OOS and techniques of computer applications for professional fashion design; Creating innovative garment design or developing an existing design; Creation of digital mood board design by manipulating various fashion accessories, composite artwork for various garments, digital Surface design; Manipulation of fabric, creative motif design manually and digitally, Filling a dress illustration as a fabric pattern, presenting color shade by color wheel and color chart digitally; Creation of various dress and figure illustration by using solid color and mesh fold (silk); Creation of various fashion accessories like as buttons, Zipper, pocket, company logo, tag, label etc.

### FD378: Fashion Design-II: Creative Design Analysis & Collection (Practical)

Credit	Hour/Week	Total Hour
1	2	45

**Design Sources :** Historic and Ethnic Costume, Historic Inspiration, Folk Influences, Libraries and Bookstores the Art- Films, Music, Television Fabrics, Travel, Seasons, Animals, Insects, Birds, Nature, Flower & Trees, Sea underwater life, Architecture, Historical periods, Materials, Art and the work of painters, Sculptors, Technology etc.

**Design Development:** Concept Boards, Research work (Color research, Texture, Details) Color chart & Fabric Swatch, Flat Sketch of garments.

**Design Element:**

**Color:** Color Dimensions, Hue, Value, Intensity, Warm Color, Cool Color, Neutrals, Color Relationship, Color Naming, Basic Color Schemes.

**Fabric:** Fabric Selection, Fabric Characteristics, Texture, Perf Weight and Hand.

**Silhouette:** Natural Silhouette, Slim Silhouette, Rectangle Silhouette Wedge Silhouette, A-line Tent Silhouette, Hourglass Silhouette.



**Line:** The internal structure symmetrical line, asymmetrical line, vertical line, horizontal line, diagonal direction, repetition of elements, graduate development.

**Design Principles:** Proportion & Balance, Symmetrical Balance, Asymmetrical Balance, Repetition, Emphasis, Sequence, Alternation/ Variation, Gradation, Rhythm.

**Successful Design:** Sketching ideas.

**FD 471: Consumer Behavior in Fashion (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

Comprehensive analysis of the factors in human behavior, Factors influence the choice and the use of products, Consumer Segmentation.

**Consumer Research:** Demand activated product development, Consumer

**identification with fashion cycles:** Consumer groups, Fashion Leaders, Fashion Innovators, Fashion Motivators or Role Models, Fashion Victims, Fashion Followers, Fashion leaders in Manufacturing & Retailing, Media influences.

**Adoption of Fashion:** Traditional Fashion Adoption, Trickle-down Theory, Reverse/ Trickle up Theory, Mass Dimension / Trickle across Theory.

**Motives for consumer buying:** Being Fashionable, Being Attractive, To impress others, Accepted by Others, Emotional Need.

**Fashion Selection:** Aesthetic Appeal, Practical Aspects in Consideration.

**FD 472: Fashion Design-III: Product Development Preparation & Presentation (Practical)**

Credit	Hour/Week	Total Hour
2	6	90

Purpose of this course is to equip each student with the ability to analyze and determine the value-added products for the international Fashion market, with innovative product diversification. Students will find out which product Bangladesh can offer to the world fashion market.

This course include introduction to production development. Product development process, Fashion sources, dress and trims, the theme and developing research material, dress design, principles of dress design, Drawing and layout flats, Template Fashion Illustration, Net pattern,

Template pattern, Pattern problem and solution, sewing layout, Fit sample, sample Approval, Pre production sample, mood Board, Illustration, Trims and Swatches, garments specification, production display. Student will present their developed product through professional presentation.

**FD 473: Fashion Forecasting & Trend Analysis: (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

**Defining Fashion, Defining Fashion Trends:** Evolution of a Trend, Trend Movement, Trend Contagion, Trend Management,

**Defining Fashion Forecasting:** Visualization & Forecasting, Steps in Developing a Forecast.

**Fashion Forecasting:** Forecasting Specialties, Fashion Watchers, Consumer Research & Sales Forecasting, Cultural Indicators, Competitive Analysis.

**Forecasting in the Textile & Apparel Industries:** Short term Forecasting, Long Term Forecasting, Forecasting in Apparel Planning & Scheduling, Manufacturing Cycle, Scouting for Fashion trends.

**Innovation:** Diffusion of Innovation, Diffusion process, Diffusion Curve, Characteristics of Innovation.

**The consumer Adoption Process.**

**Fashion change Agents:** Innovators, Fashion leaders, Celebrities and influential, Fashion Followers, Media influences.

**Forecaster's Toolbox:** Monitoring change Agents, Targeting Innovators, Targeting Leaders, Determining Marketing Strategies, The Forecasters Observation Post, Mapping Celebrity-Consumer Interaction, Visualizing the diffusion Process, Visualizing the target market.

**The direction of fashion Change:** Trickle Down theory, Trickle up Theory, Trickle Across Theory.

**Color Forecasting:** Color of Season, Color in Marketing, Consumers and the Psychology of color, Color cycles and cultural shifts, Forecasting with color cycles, Color Relationships across product categories, Sources for color Ideas, Techniques of color Trend Analysis.

**Textile trend observation:** Fashion in fiber & fabric, Researching Seasonal Trends.

**The role of Fore Casters:** Avoiding Traps in the Forecast, avoiding traps in Trend Analysis, Factors involved in planning and presenting the forecast.

Emphasis on use and role of the print media, internet and broadcast information in fashion forecasting.

**FD- 474: Professional studio practice (Practical)**

Credit	Hour/Week	Total Hour
1	2	45

Student in this course develop skills necessary to create final finish sample garments.

**Development cycles:** Searching for new concept, Name of the concept, Mood board, Research work (Color research, Texture, Details) color chart & Fabric swatch, flat sketch of garments design collection.

**Sample Development:** Flat sketches with design specification (From the final collection) Detail, Trims & Accessories Measurement chart, Pattern drafting cutting & Manufacturing alternation/ Modification (if needed) Sample approval, costing / estimating, creating and maintain office directory customer specifies and time management.

**FD 475: Special Textile Products: (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

Introduction to modern industrial techniques.

**Use of Special Materials:** Interlinings, Linings, Reasons and techniques of using different types of Lining & Interlining, Interfacings, Narrow Fabrics, Leather, PVC, Fur, Rain proof wear, Winter wear, Survival Clothing  
Different types of special fabric studies: Properties study, Production techniques, Wear styles.

Special effects by using different types/ specialized yarn, fabric and wet processing. Quality control of special

**Apparel production:** end use, style analysis, quality aspects & controls, linking & defects.

Productivity Calculation, Fabric Consumption, Design- chart & calculation, Costing of different fashion related products used in industry, costing of finished apparel.

Machinery for making up of fashionable wear.

**FD 477: Sociology of Fashion (Theory)**

Credit	Hour/week	Total Hour
2	2	30

Clothing and the Origins of Man

**Historical Influences:** Medieval, Elizabethan, Empire, Victorian, 20 Century Fashion in Europe and America.

**Cultural Influences:** From prehistoric times to the present day. Asia, India, China, Japan, East meets west, Fashion fads and the 20 century.

Social structure of Bangladesh, Oriental & occidental. Social structure of the tribal people of Bangladesh, Influences of social structure on fashion. Nature of social change, factors of social change, biological, physical, economic, cultural, technological factor. Urbanization and industrialization in Bangladesh. Effect of social change, urbanization & industrialization on fashion.

**Environment Issues affective fashion changes:**

**Western Retail Developments:** The birth of retail, departmental stores, Supermarkets, mail order E-shopping, consumer behavior, western Subculture and Fashion, street fashion, media influences, Ready to Wear made to measure special occasion designer haute couture, future fashion.

**FD 479: Fashion Accessories: (Theory)**

Credit	Hour/Week	Total Hour
2	2	30

This course focuses on fashion accessories: Scarves, hats, shoes, jewelry and hand bags; Rendering of texture and fabrics: Velvet, fur, leather, sateen, knit, twill and print; Decoration and detailing: belts, cuffs, waist bands, hemline, bias, drape, gather, drawstring, fastenings, frills, pleats, pockets, seams, embroideries, vents, slits & zips etc.

**FD 478: Industrial Attachment**

Credit	Duration
3	2 month

The students must undergo 2 (two) months intensive of Industrial Training program in the relevant area of specialization after completion of Level-III, Term-II.

**FD 470: Project Work**

Credit
3

During the Level-IV of study each student will be required to complete a Project Work in the relevant field of their specialization. For such a work the students will be guided by a Supervisor of the concerned Department.

**FD 400: Comprehensive Viva**

Credit
2

The Comprehensive Viva will cover the entire 4 years courses of study. 60% weightage will be on the departmental subjects. 40% weightage will be on all other subjects. No specific class hour will be assigned for the comprehensive Viva.

**Department of Allied Engineering**  
**Detailed outline of courses offered for B.Sc. in Textile Engineering**  
**(Yarn Mfg/Fabric Mfg./Wet Processing /Apparel Mfg./ Tex.Mgt/Fashion & Design)**

**AE 181: Engineering Materials**

Credit	Hour / Week	Total Hour
2	2	30

Properties of metals, crystalline and amorphous structures of metals, elastic and plastic behavior of materials in service: strain energy, resiliency, toughness, hysteresis, fracture, ductile-brittle transition, fatigue, creep, endurance limit, time effect, relaxation of stresses, oxidation and degradation, corrosion and corrosion protection,

**Non-ferrous metals:** production and uses,

**Iron and steel:** production and uses, types of cast iron, effects of impurities, plain carbon steel: the iron-iron carbide phase diagram, constituents and structures of plain carbon steels, heat treatment of steels,

**Alloy steel:** principles and effects of alloying, different alloy steels and their uses.

Materials in hostile environment (high temp, Sub-normal temp. and corrosion). Hardness and its measuring methods.

**Composites:** theory of composite fabrication, properties and structure and types of different composites.

**Plastic and rubber types:** properties and uses, lubricants classification, properties and uses.

**AE 182: Machine Shop Practice (Practical)**

Credit	Hour / Week	Total Hour
1	3	45

Identification and use of hand tools and measuring instruments, reamers, taps and dies, bench vice and carpentry tools, makings of models.

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 molding, pattern for casting, sand casting

**AE 184: Engineering Drawing (Practical)**

Credit	Hour / Week	Total Hour
1	3	45

**Introduction:** Instruments and their uses, first and third angle projections, orthographic drawings, isometric views, missing lines and views, sectional views and conventional practices, auxiliary views.

Application of computer software for Engineering Drawing.

### AE 185: Computer Fundamentals

Credit	Hour / Week	Total Hour
2	2	30

**Introduction to Computers:** Evolution of Computer; Types of Computer, Functional Units of Computer; Memory and Storage Devices, Typical Input and Output Devices.

**Digital System:** Decimal, Binary, Octal and Hexadecimal Number Systems; 1's and 2's Complement; Basic Logic Gates; Boolean Algebra, Boolean Logic Simplification by Karnaugh Map; Combinational Logic Design (Half Adder, Full Adder, Subtractor, Encoder, Decoder, Multiplexer, De-multiplexer).

**Operating System Basics:** Fundamental Concepts of Operating System; Purpose of Operating System; Types of Operating Systems; Basic Concepts of Color Models.

**Application Software:** Concept of Application Software; Usage and Application of Word Processing and Spreadsheet.

**Programming Techniques:** Elementary Concepts of Programming, Algorithm Design and Flow Chart Representation; Data Types, Constants and Variables; Operator and Expressions; Conditional Expressions; Looping and Control Statements; Array and Functions.

**Introduction to Computer Networks:** Concepts of Computer Networks, Classification of Computer Networks; Commonly Used Networking Devices; Topologies and Networking Protocols.

### AE 186: Computer Fundamentals (Practical)

Credit	Hour / Week	Total Hour
1	3	45

Identification of Major Components of Computer.

Operating System Installation and Usage.

Usage and Application of Word Processing and Spread-Sheet.

Programming Based on Course Content of Computer Fundamentals.

Implementation of Basic Logic Gates, Design and Implementation of a Combinational Logic Circuit.

Identification of Network Accessories (Hub, Switch, Router etc.).

Basic Networking Commands, IP Configuration, E-Mail and Web Browsing, Web Searching.

### AE 281: Mechanical Engineering

Credit	Hour / Week	Total Hour
3	3	45

**Fluid Mechanics:** Fluid properties, fluid statics, basic hydrostatic equation, manometer, pressure variation in static incompressible and compressible fluids. Bernoulli's equation, fluid flow measurement, frictional losses in pipes and fittings, compressed air.

**Mechanics of Solids:** Stress analysis: statically indeterminate axially loaded member, thermal and centrifugal stresses, stresses in thin and thick walled cylinders and spheres.

**Beams:** Shear force and bending moment diagrams, various types of stresses in beams: flexural formula, deflection of beams: integration and area moment methods, introduction of reinforced concrete beams and slabs.

**Torsion formula, modulus of rupture, helical springs, columns:** Euler's formula, flexure formula of curved beams. Introduction to experiment stress analysis technique, strain energy, failure theories.

**Engineering mechanics:** Basic concepts of mechanics, force in trusses and frames, friction, centroids and moment of inertia, kinetics of particles and rigid bodies.

**Mechanisms:** displacement, velocity and acceleration, static and dynamic balancing of rotating components. Whirling of shafts and rotors, power transmission by ropes, belts, chain, gears and gear trains, study of cams.

**Thermodynamics and Heat transfer:** Basic concept and definitions, Sources of energy: conventional and renewable.

**Thermodynamics:** fundamental concepts and laws, thermodynamic cycles, introduction to steam generating units, types of steam, Detail study of Boiler, internal combustion engines, steam turbines, gas turbines, refrigeration and air conditioning systems. Characteristics and application of reciprocating and centrifugal pumps. Measurements and Automatic control mechanism.

Introduction to heat transfer, modes of heat transfer, steady and unsteady state heat conduction and radiation heat transfer, convection heat transfer, natural and forced convection, heat exchangers.

**AE 282: Mechanical Engineering (Practical)**

Credit	Hour / Week	Total Hour
1	3	45

Study of steam generating unit, pumps, compressor, power generator, Engines, (petrol, diesel and gas), Turbines.

Study of power transmission by ropes, belts, chain gears.

Study of cams.

Measurement of Tensile properties of a rod/bar.

**AE 283: Electrical & Electronic Engineering**

Credit	Hour / Week	Total Hour
3	3	45

**Electrical Engineering**

**Laws of electric circuit:** Ohm's law, Kirchhoff's voltage and current laws, delta-rye transformation.

**Electrical networks:** network analysis-methods of branch and loop currents, method of node-pair voltages, network theorems.

**Magnet:** Magnetic concepts and units, Characteristics of ferromagnetic materials, theory of ferromagnetism, hysteresis loss, eddy-currents and eddy-current loss, total core loss.

**Electromagnetic forces:** forces upon a current carrying conductor,

**Electromagnetic torque:** electric motor, electromagnetic induction and emf, a.c generator.

**General concepts and definitions:** Instantaneous current and power, R-, L-, C-, RL and RLC-branches.

**Effective current and voltage:** average values, form factor, crest factor, power real and reactive. Sinusoidal single phase circuit analysis, Impedance in series, parallel branches, series parallel circuits.

**Balanced polyphase circuits:** three-phase, four wire System of generated emfs, three-phase, three-wire system, balanced wye loads, balanced delta loads, power in balanced systems, power factor.

Purpose and types of Sub-station, substation equipment (HT, LT switchgear), distribution board and sub distribution board. Transformer and system. Principles of protection for transformer and motors, protective devices: circuit breaker, switches, starter etc. protection against shock and fire, earthing and its importance,

**Electronic Engineering:** Semiconductor diode, transistor characteristics, equivalent circuits, self biasing circuits, emitter-follower amplifiers, push-pull amplifiers, introduction to silicon controlled rectifier, and its application, Oscilloscope, Photo sensor and Transducers, strain, temperatures, pressure, speed and torque measurements.

### AE 284: Electrical & Electronic Engineering (Practical)

Credit	Hour / Week	Total Hour
1	3	45

Study on D.C circuits, A.C. circuits,  
Induction Motor, A.C & D.C generators,  
Single phase transformer, 3-Phase transformer, Star-Delta starter. Half-wave and full-wave rectifier,  
Transistor amplifier circuit, Transduction and sensor application.  
House wiring and layout & single line diagram of a factory (Electrical)  
Study of electrical circuit diagram of a Typical textile machine.  
Types of wires and cables.  
Practical study/visit of a Sub-station.  
Practical study of Generators.

### AE 381: Automation and Control Engineering

Credit	Hour / Week	Total Hour
1	3	45

**Automation:** Introduction to Robotics, definition, plane, rotational and spatial motion with application to manipulators, geometric configuration; structural elements, linkages, arms and grippers, motion characteristics, trajectories, dynamics and control of manipulators, actuators for manipulators, application of industrial robots and programming.

**Control Engineering:** Introduction to control systems, system response, to action, system types, frequency response, system analysis, system compensation, analogues of control systems, hydraulic and pneumatic control systems, elements of electromechanical controls, introduction to digital computer control.

#### Reference Books:

1. Robotics- Control, sensing, vision & intelligence by K.S. Fu., R.C. Gonzalez and C.S.G Lee.
2. Robotics Motion-Planning and Control By MIT Press.
3. Control Engineering: Theory and Practice by M.N. Bandyopadhyay
4. Modern Control Engineering by Katsuhiko Ogata, Prentice Hall, 2010.

### AE 481: Industrial Engineering

Credit	Hour / Week	Total Hour
2	2	30

**Materials Handling:** Issues and importance of handling of materials; selection and classification of material conveying equipment; different types of conveyors such as belt, screw, chain, flight, bucket elevators, pneumatic hydraulic cranes and forklifts.

**Maintenance:** Maintenance management: Concept of maintenance and value of maintenance management, maintenance organization and department structure (resource and administration), types of maintenance, fixed time replacement, condition based maintenance, preventive and corrective maintenance, replacement strategies, documentation and computer control in maintenance management, human factors in motivation skills in a maintenance environment,

**Ergonomics:** Man-machine-material interfaces in manufacturing; physical and cognitive aspects, comparative advantages of man and machine, physical work and human muscular effort, biomechanics and bio-engineering.

Anthropometry, work place design and work place layout, human performance under environment temperature, illumination, vibration, noise, pollution radiation static and dynamic condition.

**Safety in textile Mill:** Evolution of modern safety concepts, industrial hazard, safety and risk management techniques for safety management, safety, proactive management techniques for safety management, safety standards and regulations for engineering works, case studies.

**Inventory Management:** Type of inventory, Cost analysis of inventory, Inventory Control, Economic Order Quality (EOQ), Economic lot size, lead time, Mean absolute deviation (MAD), Reorder level.

**Air conditioning:** Comfort condition, psychometric chart, Heating, Cooling, Dehumidification, details of humidification plant.

**Machine Erection:** Floor preparation, foundation, machine fixation, leveling etc.

### **AE 483: Textile Machine Design**

<b>Credit</b>	<b>Hour / Week</b>	<b>Total Hour</b>
<b>2</b>	<b>2</b>	<b>30</b>

**Introduction to design;** stress analyses; Pressure vessels, Stresses in curved members; Deflection and stiffness considerations; Shock and impact; Column design; Types of fits; Design for static strength; Fracture mechanics in design; Design for fatigue strength; Design of Screws, fasteners and connections; Keys and couplings, welded and brazed joints.

**Mechanical springs;** Rolling contact bearings, Lubrication and journal bearings; spur, helical, worm and bevel gears, shafts, brakes and clutches; Design with composite materials. Undamped free vibrations; Longitudinal, transverse and torsional vibrations; Damped free and forced vibration; Vibration of geared systems; Vibration absorption, isolation and disolation; Vibration measuring instruments.