

**DAE Textile Weaving Technology, Revised-2020**  
**Scheme of Studies**

<b>1<sup>st</sup> Year</b>				
<b>Sub. Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>GEN-111</b>	Islamiat & Pakistan Studies	1	0	1
<b>ENG-112</b>	English	2	0	2
<b>Math-113</b>	Applied Mathematics	3	0	3
<b>CH-112</b>	Applied Chemistry	1	3	2
<b>PHY-122</b>	Applied Physics	1	3	2
<b>Mech-173</b>	Engineering Drawing & Graphics	1	6	3
<b>TT-111</b>	Textile Raw Materials	1	0	1
<b>TT-103</b>	Fundamentals of Textile Technology	2	3	3
<b>TT-123 (Rev.)</b>	Workshop Practice	0	6	2
<b>Comp-152</b>	Computer Application	1	3	2
<b>Elect-112</b>	General Electricity & Electronics	1	3	2
<b>Total</b>		<b>14</b>	<b>27</b>	<b>23</b>
<b>2<sup>nd</sup> Year</b>				
<b>Sub. Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>GEN-211</b>	Islamiat & Pakistan Studies	1	0	1
<b>Math-223</b>	Applied Mathematics	3	0	3
<b>MGM-211</b>	Business Communication	1	0	1
<b>MGM-221</b>	Business Management & Industrial Economics	1	0	1
<b>PHY-242</b>	Applied Mechanics	1	3	2
<b>TW-213</b>	Fabric Design and Structure	2	3	3
<b>TW-224</b>	Fabric Manufacturing Technology	2	6	4
<b>TW-232</b>	Knitting Technology-I	1	3	2
<b>TW-242</b>	Textile Weaving Calculations	2	0	2
<b>TT-202</b>	Introduction to Textile Testing & Quality Control	1	3	2
<b>TT-221</b>	Technical Textile	1	0	1
<b>Total</b>		<b>16</b>	<b>18</b>	<b>22</b>
<b>3<sup>rd</sup> Year</b>				
<b>Sub. Code</b>	<b>Subject</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>GEN-311</b>	Islamiat & Pakistan Studies	1	0	1
<b>MGM-311</b>	Industrial Management & Human Relations	1	0	1
<b>MGT-311</b>	Entrepreneurship	1	0	1
<b>TW-315</b>	Special Project on Weaving	3	6	5
<b>TW-303</b>	Fabric Design & Analysis	2	3	3
<b>TW-333</b>	Knitting Technology-II	2	3	3
<b>TW-354</b>	Textile Weaving Repair & Maintenance	2	6	4
<b>TW-352</b>	Textile Weaving Quality Evaluation	1	3	2
<b>TT-312</b>	Mill Engineering & Services	1	3	2
<b>TT-321</b>	Sustainability: Health Safety & Environment	1	0	1
<b>Total</b>		<b>15</b>	<b>24</b>	<b>23</b>

1st Year

## اسلامیات / مطالعہ پاکستان

نی پی سی  
1 0 1  
کل وقت: 20 گھنٹے

GEN III

حصہ اول اسلامیات

حصہ دوم مطالعہ پاکستان

موضوعات حصہ اول اسلامیات

سہل اول

کتاب و سنت

(ا) قرآن مجید

1- تعارف قرآن مجید 2- نزول قرآن 3- مکی و مدنی سورتوں کی خصوصیات 4- وحی کی اقسام 5- پندرہ منتخب آیات مع ترجمہ

- 1.1 تنالوا البر حتی تنفقوا مما تحبون
- 1.2 واعتصموا بحبل اللہ جمیعاً ولا تفرقوا
- 1.3 ولا یجر منکم شأن قوم علی ان لا تعدلوا
- 1.4 ان اللہ یمرکم ان تودوا الامانات الی اهلها
- 1.5 ان اللہ یمر بالعدل والاحسان
- 1.6 ان الصلوة تنہی عن الفحشاء والمنکر
- 1.7 لقد کان لکم فی رسول اللہ سوة حسنة
- 1.8 ان اکرمکم عند اللہ اتقاکم
- 1.9 وما آتاکم الرسول فخرزوه وما نہی عنہوا انتہوا
- 1.10 ولو فو بالعبء
- 1.11 وما شروہن بالمعروف
- 1.12 یمحق اللہ الربو ویربب الصمدات
- 1.13 واصبر علی ما اصابک
- 1.14 وقولوا لا سیدنا
- 1.15 ان الدین عند اللہ الاسلام

(ب) سنت

- 1- سنت کی اہمیت
- 2- دس منتخب احادیث مع ترجمہ و تشریح

- 1- افعال اعمال بالنیات
- 2- اہمیت لایم مکارم الاخلاق
- 3- لایومس احدکم حق یحب الاخیرہ ما یحب لنفسہ
- 4- المسلم من سلم المسلمون من سبہ المسلمون من لسانہ ویدہ
- 5- فی امنت باللہ سلم استقم
- 6- حیر کم خیر کم ذالہ
- 7- سبب المسلم فسوق وقتالہ کفر
- 8- المؤمن اخ المؤمن
- 9- کل المسلم عسی المسلم حیر لم یبعہ و مالہ و فرقہ
- 10- ایۃ المنافق ثلاث اذا حدیث کذب و اذا وعاو تمن خائن و اذا و فدا خلف

#### دین اسلام

- 2.1 ہمام کے بنیادی مقصد کی وضاحت اور انسان کی اخروی و مادی زندگی پر ان کے اثرات

- 1- توبہ
- 2- رسالت
- 3- آخرت
- 4- ملاکہ
- 5- اسلامی شب
- 2.2 عبادات

- 1- نماز 2- روزہ 3- حج 4- زکوٰۃ

مستدرج پلا عبادات کی اہمیت و فضیلت، مکملش اور انسان کی اخروی و معاشرتی زندگی پر ان کے اثرات

## مذریعی مقاصد

### ۱۔ قرآن مجید

- عمومی مقصد: طالب علم یہ سمجھنے کے قابل ہو کہ اسلام کی تعلیمت کا اصل سرچشمہ قرآن مجید ہے  
 خصوصی مقصد: طالب علم اس قابل ہو جائے گا کہ
- ۱۔ قرآن مجید کی تشریف لائے گئے
  - ۲۔ قرآن مجید کے نزول کی صورت بیان کر سکے
  - ۳۔ قرآن مجید کی آئی و مدنی سورتوں کی پہچان کر سکے
  - ۴۔ منتخب آیات کا ترجمہ و تشریح کر سکے
  - ۵۔ عمومی مقصد: یہ سمجھنے کے قابل ہو جائے گا کہ منتخب قرآنی آیات کے ذریعے اسلامی تعلیمت کا مفہوم کیا ہے
  - ۶۔ قرآنی آیات کا ترجمہ و تشریح کر سکے
  - ۷۔ قرآنی تعلیمت کی روشنی میں اپنی اور معاشرتی اصلاح کر سکے
- ۲۔ **صفات**

- عمومی مقصد: طالب علم سنت نبوی کی اہمیت اور ضرورت کو اچھی طرح سمجھنے کے قابل ہو جائے گا  
 خصوصی مقصد:
- ۱۔ سنت کی تشریف بیان کر سکے
  - ۲۔ سنت کی اہمیت و ضرورت کی وضاحت کر سکے
  - ۳۔ سنت کی روشنی میں امور حسنہ پر عمل کر سکے
  - ۴۔ منتخب احادیث پر عمل

عمومی مقصد: احادیث کی روشنی میں اخلاقی اقدار سے سمجھنا حاصل کر سکے  
 خصوصی مقصد: احادیث کا ترجمہ و تشریح کر سکے  
 رسول اللہ ﷺ کے اسوۂ حسنہ کا پورا، کاملہ مدعا ہو سکے

دین اسلام  
 عمومی مقاصد: دین اسلامی کے بنیادی مقاصد اور عہدات کے بارے میں جان سکنے اور بیان کر سکنے  
 خصوصی مقاصد  
 لفظ دین اسلام کے لغوی اور اصطلاحی معنی بیان کر سکنے  
 اسلام کے بنیادی مقاصد کی اہمیت بیان کر سکنے  
 اسلام کے بنیادی مقاصد سے انسان کی انفرادی و اجتماعی زندگی پر پڑنے والے اثرات بیان کر سکنے  
 عہدات کے لفظی و اصطلاحی معنی بیان کر سکنے  
 عقیدے اور عہدات کا فرق بیان کر سکنے  
 عہدات (نماز، روزہ، حج، زکوٰۃ) کے فوری، احکامات اور نفسانی زندگی پر ان کی اثرات بیان کر سکنے  
 اسلامی مقاصد و عہدات کے مطابق اپنی زندگی ڈھل کر ایک اچھا مسلمان بن سکنے

## اغیر مسلم طلباء کے لئے

GEN III

نصاب اختلاقیات سائنسوں

حصہ دوم مطالعہ پاکستان

کے جی ٹی  
1 0 1  
کل وقت - 20 گھنٹے

## موضوعات

اختلاقیات کی تعریف اور اہمیت  
اختلاقیات کا معیار (قانون، عقل، الہی کتب)

مندرجہ ذیل اخلاقیات کی وضاحت

- ☆ دولت داری
- ☆ وقہ داری
- ☆ نظم و ضبط
- ☆ راست گوئی
- ☆ صبر و استقامت
- ☆ حوصلہ مندی
- ☆ وقت کی پابندی
- ☆ سفاکی
- ☆ اعتدال
- ☆ باہمی احترام
- ☆ مصلحت

نصاب اخلاقیات (اساتذہ)

### تدریسی مقاصد

عمومی مقاصد: اعلیٰ اخلاق کی وجہ سے کل ترقی میں کل قدر اضافہ کر سکے

خصوصی مقاصد: طالب اس علم سے ایسا تہی ہو گا کہ

۱۔ موضوعات کا مطلب بیان کر سکے

۲۔ عملی زندگی سے مثالوں کی نشاندہی کر سکے

۳۔ اپنی شخصیت اور معاشرے پر موضوعات کے مثبت اثرات پیدا کرنے کے طریقہ بیان کر سکے

۴۔ وراثت داری کی اہمیت بیان کر سکے

۵۔ وفا داری کی اہمیت بیان کر سکے

۶۔ نظم و ضبط کی فلاحیت بیان کر سکے

۷۔ صدق بیان کی ضرورت بیان کر سکے

۸۔ حوصلہ مندی کے فوائد بیان کر سکے

۹۔ برکت کی پابندی کے فوائد بیان کر سکے

۱۰۔ صفائی اور باہمی اختیار سے حسن نگہداشت کو بیان کر سکے

۱۱۔ مصلحت کے فوائد بیان کر سکے



## نصابہ: سہل لڑائی (Gen II)

کل وقت 2 گھنٹے

مذاہد پاکستان

حصہ دوم

### موضوعات

- 1۔ حریتِ فکر: سہیلی قوم میں آزادیِ فکر کی تاریخ، مساعفوں میں سیاسی آزادی کی اہمیت اور ضرورت - ذاتی، جہلی، غلامی کے تعلقات
- 2۔ نظریہ پاکستان  
قیام پاکستان کی اساس (دین اسلام) قیام پاکستان کی غرض، غایت نظریہ پاکستان کی وضاحت۔ نظریہ پاکستان اور صرفہ اقبل اور قائد اعظم کے ارشادات کی مدد سے
- 3۔ نظریہ پاکستان کا تاریخی پسو  
محمد بن قاسم کی آمد، محمد بن قاسم کی تباہی، علی شہد الی اللہ کی تباہی، علی شہد الی اللہ کی تباہی، علی شہد الی اللہ کی تباہی، علی شہد الی اللہ کی تباہی
- 4۔ قیامی تحریکیں  
علی گڑھ - تحریک احمدیہ (نیزندہ - مدرسہ لائٹنگ - سندھ) اسلامیہ کانٹریکٹور (انجمن حمایت اسلام لاہور)

مطالعہ پاکستان (حصہ دوم)

تدریسی مقاصد

حریت فکر:

عمومی مقصد

طالب علم یہ جان لے کہ اسلام میں اور مسلمان قوم میں آزادی فکر کی کیا اہمیت ہے  
خصوصی مقاصد

۱۴ حریت فکر کا معنی و مفہوم بیان کر سکے

۱۵ آزادی فکر کی اہمیت بیان کر سکے

۱۶ خصوصاً "اسلام میں آزادی اظہار رائے" کی اہمیت بیان کر سکے

۱۷ ذاتی غلامی کے قومی سطح پر نقصانات کے بیان کر سکے

۱۸ دہستانی غلامی قومی سطح پر نقصانات بیان کر سکے

نظریہ پاکستان

عمومی مقصد:

نظریہ پاکستان (دوین اسلام) سے پوری طرح واقفیت ہو جائے

خصوصی مقاصد:

۱۹ نظریہ کی تعریف بیان کر سکے اور اس کی وضاحت کر سکے

۲۰ نظریہ پاکستان کی تعریف کر سکے اور اس کا مفہوم بیان کر سکے

۲۱ علامہ اقبال اور قائد اعظم کے فرمودات کی روشنی میں نظریہ پاکستان بیان کر سکے

نظریہ پاکستان کا تاریخی پسو

عمومی مقصد

۲۲ نظریہ پاکستان کے تاریخی پس منظر سے واقفیت حاصل کر سکے

خصوصی مقاصد:

۲۳ محمد بن قاسم کے بارے میں بیان کر سکے

- ۱۰۰: محمد بن قاسم کے ہندوستان پر حملہ کی وجہ بیان کر سکے
- ۱۰۱: محمد بن قاسم کے ہندوستان پر حملہ کے اثرات بیان کر سکے
- ۱۰۲: بیان کر سکے کہ ہندوستان میں ہندو مسلم دو قومی نظریہ کا کنواں آغاز کیا ہے
- ۱۰۳: محمد الف طائی کی ملی خدمات بیان کر سکے
- ۱۰۴: شہد ولی اللہ کی ملی خدمات بیان کر سکے
- ۱۰۵: محمد الف طائی اور شہد ولی اللہ نے جو تبلیغ دین اور مسلمانوں میں سنی شعور پیدا کیا اسے بیان کر سکے

### علمی تحریکیں

- ۱۰۶: علمی مقصد
- ۱۰۷: برصغیر کی ملی تحریکوں سے آگاہی حاصل اور سکے
- ۱۰۸: قصور میں مقصد:
- ۱۰۹: ملی مرکز - رنج بند - تحریک العلماء خدمت السلام، اسلامیہ کالج - ایمین خدمت اسلام نے تعلیم کے ذریعہ سیاسی شعور مسلمانوں میں پیدا کیا اسے بیان کر سکے
- ۱۱۰: آذربائی ہند کے سلسلہ میں تحریک مہدین کی خدمات بیان کر سکے

**Eng-112 ENGLISH****Total contact hours**

<b>Theory</b>	<b>64</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Practical</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>

**AIMS** At the end of the course, the students will be equipped with cognitive skill to enable them to present facts in a systematic and logical manner to meet the language demands of dynamic field of commerce and industry for functional day-to-day use and will inculcate skills of reading, writing and comprehension.

**COURSE CONTENTS****ENGLISH PAPER "A"**

- |          |   |                 |
|----------|---|-----------------|
| <b>1</b> | <b>PROSE/TEXT</b>   | <b>16 hours</b> |
| 1.1      | First eight essays of Intermediate English Book-II  |                 |
| <b>2</b> | <b>CLOZE TEST</b>   | <b>4 hours</b>  |
| 2.1      | A passage comprising 50-100 words will be selected from the text. Every 11th word or any word for that matter will be omitted. The number of missing words will range between 5-10. The chosen word may or may not be the one used in the text, but it should be an appropriate word. |                 |

**ENGLISH PAPER "B"**

- |           |   |                 |
|-----------|---|-----------------|
| <b>3</b>  | <b>GRAMMAR</b>  | <b>26 hours</b> |
| 3.1       | Sentence Structure.   |                 |
| 3.2       | Tenses.   |                 |
| 3.3       | Parts of speech.  |                 |
| 3.4       | Punctuation.  |                 |
| 3.5       | Change of Narration.  |                 |
| 3.6       | One word for several  |                 |
| 3.7       | Words often confused  |                 |
| <b>4.</b> | <b>COMPOSITION</b>  | <b>12 hours</b> |
| 4.1       | Letters/Messages  |                 |
| 4.2       | Job application letter  |                 |
| 4.3       | For character certificate/for grant of scholarship  |                 |
| 4.4       | Telegrams, Cablegrams and Radiograms, Telexes, Facsimiles   |                 |
| 4.5       | Essay writing   |                 |
| 4.6       | Technical Education, Science and Our life, Computers, Environmental Pollution, Duties of a Student. |                 |
| <b>5.</b> | <b>TRANSLATION</b>  | <b>6 hours</b>  |
| 5.1       | Translation from Urdu into English.<br>For Foreign Students: A paragraph or a dialogue.             |                 |

**RECOMMENDED BOOKS**

Technical English developed by Mr. Zia Sarwar, Mr. Habib-ur –Rehman, Evaluated by Mr.Zafar Iqbal Khokhar, Mr. Zahid Zahoor, Vol - I, National Book Foundation

**INSTRUCTIONAL OBJECTIVES**

**PAPER-A**

**1. DEMONSTRATE BETTER READING, COMPREHENSION AND VOCABULARY**

- 1.1 Manipulate, skimming and scanning of the text.
- 1.2 Identify new ideas.
- 1.3 Reproduce facts, characters in own words
- 1.4 Write summary of stories

**2. UNDERSTAND FACTS OF THE TEXT**

- 2.1 Rewrite words to fill in the blanks recalling the text.
- 2.2 Use own words to fill in the blanks.

**PAPER-B**

**3. APPLY THE RULES OF GRAMMAR IN WRITING AND SPEAKING**

- 3.1 Use rules of grammar to construct meaningful sentences containing a subject and a predicate.
- 3.2 State classification of time, i.e present, past and future and use verb tense correctly in different forms to denote relevant time.
- 3.3 Identify function words and content words.
- 3.4 Use marks of punctuation to make sense clear.
- 3.5 Relate what a person says in direct and indirect forms.
- 3.6 Compose his writings.
- 3.7 Distinguish between confusing words.

**4. APPLY THE CONCEPTS OF COMPOSITION WRITING TO PRACTICAL SITUATIONS**

- 4.1 Use concept to construct applications for employment, for character certificate, for grant of scholarship.
- 4.2 Define and write telegrams, cablegrams and radiograms, telexes, facsimiles
- 4.3 Describe steps of a good composition writing.
- 4.4 Describe features of a good composition.
- 4.5 Describe methods of composition writing
- 4.6 Use these concepts to organize facts and describe them systematically in practical situation.

**5. APPLIES RULES OF TRANSLATION**

- 5.1 Describe confusion.
- 5.2 Describe rules of translation.
- 5.3 Use rules of translation from Urdu to English in simple paragraph and sentences.

**Math-113      APPLIED MATHEMATICS-I**

<b>Total contact hours</b>	<b>96</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory:</b>	<b>96 Hrs</b>	<b>3</b>	<b>0</b>	<b>3</b>

Pre-requisite: Must have completed a course of Elective Mathematics at Matric level.

**AIMS** After completing the course the students will be able to

1. Solve problems of Algebra, Trigonometry, vectors. Menstruation, Matrices and Determinants.
2. Develop skill, mathematical attitudes and logical perception in the use of mathematical instruments as required in the technological fields.
3. Acquire mathematical clarity and insight in the solution of technical problems.

**COURSE CONTENTS**

<b>1</b>	<b>QUADRATIC EQUATIONS</b>	<b>6 Hrs</b>
1.1	Standard Form	
1.2	Solution	
1.3	Nature of roots	
1.4	Sum & Product of roots	
1.5	Formation	
1.6	Problems	
<b>2</b>	<b>ARITHMETIC PROGRESSION AND SERIES</b>	<b>3Hrs</b>
2.1	Sequence	
2.2	Series	
2.3	nth term	
2.4	Sum of the first n terms	
2.5	Means	
2.6	Problems	
<b>3</b>	<b>GEOMETRIC PROGRESSION AND SERIES</b>	<b>3Hrs</b>
3.1	nth term	
3.2	sum of the first n terms	
3.3	Means	
3.4	Infinite Geometric progression	
3.5	Problems	
<b>4</b>	<b>BINOMIAL THEOREM</b>	<b>6 Hrs</b>
4.1	Factorials	
4.2	Binomial Expression	
4.3	Binomial Co-efficient	
4.4	Statement	
4.5	The General Term	
4.6	The Binomial Series.	
4.7	Problems	
<b>5</b>	<b>PARTIAL FRACTIONS</b>	<b>6 Hrs</b>
5.1	Introduction	
5.2	Linear Distinct Factors Case I	

5.3	Linear Repeated FactorsCase II	
5.4	Quadratic Distinct Factors Case III	
5.5	Quadratic Repeated Factors Case IV	
5.6	Problems	
<b>6</b>	<b>FUNDAMENTALS OF TRIGONOMETRY</b>	<b>6 Hrs</b>
6.1	Angles	
6.2	Quadrants	
6.3	Measurements of Angles	
6.4	Relation between Sexagesimal & circular system	
6.5	Relation between Length of a Circular Arc & the Radian Measure of its central angle	
6.6	Problems	
<b>7</b>	<b>TRIGONOMETRIC FUNCTIONS AND RATIOS</b>	<b>6 Hrs</b>
7.1	trigonometric functions of any angle	
7.2	Signs of trigonometric Functions	
7.3	Trigonometric Ratios of particular Angles	
7.4	Fundamental Identities	
7.5	Problems	
<b>8</b>	<b>GENERAL IDENTITIES</b>	<b>6 Hrs</b>
8.1	The Fundamental Law	
8.2	Deductions	
8.3	Sum & Difference Formulae	
8.4	Double Angle Identities	
8.5	Half Angle Identities	
8.6	Conversion of sum or difference to products	
8.7	Problems	
<b>9</b>	<b>SOLUTION OF TRIANGLES</b>	<b>6 Hrs</b>
9.1	The law of Sines	
9.2	The law of Cosines	
9.3	Measurement of Heights & Distances	
9.4	Problems	
<b>10</b>	<b>MENSURATION OF SOLIDS</b>	<b>30 Hrs</b>
10.1	Review of regular plane figures and Simpson's Rule	
10.2	Prisms	
10.3	Cylinders	
10.4	Pyramids	
10.5	Cones	
10.6	Frusta	
10.7	Spheres	
<b>11</b>	<b>VECTORS</b>	<b>9 Hrs</b>
11.1	Scalars & Vectors	
11.2	Addition & Subtraction	

- 11.3 The unit Vectors  $\mathbf{i}, \mathbf{j}, \mathbf{k}$
- 11.4 Direction Cosines
- 11.5 Scalar or Dot Product
- 11.6 Deductions
- 11.7 Dot product in terms of orthogonal components
- 11.8 Deductions
- 11.9 Analytic Expression for  $\mathbf{a} \times \mathbf{b}$ .
- 11.10 Problems.

## **12 MATRICES AND DETERMINANTS**

**9 Hrs**

- 12.1 Definition of Matrix
- 12.2 Rows & Columns
- 12.3 Order of a Matrix
- 12.4 Algebra of Matrices
- 12.5 Determinants
- 12.6 Properties of Determinants
- 12.7 Solution of Linear Equations
- 12.8 Problems

## **REFERENCE BOOKS**

Applied Mathematics Math-113, Developed by Nasir -ud-Din Mahmood, Sana-ullah Khan, Tahir Hameed,  
Evaluated by Syed Tanvir Haider, Javed Iqbal, Vol - I, National Book Foundation



**INSTRUCTIONAL OBJECTIVES****1      USE DIFFERENT METHODS FOR THE SOLUTION OF QUADRATIC EQUATIONS**

- 1.1      Define a standard quadratic equation.
- 1.2      Use methods of factorization and method of completing the square for solving the equations.
- 1.3      Derive quadratic formula.
- 1.4      Write expression for the discriminant
- 1.5      Explain nature of the roots of a quadratic equation.
- 1.6      Calculate sum and product of the roots.
- 1.7      Form a quadratic equation from the given roots.
- 1.8      Solve problems involving quadratic equations.

**2      UNDERSTAND APPLY CONCEPT OF ARITHMETIC PROGRESSION AND SERIES**

- 2.1      Define an Arithmetic sequence and a series
- 2.2      Derive formula for the  $n$ th term of an A.P.
- 2.3      Explain Arithmetic Mean between two given numbers
- 2.4      Insert  $n$  Arithmetic means between two numbers
- 2.5      Derive formulas for summation of an Arithmetic series
- 2.6      Solve problems on Arithmetic Progression and Series

**3      UNDERSTAND GEOMETRIC PROGRESSION AND SERIES**

- 3.1      Define a geometric sequence and a series.
- 3.2      Derive formula for  $n$ th term of a G.P.
- 3.3      Explain geometric mean between two numbers.
- 3.4      Insert  $n$  geometric means between two numbers.
- 3.5      Derive a formula for the summation of geometric Series.
- 3.6      Deduce a formula for the summation of an infinite G.P.
- 3.7      Solve problems using these formulas.

**4      EXPAND AND EXTRACT ROOTS OF A BINOMIAL**

- 4.1      State binomial theorem for positive integral index.
- 4.2      Explain binomial coefficients:  $(n,0), (n,1), \dots, (n,r), \dots, (n,n)$
- 4.3      Derive expression for the general term.
- 4.4      Calculate the specified terms.
- 4.5      Expand a binomial of a given index.      -
- 4.6      Extract the specified roots
- 4.7      Compute the approximate value to a given decimal place.
- 4.8      Solve problems involving binomials.

**5      RESOLVE A SINGLE FRACTION INTO PARTIAL FRACTIONS USING DIFFERENT METHODS.**

- 5.1      Define a partial fraction, a proper and an improper fraction.
- 5.2      Explain all the four types of partial fractions.
- 5.3      Set up equivalent partial fractions for each type.
- 5.4      Explain the methods for finding constants involved.

5.5 Resolve a single fraction into partial fractions.

5.6 Solve problems involving all the four types.

## **6 UNDERSTAND SYSTEMS OF MEASUREMENT OF ANGLES.**

6.1 Define angles and the related terms.

6.2 Illustrate the generation of angle.

6.3 Explain sexagesimal and circular systems for the measurement of angles

6.4 Derive the relationship between radian and degree.

6.5 Convert radians to degrees and vice versa.

6.6 Derive a formula for the circular measure of a central angle.

6.7 Use this formula for solving problems.

## **7 APPLY BASIC CONCEPTS AND PRINCIPLES OF TRIGONOMETRIC FUNCTIONS**

7.1 Define the basic trigonometric functions/ratios of an angle as ratios of the sides of a right triangle.

7.2 Derive fundamental identities.

7.3 Find trigonometric ratios of particular angles.

7.4 Draw the graph of trigonometric functions.

7.5 Solve problems involving trigonometric functions.

## **8 USE TRIGONOMETRIC IDENTITIES IN SOLVING TECHNOLOGICAL PROBLEMS**

8.1 List fundamental identities

8.2 Prove the fundamental law

8.3 Deduce important results

8.4 Derive-sum and difference formulas

8.5 Establish half angle, double angle & triple angle formulas

8.6 Convert sum or difference into product & vice versa

8.7 Solve problems

## **9 USE CONCEPTS, PROPERTIES AND LAWS OF TRIGONOMETRIC FUNCTIONS FOR SOLVING TRIANGLES**

9.1 Define angle of elevation and angle of depression.

9.2 Prove the law of sines and the law of cosines.

9.3 Explain elements of a triangle.

9.4 Solve triangles and the problems involving heights and distances.

## **10 USE PRINCIPLES OF MENSTRUATION IN FINDING SURFACES, VOLUME AND WEIGHTS OF SOLIDS.**

10.1 Define menstruation of plane and solid figures

10.2 List formulas for perimeters & areas of plane figure.

10.3 Define pyramid and cone.

10.4 Define frusta of pyramid and cone.

10.5 Define a sphere and a shell.

10.6 Calculate the total surface and volume of each type of solid.

10.7 Compute weight of solids.

10.8 Solve problems of these solids.

**11. USE THE CONCEPT AND PRINCIPLES OF VECTORS IN SOLVING TECHNOLOGICAL PROBLEMS.**

- 11.1 Define vector quantity.
- 11.2 Explain addition and subtraction of vector
- 11.3 Illustrate unit vectors  $\mathbf{i}$ ,  $\mathbf{j}$ ,  $\mathbf{k}$ .
- 11.4 Express a vector in the component form.
- 11.5 Explain magnitude, unit vector, direction cosines of a vector.
- 11.6 Derive analytic expression for dot product and cross product of two vector.
- 11.7 Deduce conditions of perpendicularity and parallelism of two vectors.
- 11.8 Solve problems

**12. USE THE CONCEPT OF MATRICES & DETERMINANTS IN SOLVING TECHNOLOGICAL PROBLEMS**

- 12.1 Define a matrix and a determinant.
- 12.2 List types of matrices.
- 12.3 Define transpose, adjoint and inverse of a matrix.
- 12.4 State properties of determinants.
- 12.5 Explain basic concepts.
- 12.6 Explain algebra of matrices.
- 12.7 Solve linear equation by matrices.
- 12.8 Explain the solution of a determinant.
- 12.9 Use Crammer's Rule for solving linear equations

## CH – 112 APPLIED CHEMISTRY

**Total Contact Hours 128**

**T      P      C**

<b>Theory</b>	<b>32 hours</b>
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**1            3            2**

**Practical** **96 hours**

**Pre-requisites:** The student must have studied the subject of elective chemistry at secondary school level.

**COURSE AIMS:**

After studying this course a student will be able to:

1. Understand the significance and role of chemistry in the development of modern technology
2. Become acquainted with the basic principles of chemistry as applied in the study of relevant technology.
3. Know the scientific methods for production, and use of materials of industrial & technological significance.
4. Gains skill for the efficient conduct of Practical in a chemistry lab.

## COURSE CONTENTS

## 1. INTRODUCTION AND FUNDAMENTAL CONCEPTS

## 2 Hours

- 1.1. Orientation with reference to this technology
- 1.2. Terms used & units of measurements in the study of chemistry
- 1.3. Chemical reactions & their types

## 2. ATOMIC STRUCTURE

## 2 Hours

- 2.1 Sub atomic particles
- 2.2 Architecture of atoms of elements. Atomic no. & atomic weight
- 2.3 The periodic classification of elements periodic law
- 2.4 General characteristics of a period and group

### 3. CHEMICAL BOND

## 2 Hours

- Nature of chemical bond
- Electrovalent bond with examples
- Covalent bond (polar and non-polar, sigma & pie bonds with examples)
- Co-ordinate bond with examples

## 4. WATER

## 2 Hours

- Chemical nature and properties
- Impurities
- Hardness of water (types, causes and removal)
- Scales of measuring hardness (degrees Clark French, PPM, Mg-per liter)

- e. Boiler feed water, scales and treatment
  - f. Sea water desalination, sewage treatment
- 5. ACIDS, BASES AND SALTS 2 Hours**
- a. Definitions with examples
  - b. Properties, their strength, basicity and acidity
  - c. Salts and their classification with examples
  - d. Ph – value and scale
- 6. OXIDATION & REDUCTION 2 Hours**
- a. The process, definition and examples
  - b. Oxidizing and reducing agents
  - c. Oxides and their classifications
- 7. NUCLEAR CHEMISTRY 2 Hours**
- a. Introduction
  - b. Radioactivity (alpha, beta and gamma rays)
  - c. Half life process
  - d. Nuclear reaction and transformation of elements
- 8. CEMENT 2 Hours**
- a. Introduction
  - b. Composition and manufacture
  - c. Chemistry of setting and hardening
  - d. Special purpose cements
- 9. GLASS 2 Hours**
- a. Composition and raw material
  - b. Manufacture
  - c. Varieties and uses
- 10. PLASTICS AND POLYMERS 2 Hours**
- a. Introduction and importance
  - b. Classification
  - c. Manufacture
  - d. Properties and uses
- 11. PAINTS, VARNISHES AND DISTEMPER 2 Hours**
- a. Introduction
  - b. Constituents
  - c. Preparation and use
- 12. CORROSION 2 Hours**
- a. Introduction with causes
  - b. Types of corrosion
  - c. Rusting of iron
  - d. Protective measures against corrosion
- 13. REFRACTORY MATERIALS AND ABRASIVE 2 Hours**
- a. Introduction to refractories
  - b. Classification of refractories
  - c. Properties and uses
  - d. Introduction to abrasives
  - e. Artificial and natural abrasives and their uses

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|--|----------------|
| <b>14. ALLOYS</b>  | <b>2 Hours</b> |
| <ul style="list-style-type: none"><li>a. Introduction with need</li><li>b. Preparation and properties</li><li>c. Some important alloys and their composition</li><li>d. Uses</li></ul> |                |
| <b>15. FUELS AND COMBUSTION</b>  | <b>2 Hours</b> |
| <ul style="list-style-type: none"><li>a. Introduction of fuels</li><li>b. Classification of fuels</li><li>c. Combustion</li><li>d. Numerical problems of combustion</li></ul>          |                |
| <b>16. LUBRICANTS</b>  | <b>1 Hours</b> |
| <ul style="list-style-type: none"><li>a. Introduction</li><li>b. Classification</li><li>c. Properties of lubricants</li><li>d. Selection of lubricants</li></ul>                       |                |
| <b>17. POLLUTION</b>   | <b>1 Hours</b> |
| <ul style="list-style-type: none"><li>a. The problems and its dangers</li><li>b. Causes of pollution</li><li>c. Remedies to combat the hazards of pollution</li></ul>                  |                |

***RECOMMENDED BOOKS***

1. Text Book of Ch-112, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)

**INSTRUCTIONAL OBJECTIVES**

**1. UNDERSTAND THE SCOPE, SIGNIFICANCE AND FUNDAMENTAL ROLE OF THE SUBJECT**

- Define chemistry and its important terms
- State the units of measurements in the study of chemistry
- Write chemical formula of common compounds
- Describe types of chemical reactions with examples

**2. UNDERSTAND THE STRUCTURE OF ATOMS AND ARRANGEMENT OF SUB ATOMIC PARTICLES IN THE ARCHITECTURE OF ATOMS**

- Define atom
- State the periodic law of elements
- Describe the fundamentals sub atomic particles
- Distinguish between atomic no. And mass no. Isotopes and isobars
- Explain the arrangements of electrons in different shells and sub energy levels
- Explain the grouping and placing of elements in the periodic table

**3. UNDERSTAND THE NATURE OF CHEMICAL BOND**

- Define chemical bond
- Describe the nature of chemical bond
- Differentiate between electrovalent and covalent bonding
- Explain the formation of polar and non polar, sigma and pi-bond with examples
- Describe the nature of coordinate bond with examples

**4. UNDERSTAND THE CHEMICAL NATURE OF WATER**

- Describe the chemical nature of water with its formula
- Describe the general impurities present in water
- Explain the causes and methods to removing hardness of water
- Express hardness in different units like mg / liter, p.p.m, degrees clark and degrees French
- Describe the formation and nature of scales in boiler feed water
- Explain the method for the treatment of scales
- Explain the sewage treatment and desalination of sea water

**5. UNDERSTAND THE NATURE OF ACIDS, BASES AND SALTS**

- Define acids, bases and salts with examples
- State general properties of acids and bases
- Differentiate between acidity and basicity and use the related terms
- Define salts, state their classification with examples
- Explain p-h value of solution and pH-scale

**6. UNDERSTAND THE PROGRESS OF OXIDATION AND REDUCTION**

- Define oxidation
- Explain the oxidation process with examples
- Define reduction
- Explain reduction process with examples
- Define oxidizing and reducing agents and give at least six examples of each
- Define oxides
- Classify the oxides and give examples

**7. UNDERSTAND THE FUNDAMENTALS OF NUCLEAR CHEMISTRY**

Define nuclear chemistry and radioactivity  
Differentiate between alpha, beta and gamma particles  
Explain half life process  
Explain at least six nuclear reactions resulting in the transformation of some elements  
State important uses of isotopes

**8. UNDERSTAND THE MANUFACTURE, SETTING AND HARDENING OF CEMENT**

Define Portland cement and give its composition  
Describe the method of manufacture  
Describe the chemistry of setting and hardening of cement  
Distinguish between ordinary and special purpose cement

**9. UNDERSTAND THE PROCESS OF MANUFACTURE OF GLASS**

Define glass  
Describe its composition and raw materials  
Describe the manufacture of glass  
Explain its varieties and uses

**10. UNDERSTAND THE NATURE AND IMPORTANCE OF PLASTIC AND POLYMERS**

Define plastics and polymers  
Explain the mechanism of polymerization  
Describe the preparation and uses of some plastic / polymers

**11. KNOW THE CHEMISTRY OF PAINTS, VARNISHES AND DISTEMPERS**

Define paints, varnishes and distemper  
State composition of each  
State methods of preparation of each and their uses

**12. UNDERSTAND THE PROCESS OF CORROSION WITH ITS CAUSES AND TYPES**

Define corrosion  
Describe different types of corrosion. State the causes of corrosion  
Explain the process of rusting of iron  
Describe methods to prevent/ control corrosion

**13. UNDERSTAND THE NATURE OF REFRACTORY MATERIALS ABRASIVE**

Define refractory materials  
Classify refractory materials  
Describe properties and uses of refractory  
Define abrasive  
Classify natural and artificial abrasives  
Describe uses of abrasives

**14. UNDERSTAND THE NATURE AND IMPORTANCE OF ALLOYS**

Define alloy  
Describe different methods for the preparation of alloys  
Describe important properties of alloys  
Enlist some important alloys with their composition, properties and uses

**15. UNDERSTAND THE NATURE OF FUELS AND THEIR COMBUSTION**

Define fuels  
Classify fuels and make distinction of solid, liquid and gaseous fuels  
Describe important fuels  
Explain combustion  
Calculate air quantities in combustion gases

**16. UNDERSTAND THE NATURE OF LUBRICANTS**



Define a lubricant

Explain the uses of lubricants

Classify lubricants and site examples

State important properties of oils, greases and solid lubricants

State the criteria for the selection of lubricant for particular purpose / job

**17. UNDERSTAND THE NATURE OF POLLUTION**

Define pollution (air, water, food)

Describe the causes of environmental pollution

Enlist some common pollutants

Explain methods to prevent pollution

## Ch-112: APPLIED CHEMISTRY

### LIST OF PRACTICALS

96 Hours

On completion of this course, the trainees will be able to;

1. To introduce the common apparatus, glassware and chemical reagents used in the chemistry lab.
2. To purify a chemical substance by crystallization.
3. To separate a mixture of sand and salt.
4. To find the melting point of substance.
5. To find the pH of a solution with pH paper.
6. To separate a mixture of inks by chromatography.
7. To determine the co-efficient of viscosity of benzene with the help of Ostwald's viscometer.
8. To find the surface tension of a liquid with a stalagmometer.
9. To perform electrolysis of water to produce Hydrogen and Oxygen.
10. To determine the chemical equivalent of copper by electrolysis of  $\text{Cu SO}_4$ .
11. Determination of Heat of Neutralization of  $\text{NaOH}$  and  $\text{HCl}$ .
12. Determination of Heat of Solution of  $\text{C}_2\text{H}_5\text{OH}$  and  $\text{H}_2\text{O}$ .
13. Determination of %age of  $\text{O}_2$  in air.
14. Determination of %age of  $\text{N}_2$  in air.
15. Determination of %age of  $\text{CO}_2$  in air.
16. To get introduction with the methods/apparatus of conducting volumetric estimation.
17. To prepare standard solution of a substance.
18. To find the strength of a given alkali solution.
19. To estimate  $\text{HCO}_3^{-1}$  contents in water.
20. To estimate  $\text{Cl}^{-1}$  contents in water.
21. To estimate  $\text{SO}_4^{-2}$  contents in water.
22. To estimate total solids in water.
23. To find out the %age composition of a mixture solution of  $\text{KNO}_3$  and  $\text{KOH}$  volumetrically.
24. To find out the amount of  $\text{Na}_2\text{SO}_4$  and  $\text{NaOH}$  in their mixture with titration method.
25. To find the boiling point of Freon-12, or R-134a and Freon-22.
26. To find the density of Freon-12, or R 134a and Freon-22 with the help of sp. gravity bottle.
27. To prepare Ammonia gas in Laboratory and perform its tests.
28. To get introduction with the scheme of analysis of salts for basic radicals.
29. To analyse Ist group radicals ( $\text{Ag}^{+1}$ ,  $\text{Pb}^{+2}$ ,  $\text{Hg}^{+1}$ ).
30. To exercise Practice for detection of Ist group radicals.
31. To detect and confirm II-A group radicals ( $\text{Hg}^{+2}$ ,  $\text{Pb}^{+4}$ ,  $\text{Cu}^{+2}$ ,  $\text{Bi}^{+3}$ ,  $\text{Cd}^{+2}$ )
32. To detect and confirm II-B group radicals ( $\text{As}^{+3}$ ,  $\text{Sb}^{+3}$ ,  $\text{Sn}^{+2, +4}$ )

**Total Contact Hours**

<b>Theory</b>	<b>: 32</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Practicals</b>	<b>: 96</b>	<b>1</b>	<b>3</b>	<b>2</b>

**AIMS:** The students will be able to understand the fundamental principles and concept of physics, use these to solve problems in practical situations/technological courses and understand concepts to learn advance physics/technical courses.

**COURSE CONTENTS**

- |          |  |                |
|----------|--|----------------|
| <b>1</b> | <b>MEASUREMENTS.</b>   | <b>2 Hours</b> |
|          | 1.1 Fundamental units and derived units                          |                |
|          | 1.2 Systems of measurement and S.I. units                        |                |
|          | 1.3 Concept of dimensions, dimensional formula                   |                |
|          | 1.4 Conversion from one system to another                        |                |
|          | 1.5 Significant figures  |                |
| <b>2</b> | <b>SCALARS AND VECTORS.</b>                                      | <b>4 Hours</b> |
|          | 2.1 Revision of head to tail rule                                |                |
|          | 2.2 Laws of parallelogram, triangle and polygon of forces        |                |
|          | 2.3 Resolution of a vector                                       |                |
|          | 2.4 Addition of vectors by rectangular components                |                |
|          | 2.5 Multiplication of two vectors, dot product and cross product |                |
| <b>3</b> | <b>MOTION</b>  | <b>4 Hours</b> |
|          | 3.1 Review of laws and equations of motion                       |                |
|          | 3.2 Law of conservation of momentum                              |                |
|          | 3.3 Angular motion   |                |
|          | 3.4 Relation between linear and angular motion                   |                |
|          | 3.5 Centripetal acceleration and force                           |                |
|          | 3.6 Equations of angular motion                                  |                |
| <b>4</b> | <b>TORQUE, EQUILIBRIUM AND ROTATIONAL INERTIA.</b>               | <b>6 Hours</b> |
|          | 4.1 Torque   |                |
|          | 4.2 Centre of gravity and centre of mass                         |                |
|          | 4.3 Equilibrium and its conditions                               |                |
|          | 4.4 Torque and angular acceleration                              |                |
|          | 4.5 Rotational inertia   |                |
| <b>5</b> | <b>WAVE MOTION.</b>  | <b>5 Hours</b> |
|          | 5.1 Review Hooke's law of elasticity                             |                |
|          | 5.2 Motion under an elastic restoring force                      |                |
|          | 5.3 Characteristics of simple harmonic motion                    |                |
|          | 5.4 S.H.M. and circular motion                                   |                |
|          | 5.5 Simple pendulum  |                |

	5.6	Wave form of S.H.M.	
	5.7	Resonance	
	5.8	Transverse vibration of a stretched string	
<b>6</b>	<b>SOUND.</b>		<b>5 Hours</b>
	6.1	Longitudinal waves	
	6.2	Intensity, loudness, pitch and quality of sound	
	6.3	Units of Intensity of level and frequency response of ear	
	6.4	Interference of sound waves silence zones, beats	
	6.5	Acoustics	
	6.6	Doppler effect.	
<b>7</b>	<b>LIGHT.</b>		<b>5 Hours</b>
	7.1	Review laws of reflection and refraction	
	7.2	Image formation by mirrors and lenses	
	7.3	Optical instruments	
	7.4	Wave theory of light	
	7.5	Interference, diffraction, polarization of light waves	
	7.6	Applications of polarization in sunglasses, optical activity and stress analysis	
<b>8</b>	<b>OPTICAL FIBER.</b>		<b>2 Hours</b>
	8.1	Optical communication and problems	
	8.2	Review total internal reflection and critical angle	
	8.3	Structure of optical fiber	
	8.4	Fiber material and manufacture	
	8.5	Optical fiber - uses.	
<b>9</b>	<b>LASERS.</b>		<b>3 Hours</b>
	9.1	Corpuscular theory of light	
	9.2	Emission and absorption of light	
	9.3	Stimulated absorption and emission of light	
	9.4	Laser principle	
	9.5	Structure and working of lasers	
	9.6	Types of lasers with brief description.	
	9.7	Applications (basic concepts)	
	9.8	Material processing	
	9.9	Laser welding	
	9.10	Laser assisted machining	
	9.11	Micro machining	
	9.12	Drilling, scribing and marking	
	9.13	Printing	
	9.14	Lasers in medicine	

## **RECOMMENDED BOOKS**

1. Text Book of Phy-122, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)

**INSTRUCTIONAL OBJECTIVES**

- 1      USE CONCEPTS OF MEASUREMENT TO PRACTICAL SITUATIONS AND TECHNOLOGICAL PROBLEMS.**
  - 1.1      Write dimensional formulae for physical quantities
  - 1.2      Derive units using dimensional equations
  - 1.3      Convert a measurement from one system to another
  - 1.4      Use concepts of measurement and Significant figures in problem solving.
  
- 2      USE CONCEPTS OF SCALARS AND VECTORS IN SOLVING PROBLEMS INVOLVING THESE CONCEPTS.**
  - 2.1      Explain laws of parallelogram, triangle and polygon of forces
  - 2.2      Describe method of resolution of a vector into components
  - 2.3      Describe method of addition of vectors by rectangular components
  - 2.4      Differentiate between dot product and cross product of vectors
  - 2.5      Use the concepts in solving problems involving addition resolution and multiplication of vectors.
  
- 3      USE THE LAW OF CONSERVATION OF MOMENTUM AND CONCEPTS OF ANGULAR MOTION TO PRACTICAL SITUATIONS.**
  - 3.1      Use law of conservation of momentum to practical/technological problems.
  - 3.2      Explain relation between linear and angular motion
  - 3.3      Use concepts and equations of angular motion to solve relevant technological problems.
  
- 4      USE CONCEPTS OF TORQUE, EQUILIBRIUM AND ROTATIONAL INERTIA TO PRACTICAL SITUATION/PROBLEMS.**
  - 4.1      Explain Torque
  - 4.2      Distinguish between Centre of gravity and centre of mass
  - 4.3      Explain rotational Equilibrium and its conditions
  - 4.4      Explain Rotational Inertia giving examples
  - 4.5      Use the above concepts in solving technological problems.
  
- 5      USE CONCEPTS OF WAVE MOTION IN SOLVING RELEVANT PROBLEMS.**
  - 5.1      Explain Hooke's Law of Elasticity
  - 5.2      Derive formula for Motion under an elastic restoring force
  - 5.3      Derive formulae for simple harmonic motion and simple pendulum
  - 5.4      Explain wave form with reference to S.H.M. and circular motion
  - 5.5      Explain Resonance
  - 5.6      Explain Transverse vibration of a stretched string
  - 5.7      Use the above concepts and formulae of S.H.M. to solve relevant problems.
  
- 6      UNDERSTAND CONCEPTS OF SOUND.**
  - 6.1      Describe longitudinal wave and its propagation
  - 6.2      Explain the concepts: Intensity, loudness, pitch and quality of sound
  - 6.3      Explain units of Intensity of level and frequency response of ear

- 6.4 Explain phenomena of silence zones, beats
- 6.5 Explain Acoustics of buildings
- 6.6 Explain Doppler effect giving mathematical expressions.

**7 USE THE CONCEPTS OF GEOMETRICAL OPTICS TO MIRRORS and LENSES.**

- 7.1 Explain laws of reflection and refraction
- 7.2 Use mirror formula to solve problems
- 7.3 Use the concepts of image formation by mirrors and lenses to describe working of optical instruments, e.g. microscopes, telescopes, camera and sextant.

**8 UNDERSTAND WAVE THEORY OF LIGHT**

- 8.1 Explain wave theory of light
- 8.2 Explain phenomena of interference, diffraction, polarization of light waves
- 8.3 Describe uses of polarization given in the course contents.

**9 UNDERSTAND THE STRUCTURE, WORKING AND USES OF OPTICAL FIBER.**

- 9.1 Explain the structure of the Optical Fiber
- 9.2 Explain its principle of working
- 9.3 Describe use of optical fiber in industry and medicine.

**LIST OF PRACTICALS.**

- 1 Draw graphs representing the functions:
  - a)  $y=mx$  for  $m=0, 0.5, 1, 2$
  - b)  $y=x^2$
  - c)  $y=1/x$
- 2 Find the volume of a given solid cylinder using Vernier callipers.
- 3 Find the area of cross-section of the given wire using micrometer screw gauge.
- 4 Prove that force is directly proportional to (a) mass, (b) acceleration, using fletchers' trolley.
- 5 Verify law of parallelogram of forces using Grave-sands apparatus.
- 6 Verify law of triangle of forces and Lami's theorem
- 7 Determine the weight of a given body using
  - a) Law of parallelogram of forces
  - b) Law of triangle of forces
  - c) Lami's theorem
- 8 Verify law of polygon of forces using Grave-sands apparatus.
- 9 Locate the position and magnitude of resultant of like parallel forces.
- 10 Determine the resultant of two unlike parallel forces.
- 11 Find the weight of a given body using principle of moments.
- 12 Locate the center of gravity of regular and irregular shaped bodies.
- 13 Find Young's Modules of Elasticity of a metallic wire.
- 14 Verify Hooke's Law using helical spring.
- 15 Study of frequency of stretched string with length.
- 16 Study of variation of frequency of stretched string with tension.
- 17 Study resonance of air column in resonance tube and find velocity of sound.
- 18 Find the frequency of the given tuning fork using resonance tube.
- 19 Find velocity of sound in rod by Kundt's tube.
- 20 Verify rectilinear propagation of light and study shadow formation.
- 21 Study effect of rotation of plane mirror on reflection.
- 22 Compare the refractive indices of given glass slabs.
- 23 Find focal length of concave mirror by locating centre of curvature.
- 24 Find focal length of concave mirror by object and image method
- 25 Find focal length of concave mirror with converging lens.
- 26 Find refractive index of glass by apparent depth.
- 27 Find refractive index of glass by spectrometer.
- 28 Find focal length of converging lens by plane mirror.
- 29 Find focal length of converging lens by displacement method.
- 30 Find focal length of diverging lense using converging lens.
- 31 Find focal length of diverging lens using concave mirror.
- 32 Find angular magnification of an astronomical telescope.
- 33 Find angular magnification of a simple microscope (magnifying glass)
- 34 Find angular magnification of a compound microscope.
- 35 Study working and structure of camera.
- 36 Study working and structure of sextant.
- 37 Compare the different scales of temperature and verify the conversion formula.



- 38 Determine the specific heat of lead shots.
- 39 Find the coefficient of linear expansion of a metallic rod.
- 40 Find the heat of fusion of ice.
- 41 Find the heat of vaporization.
- 42 Determine relative humidity using hygrometer.

Total Contact Hours		T	P	C
Theory:	32 Hrs	1	3	2
Practical:	96 Hrs			

**Pre-requisites:** None

**AIMS:** This subject will enable the student to be familiar with the fundamental concepts of Computer Science. He will also learn MS-Windows, MS-Office, and Internet to elementary level.

### Course Contents:

1. **ELECTRONIC DATA PROCESSING (E.D.P.)** **6 Hrs**
  - 1.1 Basic Terms of Computer Science Data & its, types, Information, Hardware, Software
  - 1.2 Computer & its types
  - 1.3 Generations of Computers
  - 1.4 Block diagram of a computer system
  - 1.5 BIT, Byte, RAM & ROM
  - 1.6 Input & Output devices
  - 1.7 Secondary storage devices
  - 1.8 Types of Software
  - 1.9 Programming Languages
  - 1.10 Applications of computer in different fields
  - 1.11 Application in Engineering, Education & Business
2. **MS-WINDOWS** **10** **2 Hrs**
  - 2.1 Introduction to Windows
  - 2.2 How to install Drivers in Windows
  - 2.3 Loading & Shut down process
  - 2.4 Introduction to Desktop items (Creation of Icons, Shortcut, Folder & modify Taskbar)
  - 2.5 Desktop properties
  - 2.6 Use of Control Panel
  - 2.7 Searching a document
3. **MS-OFFICE (MS-WORD -2016)** **8 Hrs**
  - 3.1 Introduction to MS-Office
  - 3.2 Introduction to MS-Word & its Screen
  - 3.3 Create a new document
  - 3.4 Editing & formatting the text
  - 3.5 Saving & Opening a document
  - 3.6 Page setup (Set the Margins & Paper)
  - 3.7 Spell Check & Grammar
  - 3.8 Paragraph Alignment
  - 3.9 Inserting Page numbers, Symbols, Text box & Picture in the document
  - 3.10 Use the different Format menu drop down commands (Drop Cap, Change Case, Bullet & Numbering and Border & Shading)
  - 3.11 Insert the Table and it's Editing
  - 3.12 Printing the document
  - 3.13 Saving a document file as PDF format

- |  |               |
|--|---------------|
| <b>4. MS-OFFICE (MS-EXCEL -2016)</b>                                   | <b>9 Hrs</b>  |
| 4.1 Introduction to MS-Excel & its Screen                              |               |
| 4.2 Entering data & apply formulas in worksheet                        |               |
| 4.3 Editing & Formatting the Cells, Row & Colum                        |               |
| 4.4 Insert Graphs in sheet   |               |
| 4.5 Page setup, Print Preview & Printing                               |               |
| 4.6 Types & Categories of Charts                                       |               |
| <b>5. MS. OFFICE (MS-POWER POINT- 2016)</b>                            | <b>4 Hrs.</b> |
| 5.1 Introduction to MS-Power point                                     |               |
| 5.2 Creating a, presentation   |               |
| 5.3 Editing & formatting a text box                                    |               |
| 5.4 Adding pictures & colors to a slide                                |               |
| 5.5 Making slide shows   |               |
| 5.6 Slide Transition   |               |
| <b>6. INTERNET &amp; E-MAIL</b>  | <b>3Hrs</b>   |
| 6.1 Introduction to Internet & browser window                          |               |
| 6.2 Searching, Saving and Print a page from internet                   |               |
| 6.3 Creating, Reading & Sending E-Mail                                 |               |
| 6.4 Drop Box / Online/ Sky drive/ Cloud data etc.                      |               |
| 6.5 File attachment.   |               |
| 6.6 Uploading and downloading file(s) and software(s)                  |               |
| 6.7 Explain some advance features over the internet and search engines |               |
| 6.8 Difference between Internet, Intranet and Extranet                 |               |

**Recommended Textbooks:**

1. Bible Microsoft Office 2016 by John Walkenbach
2. Bible Microsoft Excel 2016 by John Walkenbach
3. Bible Microsoft PowerPoint 2016 by John Walkenbach

**Instructional Objectives:****1. UNDERSTAND ELECTRONIC DATA PROCESSING (E.D.P)**

- 1.1. Describe Basic Terms of Computer Science. Data & its Types, Information, Hardware, Software
- 1.2. Explain Computer & its types
- 1.3. Generations of Computers
- 1.4. Explain Block diagram of a computer system
- 1.5. State the terms such as BIT, Byte, RAM & ROM
- 1.6. Identify Input & Output devices
- 1.7. Describe Secondary Storage devices
- 1.8. Explain Types of Software
- 1.9. Introduction to Programming Language
- 1.10. Explain Applications of computer in different fields
- 1.11. Application in Engineering, Education & Business

**2. UNDERSTAND MS-WINDOWS 10**

- 2.1 Explain Introduction to Windows
- 2.2 How to install Drivers in Windows
- 2.3 Describe Loading & Shut down process
- 2.4 Explain Introduction to Desktop items (Creation of Icons, Shortcut, Folder & modify Taskbar)
- 2.5 Explain Desktop properties
- 2.6 Describe use of Control Panel (add/remove program, time & date, mouse and create user account)
- 2.7 Explain the method of searching a document

**3. UNDERSTAND MS-OFFICE (MS-WORD - 2016)**

- 3.1 Explain Introduction to MS-Office
- 3.2 Describe -Introduction to MS-Word & its Screen
- 3.3 Describe create a new document
- 3.4 Explain Editing & formatting the text
- 3.5 Describe saving & Opening a document
- 3.6 Explain Page setup, (Set the Margins & Paper)
- 3.7 Describe Spell Check & Grammar
- 3.8 Explain Paragraph Alignment
- 3.9 Explain Inserting Page numbers, Symbols, Text box & Picture in the document
- 3.10 Describe Use the different Format menu drop down commands (Drop Cap, Change Case, Bullet & Numbering and Border & Shading)
- 3.11 Explain Insert the Table and its Editing and modifying
- 3.12 Describe printing the document
- 3.13 Describe the method of file saving as a PDF Format

**4. UNDERSTAND MS-OFFICE (MS-EXCEL- 2016)**

- 4.1 Explain Introduction to MS-Excel & its Screen
- 4.2 Describe Entering data & apply formulas in worksheet
- 4.3 Describe Editing & Formatting the, Cells, Row & Column
- 4.4 Explain Insert Graphs in sheet
- 4.5 Describe Page setup, Print preview & Printing

- 4.6 Explain in details formulas for sum, subtract, multiply, divide, average
- 4.7 Explain in details the types of charts e.g pie chart, bar chart

**5. UNDERSTAND MS-OFFICE (MS-POWER POINT-2016)**

- 5.1 Describe Introduction to MS-Power point
- 5.2 Explain creating a presentation
- 5.3 Describe Editing & formatting a text box
- 5.4 Explain Adding pictures & colors to a slide
- 5.5 Describe Making slide shows
- 5.6 Explain Slide Transitions

**6. UNDERSTAND INTERNET &E-MAIL**

- 6.1 Explain Introduction to Internet and browser window
- 6.2 Explain Searching, Saving and Print a page from internet
- 6.3 Describe Creating, Reading & Sending E-Mail
- 6.4 Interpret Drop Box / Online/ Sky drive/ Cloud data etc.
- 6.5 File attachment.
- 6.6 Uploading and downloading file(s) and software(s)
- 6.7 Explain some advance features over the internet and how to search topics on different search engines
- 6.8 Enlist the Difference between Internet, Intranet and Extranet

**List of Practical:**

- |   |               |
|---|---------------|
| <b>1. Identify key board, mouse, CPU, disk drives, disks, monitor, and printer and</b>                      | <b>3Hrs</b>   |
| <b>2. MS WINDOWS 10</b>   | <b>12 Hrs</b> |
| 2.1 Practice of loading and shutdown of operating system  |               |
| 2.2 How to install Drivers in Windows   |               |
| 2.3 Creating items (icons, shortcut, folders etc) and modifying taskbar                                     |               |
| 2.4 Changing of wallpaper, screensaver, and resolution  |               |
| 2.5 Practice of control panel items (add/remove, time and date, mouse, and create user account)             |               |
| <b>3. MS OFFICE (MS-WORD 2016)</b>  | <b>27 Hrs</b> |
| 3.1 Identifying the MS Word Screen and its menu   |               |
| 3.2 Practice of create a new document, saving and re-opening it from the location and spell check & grammar |               |
| 3.3 Practice of Page Formatting (Borders, Character Spacing, Paragraph, Bullets & Numberings and Fonts)     |               |
| 3.4 Practice of different tool bars like standard, format& drawing tool bars                                |               |
| 3.5 Practice of Insert pictures, clipart, and shapes  |               |
| 3.6 Practice of header and footer   |               |
| 3.7 Practice of insert table and also format of table   |               |
| 3.8 Practice of page setup, set the page margins, and printing documents                                    |               |
| <b>4. MS OFFICE (MS-EXCEL 2016)</b>   | <b>27 Hrs</b> |
| 4.1 Identifying the MS EXCEL Screen and its menu  |               |
| 4.2 Practice of create a new sheet, saving and re-opening it from the location and spell check              |               |
| 4.3 Practice of insert and delete of row and columns (format of cell)                                       |               |
| 4.4 Practice of entering data and formulas in worksheet (Add, Subtract, Multiplying, and Divide & Average)  |               |
| 4.5 Repeating practical serial number04   |               |
| 4.6 Practice of insert chart and its types  |               |
| 4.7 Practice of page setup, set the page margins, and printing  |               |
| <b>5. MS OFFICE (MS-POWER POINT 2016)</b>   | <b>15 Hrs</b> |
| 5.1 Identifying the MS POWER POINT Screen and its menu  |               |
| 5.2 Practice of create a new presentation and save  |               |
| 5.3 Practice of open saves presentations  |               |
| 5.4 Practice of inset picture and videos  |               |
| <b>6. INTERNET &amp; E-MAIL</b>   | <b>12 Hrs</b> |
| 6.1 Identifying internet explorer   |               |
| 6.2 Practice of searching data from any search engine   |               |
| 6.3 Practice of create an E-Mail account and how to send and receive mails, download attachments            |               |
| 6.4 File attachment.  |               |
| 6.5 Uploading and downloading file(s) and software(s)   |               |

Total Contact Hours		T	P	C
Theory:	32 Hrs	1	6	3
Practical:	192 Hrs			

**Pre-requisites :** None

**AIMS:** At the end of this course the students will be able to understand the Fundamentals of Engineering Drawing used in the various fields of industry especially in the Mechanical Technology. The students will be familiarizing with the use of conventional drawing equipment as well as the modern techniques used for this subject.

**Details of course contents:**

**(PART-A)      BASIC ENGINEERING DRAWING (50%)**

- |   |             |
|---|-------------|
| <b>1. Introduction of Technical Drawing/Drafting</b><br>1.1 Importance of Technical Drawing<br>1.2 Uses/Applications of Technical Drawing<br>1.3 Type of Drawing used in Engineering  | <b>1Hr</b>  |
| <b>2. Drafting Instruments and Accessories</b><br>2.1. Introduction and importance of drafting instruments<br>2.2. List of drawing Instruments<br>2.3. Construction, uses and care of all instruments and accessories   | <b>2Hrs</b> |
| <b>3. Lines and Symbols</b><br>3.1. Basic lines<br>3.2. Importance of lines and Symbols<br>3.3. Common Types (Alphabets) of lines<br>3.4. Common Symbols used in Industry   | <b>2Hrs</b> |
| <b>4. Lettering</b><br>4.1. Importance of good lettering<br>4.2. General Proportion/ Composition of letters<br>4.3. Uses of Guide lines in Lettering<br>4.4. Classification of lettering  | <b>1Hr</b>  |
| <b>5. Drafting Geometry and Curves</b><br>5.1. Introduction to geometry, plane and solid type<br>5.2. Definition of terms<br>5.3. Basic geometric constructions<br>5.4. Introduction to engineering curve<br>5.5. Application of engineering curves<br>5.6. Cone and conic section<br>5.7. Geometrical Solid and its types<br>5.8. Geometrical Surfaces and its types | <b>4Hrs</b> |
| <b>6. Freehand Sketching</b><br>6.1. Introduction to sketching techniques<br>6.2. Sketching of basic lines and shapes<br>6.3. Sketching of pictorial drawings   | <b>1Hr</b>  |
| <b>7. Theory of Projections</b><br>7.1. Introduction to the plane and its types<br>7.2. Dihedral and Trihedral angles<br>7.3. Projection of point, lines, plane and solids<br>7.4. Perceptual views of plan of projections  | <b>4Hrs</b> |

- 7.5. Orthographic projections
- 7.6. 1st angle and 3rd angle projection
- 7.7. Principal views and its arrangements
- 7.8. Multi-view drawings and missing lines
- 8. Dimensioning** **1Hr**
  - 8.1. Dimensioning and its types
  - 8.2. Principles of Dimensioning
  - 8.3. Methods of indicating Dimensions

**(PART-B) ADVANCED ENGINEERING DRAWING (50%)**

- 9. Introduction to Pictorial drawing** **3Hrs**
  - 9.1. Uses of pictorial /3D Views
  - 9.2. Classification of pictorial views
  - 9.3. Isometric drawing and its types
  - 9.4. Oblique drawing and its types
  - 9.5. Perspective drawing and its types
- 10. Development and Intersection** **3Hrs**
  - 10.1. Introduction and importance of development
  - 10.2. Applications of development in industry
  - 10.3. Methods to develop the surfaces
  - 10.4. Frustum and truncation of solids
  - 10.5. Introduction and importance of intersection
  - 10.6. Applications of intersection in industry
  - 10.7. Methods to develop the intersection
- 11. Sectioning** **1Hr**
  - 11.1. Sectioning and its purposes
  - 11.2. Cutting Plane, Section Lines
  - 11.3. Type of sectional views
  - 11.4. Parts not sectioned
  - 11.5. Conventional Breaks
- 12. Fasteners and its Types** **6Hrs**
  - 12.1. Fasteners and their types
  - 12.2. Threads nomenclature
  - 12.3. Screw Threads, their types
  - 12.4. Rivet, Rivet heads
  - 12.5. Riveted joints
  - 12.6. Caulking and fullering in riveting
  - 12.7. Key and its types
  - 12.8. Cotter and its types
  - 12.9. Bearing and its types
  - 12.10. Shaft Coupling
  - 12.11. Types of coupling



- 13. Working / Production Drawings** **2Hrs**
- 13.1. Working / production drawing
  - 13.2. Types of production drawings
  - 13.3. Importance of detail and assembly drawings
  - 13.4. Title blocks
  - 13.5. Essentials Requirements for making detail and assembly drawings
- 14. Study of Drawings standards (with related sheet example)** **1Hr.**
- 14.1. Japanese
  - 14.2. Chinese
  - 14.3. European
  - 14.4. American
  - 14.5. British
  - 14.6. Common Standards

**Recommended Textbooks:**

- 1. Engineering Drawing By N.D Bhatt, 53<sup>rd</sup> Edition (2014)
- 2. A First Year Engineering Drawing By A.C Parkinson; Pitman Publisher, Latest Edition
- 3. Mechanical Drawing (12<sup>th</sup> Addition) by French. Svensen, Helsel and Urbanick
- 4. Drafting Fundamentals by scot. Foy, Schwendan
- 5. Text Book of Machine Drawing by R.K. Dhawan
- 6. Engineer Drawing by M.B. Shah (B.C.Rana)

**Instructional objectives**

**(PART-A)      BASIC ENGINEERING DRAWING    (50%)**

- 1. Introduction of Technical Drawing/Drafting**
  - 1.1 Describe the Importance of Technical Drawing
  - 1.2 Explain the Uses/Applications of Technical Drawing
  - 1.3 Describe the type of Drawing used in Engineering
- 2. Drafting Instruments and Accessories**
  - 2.1. State the Introduction and importance of drafting instruments
  - 2.2. State a List of drawing Instruments
  - 2.3. Explain construction, uses and care of all instruments and accessories
- 3. Lines and Symbols**
  - 3.1. Describe Basic lines
  - 3.2. Explain the Importance of lines and Symbols
  - 3.3. Describe Common Types (Alphabets) of lines
  - 3.4. Explain Common Symbols used in Industry
- 4. Lettering**
  - 4.1. Describe the Importance of good lettering
  - 4.2. Explain General Proportion/ Composition of letters
  - 4.3. Explain Uses of Guide lines in Lettering
  - 4.4. Describe Classification of lettering
- 5. Drafting Geometry and Curves**
  - 5.1. Describe the Introduction to geometry, plane and solid type
  - 5.2. State the Definition of terms
  - 5.3. State Basic geometric constructions
  - 5.4. Describe Introduction to engineering curve
  - 5.5. Describe Application of engineering curves
  - 5.6. Define Cone and explain conic section
  - 5.7. Describe Geometrical Solid and its types
  - 5.8. Explain Geometrical Surfaces and its types
- 6. Freehand Sketching**
  - 6.1. Describe Introduction to sketching techniques
  - 6.2. Explain Sketching of basic lines and shapes
  - 6.3. Explain Sketching of pictorial drawings
- 7. Theory of Projections**
  - 7.1. Describe Introduction to the plane and state its types
  - 7.2. Explain Dihedral and Trihedral angles
  - 7.3. Explain Projection of point, lines, plane and solids
  - 7.4. Explain Perceptual views of plan of projections
  - 7.5. Explain Orthographic projections
  - 7.6. Compare 1st angle and 3rd angle projection
  - 7.7. State Principal views and its arrangements
  - 7.8. Explain Multi-view drawings and missing lines
- 8. Dimensioning**
  - 8.1. Define Dimensioning and describe its types
  - 8.2. Explain Principles of Dimensioning
  - 8.3. Explained Methods of Indicating Dimensions,

**(PART-B) ADVANCED ENGINEERING DRAWING (50%)**

- 9. Introduction to Pictorial drawing**
  - 9.1. Explain Uses of pictorial /3D Views
  - 9.2. Explain the Classification of pictorial views
  - 9.3. Describe Isometric drawing and its types
  - 9.4. Describe Oblique drawing and its types
  - 9.5. Describe Perspective drawing and its types
- 10. Development and Intersection**
  - 10.1. Describe Introduction and importance of development
  - 10.2. Explain Applications of development in industry
  - 10.3. Explain Methods to develop the surfaces
  - 10.4. Distinguish Frustum and truncation of solids
  - 10.5. Explain the Introduction and importance of intersection
  - 10.6. Explain Applications of intersection in industry
  - 10.7. Describe the Methods to develop the intersection
- 11. Sectioning**
  - 11.1. Define Sectioning and describe its purposes
  - 11.2. State Cutting Plane, Section Lines
  - 11.3. Explain type of sectional views
  - 11.4. State Parts not sectioned
  - 11.5. Describe Conventional Breaks
- 12. Fasteners and its Types**
  - 12.1. Describe Fasteners and their types
  - 12.2. State Threads nomenclature
  - 12.3. Describe Screw Threads, their types
  - 12.4. Define Rivet, state Rivet heads
  - 12.5. Explain Riveted joints
  - 12.6. State Caulking and fullering process in riveting
  - 12.7. Define Key and state its types
  - 12.8. State Cotter and its types
  - 12.9. Describe Bearing and its types
  - 12.10. Describe Shaft Coupling
  - 12.11. Explain Types of coupling
- 13. Working / Production Drawings**
  - 13.1. Explain Working / production drawing
  - 13.2. Describe Types of production drawings
  - 13.3. Explain Importance of detail and assembly drawings
  - 13.4. State Title blocks
  - 13.5. Explain Essentials Requirements for making detail and assembly drawings
- 14. Study of Drawings standards**
  - 14.1 Explain Japanese drawing standards.
  - 14.2 Explain Chinese drawing standards.
  - 14.3 Explain European drawing standards.
  - 14.4 Explain American drawing standards.
  - 14.5 Explain common Standards.

**List of Practical**

**(PART-A) BASIC ENGINEERING DRAWING**

1. Practice of single stroke capital **vertical** lettering on graph and drawing sheet
2. Practice of single stroke capital **Inclined** lettering on graph and drawing sheet  
Practice of single stroke capital **Vertical & Inclined** lettering on drawing sheet (Home Assignment)
3. Double stroke lettering on self-developed graph.
4. Practice to draw horizontal, vertical and inclined lines (use of tee square and set squares)
5. Drawing of lines, centers, curves, and crossing of lines
6. Construction of angles and triangles
7. Construction of quadrilaterals and circles elements
8. Construction of parallel-lines, perpendiculars, bisects line, angles and equal division of lines
9. Different types of drawing lines
10. Plumbing and Piping Symbols.
11. Welding Symbols & Threads Symbols
12. Material Symbols and Conventional Breaks.
13. Construction of inscribe and circumscribe figures (square, triangle and hexagon)
14. Construction of Pentagon, Hexagon & Octagon, by general and different methods
15. Construction of Tangents of circles (Inside & Outside)
16. Construction of Ellipse by four different methods
17. Construction of Parabola and Hyperbola curves.
18. Construction of Archimedean spiral, cycloid & involute curve of square, circle.
19. Orthographic projection 1 and 3<sup>rd</sup> angle wooden block-1
20. Orthographic projection 1 and 3<sup>rd</sup> angle wooden block-2
21. Orthographic projection 1 and 3<sup>rd</sup> angle wooden block-3

**(Part-B) ADVANCED ENGINEERING DRAWING**

22. Orthographic projection and Isometric Drawing-I
23. Orthographic projection and Isometric Drawing-II
24. Orthographic projection and Oblique Drawing
25. Construction of perspective drawing. (One Point and Two Point)
26. Development of Right and Truncated Prisms (Square, Hexagon)
27. Development of Right Pyramids and Frustum & Truncated Pyramid (Square, Hexagon)
28. Development of right and oblique Cones (Frustum & Truncated)
29. Development of right and oblique Cylinders (Truncated)
30. Line of Intersection of Plane Surfaces (Two square prism)
31. Line of Intersection of curved surfaces (Two Cylinders Having unequal dia)
32. Nut & Bolt (Hex. & Square Type)
33. Threads forms and multiple threads, (Locking devices Home Assignment)
34. Lap Joints (Single & Double Riveted) Chain and Zigzag type
35. Butt Joints (Single & Double Riveted) Chain and Zigzag type Rivets head Home Assignment)
36. Sketching of Keys and Cotter
37. Bushed Bearing (Half Section)
38. Multi view drawing of Gland
39. Split Muff Coupling and Oldham coupling
40. Flanged Coupling and Hook's Coupling
41. Plummer Block (Details and Assembly)
42. Screw Jack (Details and Assembly)
43. Tail stock (Detail)-I & II
44. Tail Stock (Assembly)-I & II

Total Contact Hours		T	P	C
Theory:	32 Hrs	1	3	2
Practical:	96 Hrs			

**Pre-requisites:** Applied Physics (1st year)

**AIMS:** This course enables the students to understand the fundamental of electricity, know the devices used for control of industrial equipment, their properties and uses. The course provides the knowledge of working principles and operation of A.C. and D.C. motors, transformers and generators, interpret connection diagrams of various electrical devices. Students will be able to observe safety rules and provide electric shock treatment.

#### Corse Contents:

- |    |  |      |
|----|--|------|
| 1. | FUNDAMENTALS OF ELECTRICITY              | 4Hrs |
| 2. | PROTECTION DEVICES AND ELECTRICAL SAFETY | 5Hrs |
| 3. | MOTORS, GENERATORS AND TRANSFORMERS      | 6Hrs |
| 4. | INSTRUMENTS AND WIRING                   | 6Hrs |
| 5. | FUNDAMENTALS OF ELECTRONICS              | 6Hrs |
| 6. | TRANSISTORS/AND SPECIAL DIODES           | 5Hrs |

#### Detail of Contents:

- |       |  |       |
|-------|--|-------|
| 1.    | FUNDAMENTALS OF ELECTRICITY  | 4 Hrs |
| 1.1   | Current, (AC and DC Supply) voltage and resistance, their units, single phase and three phase supply |       |
| 1.2   | Ohms law, simple calculations  |       |
| 1.3   | Laws of resistance, simple calculations  |       |
| 1.4   | Combination of resistances, simple calculations, capacitors and their combinations                   |       |
| 1.5   | Electrical and mechanical power, their conversion, units, horse power                                |       |
| 1.6   | Heating effect of current, joules law  |       |
| 1.7   | Electrical energy, units, energy bill  |       |
| 1.8   | Batteries and battery cells  |       |
| 2.    | PROTECTION DEVICES AND ELECTRICAL SAFETY   | 5 Hrs |
| 2.1   | Fuse and their types   |       |
| 2.2   | Circuit breaker and their types  |       |
| 2.3   | Relay and their types  |       |
| 2.4   | Starter and their types  |       |
| 3.    | MOTORS, GENERATORS AND TRANSFORMERS  | 6 Hrs |
| 3.1   | Faraday's law  |       |
| 3.2   | Construction and working of AC and DC generators   |       |
| 3.3   | Construction and working of transformers, emf and current equation types                             |       |
| 3.4   | Welding transformers, ratings  |       |
| 3.5   | Types and working of motors  |       |
| 3.5.1 | AC MOTORS  |       |

- 3.5.1.1 1- Phase induction motor
- 3.5.1.2 3- Phase induction motors
- 3.5.2 DC MOTORS
  - 3.5.2.1 Stepper motors
  - 3.5.2.2 Servo motors

**4. (A) MEASURING INSTRUMENTS**

**6Hrs**

- 4.1 Basic Electrical measuring instruments
- 4.2 Ammeter, Voltmeter, Ohm meter, Multimeter, Watt meter Energy Meter and their connections
- 4.3 Use of multimeter
- 4.4 Use of megger

**(B) DOMESTIC WIRING**

- 4.5 Introduction to wiring and their types

**5. FUNDAMENTALS OF ELECTRONICS**

**6 Hrs**

- 5.1 Semi-conductor theory, doping, P & N type materials
- 5.2 PN Junction diode, potential barrier, forward and reverse bias
- 5.3 Use of PN Diode as rectifier
- 5.4 Half-wave, full-wave and bridge rectifiers
- 5.5 Filtering, inverters and stabilizers
- 5.6 Power supply

**6. TRANSISTORS/AND SPECIAL DIODES**

**5 Hrs**

- 6.1 PNP & NPN transistors, biasing, working
- 6.2 Use of transistors as amplifiers, gains in CE, CB and CC amplifiers
- 6.3 Zener diode
- 6.4 Photo diode, photovoltaic cells, LED

**Recommended Textbooks:**

- 1. Examples of Electrical Calculations, by Admiralty
- 2. Reed's Basic electro-technology for marine engineers, KRAAL
- 3. Electrical Technology, B.L. Theraja
- 4. AC & DC circuits B. Grob
- 5. Basic Electronics B. Grob
- 6. Digital Electronics by Moris Mayno

**Instructional Objectives:****1. UNDERSTAND BASIC CONCEPTS AND LAWS OF ELECTRICITY**

- 1.1 Define units of current, voltage and resistance with respect to supply of single phase and three phase
- 1.2 Explain Ohm's Law with simple calculations
- 1.3 Solves simple problems on laws of resistance
- 1.4 Substitute two of the three variables to find the third unknown in equation  $V=I \times R$ 
  - 1.4.1 Calculate the equivalent resistances for resistors joined in series, parallel and combination
  - 1.4.2 Calculate the total capacitance in series and parallel
- 1.5 Calculate electrical and mechanical power and the inter relation between the two systems
- 1.6 Heating effect of current, Jowls Law
- 1.7 Calculate the electrical energy consumption in an installation and prepare the energy bill
- 1.8 Define the inductors and its uses
- 1.9 Define RLC circuit and its uses
- 1.10 Define the batteries and battery cell
  - 1.10.1 Define primary and secondary battery
  - 1.10.2 State the types of primary and secondary batteries

**2. UNDERSTAND PROTECTION DEVICES AND ELECTRICAL SAFETY**

- 2.1 Define Fuse and its current rating, fusing factor, Types of fuses, Rewirable and HRC
- 2.2 Explain working of circuit breaker, Types of C.B, High power circuit breaker and their types, Domestic Circuit breakers
  - 2.2.1 Difference between MCB and MCCB, Types of MCB w.r.t. poles
- 2.3 Define relay and explain its working
  - 2.3.1 State types of relays w.r.t working
- 2.4 Describe starter and its types
  - 2.4.1 Explain the working of following starter, 3Point, 4Point and star delta starter and soft starter)
  - 2.4.2 Understand personal safety while working on electricity)

**3. UNDERSTAND WORKING OF ELECTRIC MOTORS, AND GENERATORS AND TRANSFORMERS**

- 3.1 Explain Faraday's law
- 3.2 State the construction of alternator and D.C. generator with its parts and working
- 3.3 Explain the working principal of transformers and emf equation
- 3.4 State various parts of a welding transformer and setting
- 3.5 Explain the working of single phase, three phase, and servo motors
- 3.6 Explain the working of stepper motors

**4. INSTRUMENTS AND BASIC WIRING**

- 4.1 Define instrument and their types, Use of instruments and their connections)
- 4.2 Define secondary analog digital and working effect
- 4.3 Explain types of meters, there uses and connection in a circuit, Ammeter, Voltmeter, Ohm meter, Multimeter, Watt meter and Energy Meter
- 4.4 Define electric wiring and enlist the accessories used in Domestic wiring
  - 4.4.1 Describe batten wiring, conduit PVC, casing capping wiring, advantages and disadvantages of each

**5. UNDERSTAND THE FUNDAMENTALS OF ELECTRONICS**



- 5.1 State the Semiconductor theory
  - 5.1.1. State how P type and N type material is produced
- 5.2 State the action of potential barrier in a PN junction and the effect of forward and reverse bias on the junction
- 5.3 Describe the use of PN junction diode as rectifier
- 5.4 Draw and explain the circuit diagram for half wave and full wave rectifier
- 5.5 Draw and explain the Bridge Rectifier circuit with filter circuit, inductor and stabilizer and its circuits
- 5.6 Explain Power supply

**6. UNDERSTAND THE WORKING OF SPECIAL DIODES**

- 6.1 State the biasing working of Zener diodes
- 6.2 State the construction working and uses of photo diodes, Photovoltaic cell and LED

**List of Practical:****1. FUNDAMENTALS OF ELECTRICITY**

- 1.1 Study of electrical measuring instruments, handling precautions, methods of connection and identification of AC & DC Meter
- 1.2 Verification of Ohm's law
- 1.3 Verification laws of combination; of resistance
- 1.4 Measurement of power by Volt-ammeter and wattmeter
- 1.5 Measurement of electrical energy
- 1.6 Use of primary and secondary batteries

**2. PROTECTION DEVICES AND ELECTRICAL SAFETY**

- 2.1 Application of various fuses in wiring
- 2.2 Study of connection circuit breaker 2 pole, 3 pole with time setting

**3. MOTORS, GENERATORS AND TRANSFORMERS**

- 3.1 Verification of faraday's laws of electro-magnetic induction
- 3.2 Connection of star delta starter and timer
- 3.3 Study of AC and DC generators
- 3.4 Study of welding transformers
- 3.5 Starting single-phase induction motors, reversal and forward
- 3.6 Starting 3-phase induction motors, reversal and forward
- 3.7 Connections of magnetic starters with motors

**4. INSTRUMENTS AND WIRING**

- 4.1 Current carrying capacity of cables
- 4.2 Wiring, PVC, casing Capping and Batten
- 4.3 Use of oscilloscope
- 4.4 Study of calibration of instruments using bridge circuits
- 4.5 Study of using AVO meter and meggar analog and digital

**5. FUNDAMENTALS OF ELECTRONICS**

- 5.1 Study and connections of PN diodes as rectifiers
- 5.2 Connecting PN Diode as half-wave and full-wave rectifier
- 5.3 Connecting PN Diode as bridge Rectifiers with filter
- 5.4 Study of Power Supply

**6. TRANSISTORS AND SPECIAL DIODES**

- 6.1 Connections and biasing of PNP and NPN transistors
- 6.2 Study and connections of Zener diode as voltage regulator
- 6.3 Study and connections of Photodiode as light sensing device
- 6.4 Study and connections of DIAC's and TRIAC's as switch circuits

**TT-123 (Rev.) WORKSHOP PRACTICE (METAL, WELDING, WOOD)****TOTAL CONTACT HOURS: 192 Hrs.**

<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>6</b>	<b>2</b>

**Theory: 0****Practicals 192 Hrs.****LIST OF PRACTICALS:****(A) METAL SHOP****32 Hours**

1. Preparation of name plate.
2. Sawing exercise.
3. Preparation of inside caliper.
4. Preparation of Bottle opener.
5. Preparation of dove-tail joint.
6. Preparation of small size Try-square.
7. Preparation of Coat hook.
8. Preparation of funnel (sheet)
9. Preparation of Pin tray (sheet).
10. Preparation of Drawer handle.
11. Preparation of bevel square.
12. Preparation of Spanner (small size).

**(B) WELDING SHOP****96 Hours**

1. Describe Welding and its process
  - 1.1. Gas Welding
  - 1.2. Arc Welding
  - 1.3. Spot Welding
  - 1.4. Tig and Mig Welding
2. Flame making practice.
3. Pool making.
4. Bed making.
5. Welding Joint
  - 5.1. Butt joint.
  - 5.2. Lap joint.
  - 5.3. T. joint.
  - 5.4. Edge joint.
6. Corner Joint without filler Rod
7. Corner Joint with filler Rod
8. Brazing practice.
9. Arc Welding:
  - 9.1. Arc making/current setting/polarity selection.
  - 9.2. Bed making.
  - 9.3. Butt joint.
  - 9.4. V. Butt joint.
  - 9.5. Lap joint.
  - 9.6. Corner joint.
  - 9.7. T. joint.
  - 9.8. Square corner joint.
  - 9.9. Bevel butt joint.

10. Forging:
  - 10.1 Forging and its processes
  - 10.2 Describe forging and its operations
  - 10.3 Materials costing
    - 10.3.1 Aluminum, Ferrous, Brass and steel alloys
    - 10.3.2 Pattern making
  - 10.4 Cutting with chisel hot and cold.
  - 10.5 Upsetting.
  - 10.6 Twisting.
  - 10.7 Heading.
  - 10.8 Drawing by forging.

**(C) WOOD WORKING SHOP**

**64 hours**

1. Safety precautions in wood working shop.
2. Using of various wood working tools
3. Planning and squaring to dimensions. (Job-1)
4. Introducing different wood working, layout and measuring tools.
5. Sawing exercise (job-2).
6. Identifying different types of handsaws and making sketches of all saws.
7. Wood chiseling.
8. Making middle half cross-lap joint. (job-3).
9. Making Mortise and Tenon joint. (job-4).
10. Making dado-joint (job-5).
11. Observing wood structure.
12. Identifying and comparing soft and hard wood.
13. Boring process, making holes of different diameters in wood. (job-6)
14. Nailing and wood screwing process. (job-7+8)
15. Making dove-tail joint. (job-9)
16. Wood working projects.
17. Spirit polishing (preparing wood surface for polishing, staining and lacquering).

**TT-111 TEXTILE RAW MATERIALS****TOTAL CONTACT HOURS****T      P      C****Theory: 32 Hours****1      0      1****Pre Requisite: None****AIMS:**

To develop within the students, necessary knowledge of textile raw materials.

**DETAIL COURSE CONTENTS:****1. CLASSIFICATION OF FIBERS****4 HOURS**

- 1.1 Introduction to Textile Fibers
- 1.2 Classification of Natural and Man-Made fibers
- 1.3 Essential and desirable properties of textile fibers

**2. COTTON:****8 HOURS**

- 2.1 History of cotton
- 2.2 Types of picking.
- 2.3 Varieties of cotton
- 2.4 Properties of cotton and uses

**3. GINNING:****6 HOURS**

- 3.1 Introduction
- 3.2 Types of ginning.
- 3.3 Roller ginning.
- 3.4 Saw ginning.

**4. JUTE:****2 HOURS**

- 4.1 Properties of Jute and uses

**5. WOOL:****2 HOURS**

- 5.1 Introduction
- 5.2 Types of wool
- 5.3 Properties of wool and uses

**6. SILK:****2 HOURS**

- 6.1 Introduction and Sericulture of silk.
- 6.2 Properties of silk and uses

**7. POLYESTER****2 HOURS**

- 7.1 Introduction.
- 7.2 Properties of polyester and uses

**8. ACRYLIC****2 HOURS**

- 8.1 Introduction
- 8.2 Properties of Acrylic Rayon and uses

**9. VISCOSE RAYON****2 HOURS**

- 9.1 Introduction
- 9.2 Properties of Viscose Rayon and uses

**10. TENCEL FIBER****2 HOURS**

- 10.1 Introduction.
- 10.2 Properties of Tencel and uses

**11. MODAL FIBER****2 HOURS**

- 11.1 Introduction.
- 11.2 Properties of Modal and uses

**REFERENCE BOOKS:**

1. TEXTILES By Sara J. Kadolph
2. TEXTILES Fiber to fabric by Corbman
3. Hand book of technical textile Published by Textile Institute Manchester

## **TT-111 TEXTILE RAW MATERIALS**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. UNDERSTAND CLASSIFICATION OF FIBERS**

- 1.1 Narrate Introduction to Textile Fibers
- 1.2 Classification of Natural and Man Made fibers
- 1.3 Narrate Essential and desirable properties of textile fibers

#### **2. UNDERSTAND COTTON:**

- 2.1 History of cotton
- 2.2 Narrate Types of picking.
- 2.3 Narrate Varieties of cotton
- 2.4 Properties of cotton and uses

#### **3. UNDERSTAND GINNING:**

- 3.1 Introduction
- 3.2 Narrate Types of ginning.
- 3.3 Roller ginning.
- 3.4 Saw ginning.

#### **4. UNDERSTAND JUTE:**

- 4.1 Narrate Properties of Jute and uses

#### **5. UNDERSTAND WOOL:**

- 5.1 State Introduction of wool
- 5.2 Types of wool
- 5.3 Properties of wool and uses

#### **6. UNDERSTAND SILK:**

- 6.1 Narrate Introduction and Sericulture of silk.
- 6.2 Properties of silk and uses

#### **7. UNDERSTAND POLYESTER**

- 7.1 State Introduction. of Polyester
- 7.2 Describe Properties of polyester and uses

#### **8. UNDERSTAND ACRYLIC**

- 8.1 Introduction of Acrylic
- 8.2 Narrate Properties of Acrylic Rayon and uses

#### **9. UNDERSTAND VISCOSE RAYON**

- 9.1 Introduction of Viscose Rayon
- 9.2 Properties of Viscose Rayon and uses

**10. UNDERSTAND TENCEL FIBER**

10.1 Introduction. of Tencel Fiber

10.2 Properties of Tencel and uses

**11. UNDERSTAND MODAL FIBER**

11.1 State Introduction of Modal Fiber

11.2 Narrate Properties of Modal and uses



## **TT-103 FUNDAMENTALS OF TEXTILE TECHNOLOGY**

### **TOTAL CONTACT HOURS**

**T          P          C**

**Theory: 64 Hours**

**2          3          3**

**Practical: 96 Hours**

**Pre Requisite: Self Interest**

### **AIMS:**

To develop within the students, necessary knowledge of Textile Technology.

### **Detail Course Contents:**

- |  |                 |
|--|-----------------|
| <b>1. INTRODUCTION AND EVALUATION OF TEXTILE</b>     | <b>4 HOURS</b>  |
| 1.1 Introduction of Textile                          |                 |
| 1.2 Importance of Textile                            |                 |
| 1.3 Major Fields and Application of Textile          |                 |
| <b>2. THE BASIC PRINCIPLES INVOLVED IN YARN:</b>     | <b>12 HOURS</b> |
| 2.1 Flow chart of spinning                           |                 |
| 2.2 Principle of Blow room.                          |                 |
| 2.3 Objectives of blow room.                         |                 |
| 2.4 Objectives of carding engine.                    |                 |
| 2.5 Objectives of Drawing frame.                     |                 |
| 2.6 Objectives of Lap former and Comber              |                 |
| 2.7 Objectives of Roving frame.                      |                 |
| 2.8 Objectives of Ring machine.                      |                 |
| 2.9 Objectives of Winding                            |                 |
| <b>3. YARN NUMBERING SYSTEM:</b>                     | <b>6 HOURS</b>  |
| 3.1 Yarn numbering.                                  |                 |
| 3.2 Direct and Indirect system of numbering the yarn |                 |
| <b>4. THE BASIC PRINCIPLES INVOLVED IN FABRIC:</b>   | <b>12 HOURS</b> |
| 4.1 Flow chart of weaving.                           |                 |
| 4.2 Study of weaving sections                        |                 |
| 4.3 Introduction of Knitting (Wales and courses).    |                 |
| <b>5. WEAVE DESIGN:</b>                              | <b>5 HOURS</b>  |
| 5.1 Definition of design.                            |                 |

5.2 Basic weaves. (Plain, Twill & Satin)

**6. INTRODUCTION OF PRE-TREATMENT OF FABRIC:**

**6 HOURS**

6.1 Flow chart of wet processing

6.2 Inspection of fabric

6.3 Shearing.

6.4 Singeing

6.5 De-sizing

6.6 Scouring

6.7 Bleaching

6.8 Mercerizing

**7. DYEING:**

**6 HOURS**

7.1 Introduction of dyeing.

7.2 Dyeing techniques, process and flow chart

**8. PRINTING:**

**6 HOURS**

8.1 Introduction of printing.

8.2 Printing techniques, process and flow chart

**9. TECHNICAL TEXTILE**

**3 HOURS**

9.1 Introduction of technical textile and its application

9.2 Introduction to Non-woven textiles and its application

9.3 Introduction to textile composites and its application

**10. INTRODUCTION OF GARMENTS TECHNOLOGY**

**6 HOURS**

10.1 Introduction of Garments Technology

10.2 Types of Stitching Machines.

10.3 Basic Parts of Garments

10.4 Sequence of Tasks in Garments Stitching.

**REFERENCE BOOKS:**

1. TEXTILES By Sara J. Kadolph
2. TEXTILES Fiber to fabric by Corbman
3. Hand book of technical textile Published by Textile Institute Manchester

## **TT-103 FUNDAMENTALS OF TEXTILE TECHNOLOGY**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. UNDERSTAND INTRODUCTION AND EVALUATION OF TEXTILE**

- 1.1 Learn Introduction of Textile
- 1.2 State Importance of Textile
- 1.3 Narrate major fields and application of textile

#### **2. UNDERSTAND THE BASIC PRINCIPLES INVOLVED IN YARN:**

- 2.1 Learn Flow chart of spinning
- 2.2 State Principle of Blow room.
- 2.3 State Objectives of blow room.
- 2.4 State Objectives of carding engine.
- 2.5 State Objectives of Drawing frame.
- 2.6 State Objectives of Lap former and Comber
- 2.7 State Objectives of Roving frame.
- 2.8 State Objectives of Ring machine.
- 2.9 State Objectives of Winding

#### **3. UNDERSTAND YARN NUMBERING SYSTEM:**

- 3.1 Narrate Yarn numbering.
- 3.2 Elaborate Direct and Indirect system of numbering the yarn

#### **4. UNDERSTAND THE BASIC PRINCIPLES INVOLVED IN FABRIC:**

- 4.1 State Flow chart of weaving.
- 4.2 Describe Study of weaving sections
- 4.3 Narrate Introduction of Knitting (Wales and courses).

#### **5. UNDERSTAND WEAVE DESIGN:**

- 5.1 State Definition of design.
- 5.2 State Basic weaves. (Plain, Twill & Satin)

#### **6. UNDERSTAND INTRODUCTION OF PRE-TREATMENT OF FABRIC:**

- 6.1 Exhibit flow chart of wet processing
- 6.2 State Inspection of fabric
- 6.3 State Shearing.

- 6.4 State Singeing
- 6.5 State De-sizing
- 6.6 State Scouring
- 6.7 State Bleaching
- 6.8 State Mercerizing

**7. UNDERSTAND DYEING:**

- 7.1 Narrate Introduction of dyeing.
- 7.2 Describe Dyeing techniques, process and flow chart

**8. UNDERSTAND PRINTING:**

- 8.1 State Introduction of printing.
- 8.2 Exhibit printing techniques, process and flow chart

**9. UNDERSTAND TECHNICAL TEXTILE**

- 9.1 State Introduction of technical textile and its application
- 9.2 Narrate Introduction to Non-woven textiles and its application
- 9.3 Describe Introduction to textile composites and its application

**10. UNDERSTAND INTRODUCTION OF GARMENTS TECHNOLOGY**

- 10.1 State Introduction of Garments Technology
- 10.2 Exhibit Types of Stitching Machines.
- 10.3 Narrate Basic Parts of Garments
- 10.4 Learn Sequence of Tasks in Garments Stitching.

## **TT-103 FUNDAMENTALS OF TEXTILE TECHNOLOGY**

**Contact Hours:      Practical : 96**

### **LIST OF PRACTICALS:**

1. Flow Chart of Spinning	3 HOURS
2. Familiarization of blow room with Diagram Study.	6 HOURS
3. Familiarization of Card Machine with Diagram Study.	6 HOURS
4. Familiarization of Drawing Frame with Diagram Study.	6 HOURS
5. Familiarization of Roving Frame with Diagram Study.	6 HOURS
6. Familiarization of Ring Frame with Diagram Study.	6 HOURS
7. Familiarization of Auto-Coner with Diagram Study.	6 HOURS
8. Flow Chart of Weaving Mill.	3 HOURS
9. Familiarization of Warping Machine with Diagram Study.	6 HOURS
10. Familiarization of Sizing with Diagram Study.	6 HOURS
11. Familiarization with loom operations.	6 HOURS
12. Flow Chart of Dyeing and Printing Mills	3 HOURS
13. Desizing (Enzyme) of dry woven fabric.	6 HOURS
14. Scouring and Bleaching of cotton fabric	6 HOURS
15. Dyeing of cotton fabric with reactive dyes.	6 HOURS
16. Pigment printing on cotton fabric.	6 HOURS
17. Demonstration on Garments Technology	6 HOURS
18. Demonstration on stitching machines.	6 HOURS

2nd Year

## اسلامیات / مطالعہ پاکستان

GEN 211

مضب (سلی روٹم)

نمبر کول اسلامیات

نمبر دور مطالعہ پاکستان

نن ننا نا

1 0 1

کل وقت: 20 گھنٹے

### موضوعات

1. سورة المؤمنین آیت تاویلہ آیات کا معنی قریم
2. اس خطبہ مخلص مع زیرہ و تفریح
3. خیار کم من تعسیم القرآن و علمہ
4. لا ایمان لمن لا ایمانہ له ولا دین لمن لا عہدہ له
5. وراکم و الغن لان الغن اکرب الحدیث
6. من احدث فی امرنا بدنا فلیس متہ فہو رد
7. من حمل علیہ السلاح فلیس منا
8. لاولی کافل البیتیم فی الجنۃ
9. لا ضرر ولا ضرار فی الاسلام
10. کلکم راع و کلکم راع و کلکم مسؤول عن رعیتہ
11. میرا طیبہ
12. کی زندگی والاہل بیتہ بحشتہ و جنتہ
13. علی زندگیا۔ مہافت۔ میثاق مدرسہ۔ (کد اسباب و نتائج)
14. حضور ﷺ بحیثیت
15. قطبہ جنتہ الاموال
16. معمر کل سرپرست خاندان
17. اسلامی معاشرہ
18. نظام تعلیم اور اس کے مقصد۔ عدس و انقلاب۔ امر بالمعروف۔ فی من افکر
19. جملہ۔ کسب حلال۔ سچہ (حیث و فضیلت)
20. اسلامی ریاست کی تعریف۔ اسلامی ریاست کی خصوصیات۔ اسلامی حکومت کے فرائض۔ اسلامی طرز حکومت

## اسلامیات

### تدریس مقاصد

عمومی مقاصد بطالعلم یہ جان سکے کہ آیات قرآنی کی روشنی میں مومن کے اوصاف کیا ہیں  
قرآن مجید  
فصلی مقاصد:

- ☆ قرآنی آیات کا ترجمہ بیان کر سکے
- ☆ قرآنی آیات کی تشریح کر سکے
- ☆ قرآنی آیات کی روشنی میں ایک مومن کے اوصاف بیان کر سکے
- ☆ قرآنی آیات میں بیان کردہ مومن کے اوصاف اپنے اندر پیدا کر سکے
- ☆ احادیث نبویہ
- ☆ عمومی مقصد احادیث کی روشنی میں اسلامی اخلاقی اقدار (انفرادی و اجتماعی) سے آگاہ ہو سکے
- ☆ فصلی مقاصد:
- ☆ احادیث کا ترجمہ بیان کر سکے
- ☆ احادیث کی تشریح کر سکے
- ☆ احادیث کی روشنی میں اسلام کی اخلاقی اقدار کی وضاحت کر سکے
- ☆ ان احادیث کی دی گئی تعلیمات کے مطابق اپنی زندگی گزار سکے
- ☆ سیرت طیبہ
- ☆ عمومی مقصد: حضور ﷺ کی سیرت طیبہ کے بارے میں جان سکے
- ☆ فصلی مقاصد:
- ☆ حضور ﷺ کی ابتدائی زندگی اختصار کے ساتھ بیان کر سکے
- ☆ حضور ﷺ کی ہجرت کا واقعہ بیان کر سکے
- ☆ حضور ﷺ کی مدنی زندگی اختصار سے بیان کر سکے
- ☆ حضور ﷺ کی بطور معلم خصوصیات بیان کر سکے



☆	حضور ﷺ کی بطور سربراہ خاتم ان بیان کر سکے
	اسلامی معاشرہ
	عمومی مقصد: اسلامی معاشرہ کی خصوصیات سے آگاہی حاصل کر سکے
	خصوصی مقاصد:
☆	اسلامی معاشرہ کا معنی و مفہوم بیان کر سکے
☆	اسلامی معاشرہ کی اقداری خصوصیات بیان کر سکے
☆	اسلامی معاشرہ میں عدل و احسان کی اہمیت بیان کر سکے
☆	تبلیغ کے لغوی معنی بیان کر سکے
☆	تبلیغ کی اہمیت و ضرورت بیان کر سکے
☆	جملہ کے لفظی و اصطلاحی معنی بیان کر سکے
☆	جملہ کی اہمیت بیان کر سکے
☆	جملہ اور قتل میں فرق بیان کر سکے
☆	جملہ کی مختلف اقسام بیان کر سکے
☆	انظ مسجد کی تعریف کر سکے
	مسجد کی سابقہ حیثیت کو بحال کرنے کے بارہ میں اقدامات کو بیان کر سکے
	<b>اسلامی ریاست</b>
	عمومی مقصد: اسلامی ریاست کی خصوصیات بیان کر سکے
	خصوصی مقاصد:
☆	ریاست کی تعریف بیان کر سکے
☆	اسلامی ریاست میں طرز حکومت سے آگاہی حاصل کر سکے
☆	اسلامی ریاست کی خصوصیات بیان کر سکے
☆	اسلامی ریاست کے اغراض و مقاصد بیان کر سکے
☆	اسلامی ریاست کے قیام کیلئے جدوجہد کر سکے

## نصاب مطالعہ پاکستان

نی لی ی  
۱ ۰ ۱  
کل وقت: ۱۷ گھنٹے

سہ ماہی  
حصہ دوم

### موضوعات

- ☆ ۱۰ قومی نظریہ
- ☆ ۱۱ تحریک پاکستان
- ☆ ۱۲ انجمن کانگریس
- ☆ ۱۳ مسلم لیگ
- ☆ ۱۴ تفسیر بنگلہ
- ☆ ۱۵ مینشن کمونو
- ☆ ۱۶ تحریک خلافت
- ☆ ۱۷ سندھ تحریک
- ☆ ۱۸ جیلویند راجی
- ☆ ۱۹ شوہر پورٹ
- ☆ ۲۰ قائد اعظم کے چودہ نکات
- ☆ ۲۱ خلیفہ آلہ آباد
- ☆ ۲۲ انکلیت ۱۹۳۸ اور اشتعل ہندو
- ☆ ۲۳ قرار دلو پاکستان

قصد دوم

سفاحہ پاکستان

**تقریریں مقاصد**

تحریک پاکستان

عمومی مقصد: قیام پاکستان کے سبب و محرکات کو بیان کر سکے

خصوصی مقاصد:

☆ قومیت کے مفہوم کو بیان کر سکے

☆ دو قومی نظریہ کی تعریف و توضیح کر سکے

☆ دو قومی نظریہ اہمیت بیان کر سکے

☆ ہندوستانی مسلمانوں کی عسروں کو بیان کر سکے

☆ قومی تشخص کو عمل رکھنے کے لئے مسلمان ہند کی مساعی بیان کر سکے

☆ آزادی ہند اور قیام پاکستان علامہ اقبال اور قائد اعظم کی مساعی بیان کر سکے

☆ قیام پاکستان سے مستقبل اسلامی مملکت کے قیام کے لئے مسلم عوام کی کوششوں کو بیان کر سکے

☆ مسلم لیگ کے قیام پاکستان کے لئے جدوجہد بیان کر سکے

## (غیر مسلم طلباء کے لئے)

نی ڈی اے  
J D A  
کل وقت: 20 منٹ

نصاب اختلاقیات  
سال دوم

### موضوعات

معاشرتی، قدر اور اخلاق پر مبنی۔ قوم۔ قوی سطح۔ شہری سطح۔ صنعتی اور لوہوں کی سطح۔ ضروریات۔ ورثہ

- ☆ حقوق و فرائض
- ☆ قوت پرست
- ☆ قوت ارادی
- ☆ نکلن و جذبہ
- ☆ وسیع انگیزی
- ☆ بے غرضی
- ☆ مسئلہ دوستی
- ☆ حفاظتی شعور
- ☆ پاس آزادی
- ☆ کامل اچھی
- ☆ تعمیرات کو قبول کرنا
- ☆ خود شناسی

نسب اخلاقیات

جلد دوم

### تدریس مقاصد

عمومی مقاصد :

طالب علم : اخلاقیات کی اہمیت اور ضرورت سے سمجھ ہو سکے اور بیان کر سکے

خصوصی مقاصد : طالب علم اس مسئلہ کو

موضوعات کا مطلب بیان کر سکے

عملی زندگی سے مثالوں کی نشاندہی کر سکے

اپنی شخصیت اور حاشیہ پر موضوعات کے متعلق مثبت اثرات پیدا کرنے کے طریقے بیان کر سکے

اعلیٰ اخلاقی قدروں سے

توبہ برداشت۔ قوت ارادی۔ نکتہ جذبہ۔ وسیع انگری۔ بے غرض۔ انسانی دوستی خالص۔ شعور۔ پس آزادی۔

کمال اعلیٰ اور خواہش کی اہمیت بیان کر سکے

اخلاقیات سے متعلق ہر قسم کی خدمت بہتر طور پر انجام دے سکے

## MATH-223 APPLIED MATHEMATICS -II

### TOTAL CONTACT HOURS:

Theory 96

T	P	C
3	0	3

**Pre-Requisite:** Must have completed Mathematics-I.

**AIMS:** The students will be able to:

1. Solve problems of Calculus and Analytic Geometry.
2. Develop mathematical skill, attitudes and logical perception in the use of mathematical instruments.
3. Apply principles of differential calculus to work out rate measures, velocity, acceleration, maxima and minima values.
4. Use principles of Integral Calculus to compute areas and volumes.
5. Acquire proficiency in solving technological problems with mathematical clarity and insight.

### COURSE CONTENTS

#### 1. FUNCTIONS AND LIMITS 6 HOURS

- 1.1 Constant and variable quantities.
- 1.2 Functions and their classification.
- 1.3 The concept of limit.
- 1.4 Limit of a function.
- 1.5 Fundamental theorems on limit.
- 1.6 Some important limits.
- 1.7 Problems.

#### 2. DIFFERENTIATION 6 HOURS

- 2.1 Increments.
- 2.2 differential coefficient or derivative.
- 2.3 Differentiation ab-initio or by first principle.
- 2.4 Geometrical interpretation of differential coefficient.
- 2.5 Differential coefficient of  $X^n$ ,  $(ax+b)^n$ .
- 2.6 Three important rules.
- 2.7 Problems.

#### 3. DIFFERENTIATION OF ALGEBRAIC FUNCTIONS 9 HOURS

- 3.1 Explicit functions.
- 3.2 Implicit functions.
- 3.3 Parametric forms.
- 3.4 Problems.

#### 4. DIFFERENTIATION OF TRIGONOMETRIC FUNCTIONS 6 HOURS

- 4.1 Differential coefficient of  $\sin x$ ,  $\cos x$ ,  $\tan x$  from first principle.
- 4.2 Differential coefficient of  $\operatorname{cosec} x$ ,  $\sec x$ ,  $\cot x$ .
- 4.3 Differentiation of inverse Trigonometric functions.

4.4	Problems.	
<b>5.</b>	<b>DIFFERENTIATIONS OF LOGARITHMIC AND EXPONENTIAL FUNCTIONS</b>	<b>6 HOURS</b>
5.1	Differentiation of $\ln x$ .	
5.2	Differentiation of $\log a^x$ .	
5.3	Differentiation $a^x$ .	
5.4	Differentiation $e^x$ .	
5.5	Problems.	
<b>6.</b>	<b>RATE OF CHANGE OF VARIABLES</b>	<b>6 HOURS</b>
6.1	Increasing and decreasing functions.	
6.2	Maxima and Minima values.	
6.3	Criteria for maximum and minimum values.	
6.4	Methods of finding maxima and minima.	
6.5	Problems.	
<b>7.</b>	<b>INTEGRATION</b>	<b>9 HOURS</b>
7.1	Concept.	
7.2	Fundamental formulas.	
7.3	Important rules.	
7.4	Problems.	
<b>8.</b>	<b>METHODS OF INTEGRATION</b>	<b>9 HOURS</b>
8.1	Integration by substitution.	
8.2	Integration by parts.	
8.3	Problems.	
<b>9.</b>	<b>DEFINITE INTEGRALS</b>	<b>6 HOURS</b>
9.1	Properties.	
9.2	Application to area.	
9.3	Problems.	
<b>10.</b>	<b>DIFFERENTIAL EQUATIONS</b>	<b>6 HOURS</b>
10.1	Introduction.	
10.2	Degree and Order.	
10.3	First order differential equation.	
10.4	Solution.	
10.5	Problems.	
<b>11.</b>	<b>PLANE ANALYTIC GEOMETRY AND STRAIGHT LINE</b>	<b>6 HOURS</b>
11.1	Coordinate system.	
11.2	Distance formula.	
11.3	The ratio formula.	
11.4	Inclination and slope of a line.	
11.5	The slope formula.	
11.6	Problems.	
<b>12.</b>	<b>EQUATIONS OF STRAIGHT LINE</b>	<b>6 HOURS</b>

- 12.1 Some important forms.
- 12.2 General form.
- 12.3 Angle formula.
- 12.4 Parallelism and perpendicularity.
- 12.5 Problems.

**13. EQUATIONS OF CIRCLE**

**6 HOURS**

- 13.1 Standard form of equation.
- 13.2 Central form of equation.
- 13.3 General form of equation.
- 13.4 Radius and coordinates of the centre.
- 13.5 Problems.

**14. STATISTICS**

**9 HOURS**

- 14.1 Concept of mean, median and mode.
- 14.2 Standard deviation.
- 14.3 Laws of probability.
- 14.4 Problems.

**Books Recommended:**

1. Text Book of Math-223, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)



**MATH-223 APPLIED MATHEMATICS -II**  
**INSTRUCTIONAL OBJECTIVES**

**1. USE THE CONCEPT OF FUNCTIONS AND THEIR LIMITS IN SOLVING SIMPLE PROBLEMS**

- 1.1 Define a function.
- 1.2 List all type of functions.
- 1.3 Explain the concept of limit and limit of a function.
- 1.4 Explain fundamental theorems on limits.
- 1.5 Derive some important limits.
- 1.6 Solve problems on limits.

**2. UNDERSTAND THE CONCEPT OF DIFFERENTIAL COEFFICIENT**

- 2.1 Derive mathematical expression for a differential coefficient.
- 2.2 Explain geometrical interpretation of differential coefficient.
- 2.3 Differentiate a constant, a constant associated with a variable and the sum of finite number of functions.
- 2.4 Solve related problems.

**3. USE RULES OF DIFFERENTIATION TO SOLVE PROBLEMS OF ALGEBRAIC FUNCTIONS**

- 3.1 Differentiate ab-initio  $x^n$  and  $(ax+b)^n$ .
- 3.2 Derive product quotient and chain rules.
- 3.3 Find derivatives of implicit functions and explicit functions.
- 3.4 Differentiate parametric forms, functions w.r.t. another function and by rationalization.
- 3.5 Solve problems using these formulas.

**4. USE RULES OF DIFFERENTIATION TO SOLVE PROBLEMS INVOLVING TRIGONOMETRIC FUNCTIONS.**

- 4.1 Differentiate from first principle  $\sin x$ ,  $\cos x$ ,  $\tan x$ .
- 4.2 Derive formula derivatives of  $\sec x$ ,  $\operatorname{cosec} x$ ,  $\cot x$ .
- 4.3 Find differential coefficients of inverse trigonometric functions.
- 4.4 Solve problems based on these formulas.

**5. USE RULES OF DIFFERENTIATION TO LOGARITHMIC AND EXPONENTIAL FUNCTIONS.**

- 5.1 Derive formulas for differential coefficient of logarithmic and exponential functions.
- 5.2 Solve problems using these formulas.

**6. UNDERSTAND RATE OF CHANGE OF VARIABLE WITH RESPECT TO ANOTHER**

- 6.1 Derive formula for velocity, acceleration and slope of a line.
- 6.2 Define an increasing and a decreasing function, maxima and minima values, point

- of inflexion.
- 6.3 Explain criteria for maxima and minima values of a function.
- 6.4 Solve problems involving rate of change of variables.
- 6.5 Solve problems using these formulas.
- 7. USE RULES OF INTEGRATION IN SOLVING RELEVANT PROBLEMS.**
  - 7.1 Explain the concept of integration.
  - 7.2 State basic theorems of integration.
  - 7.3 List some important rules of integration.
  - 7.4 Derive fundamental formulas of integration.
  - 7.5 Solve problems of integration based on these rules/formulas.
- 8. UNDERSTAND DIFFERENT METHODS OF INTEGRATION**
  - 8.1 List standard formulas of integration.
  - 8.2 Integrate a function by substitution method.
  - 8.3 Find integrals by the method of integration by parts.
  - 8.4 Solve problems using these methods.
- 9. UNDERSTAND METHODS OF SOLVING DEFINITE INTEGRALS**
  - 9.1 Define definite integral.
  - 9.2 List properties of definite integrals.
  - 9.3 Find areas under the curve using definite integrals.
  - 9.4 Solve problems of definite integrals.
- 10. USE DIFFERENT METHODS OF INTEGRATION TO SOLVE DIFFERENTIAL EQUATIONS**
  - 10.1 Define a differential equation, its degree and order.
  - 10.2 Explain method of separation of variables to solve differential equation of first order and first degree.
  - 10.3 Solve differential equations of first order and first degree.
- 11. UNDERSTAND THE CONCEPT OF PLANE ANALYTIC GEOMETRY**
  - 11.1 Explain the rectangular coordinate system.
  - 11.2 Locate points in different quadrants.
  - 11.3 Derive distance formula.
  - 11.4 Prove section formula.
  - 11.5 Derive slope formula.
  - 11.6 Solve problem using these formulas.
- 12. USE EQUATIONS OF STRAIGHT LINE IN SOLVING PROBLEMS**
  - 12.1 Define a straight line.
  - 12.2 Write general form of equation of a straight line.
  - 12.3 Derive slope intercept and intercept forms of equations of a straight line.
  - 12.4 Derive expression for angle between two straight lines.
  - 12.5 Derive conditions of perpendicularity and parallelism of two straight lines.
  - 12.6 Solve problems involving these equations/formulas.

- 13. SOLVE TECHNOLOGICAL PROBLEMS USING EQUATIONS OF CIRCLE**
- 13.1 Define a circle.
  - 13.2 Describe standard, central and general forms of the equation of a circle.
  - 13.3 Convert general form to the central form of equation of a circle.
  - 13.4 Derive formula for the radius and the coordinates of the centre of a circle from the general form.
  - 13.5 Derive equation of the circle passing through three given points.
  - 13.6 Solve problems involving these equations.
- 14. UNDERSTAND THE BASIC CONCEPT OF STATISTICS**
- 14.1 Define mean, median and mode.
  - 14.2 Explain standard deviation.
  - 14.3 State laws of probability.
  - 14.4 Calculate the above-mentioned quantities using the proper formula.

## **Mgm-211 BUSINESS COMMUNICATION**

	<b>T</b>	<b>P</b>	<b>C</b>
<b>Total CONTACT Hours</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Theory 32 Hrs.</b>			

**PRE-REQUISITE:** The students shall already be familiar with the language concerned.

**AIMS:** The course has been designed to enable the students to.

1. Develop communication skills.
2. Understand basic principles of good and effective business writing in commercial and industrial fields.
3. Develop knowledge and skill to write technical report with confidence and accuracy.

### **COURSE CONTENTS**

- |   |                |
|---|----------------|
| <b>1. COMMUNICATION PROCESS</b>                 | <b>6 HOURS</b> |
| 1.1 Purposes of communication.                  |                |
| 1.2 Communication process.                      |                |
| 1.3 Distortions in communication.               |                |
| 1.4 Consolidation of communiqué.                |                |
| 1.5 Communication flow.                         |                |
| 1.6 Communication of self-development.          |                |
| <b>2. COMMUNICATION SKILLS</b>                  | <b>6 HOURS</b> |
| 2.1 Significance of speaking.                   |                |
| 2.2 Verbal and non-verbal messages.             |                |
| 2.3 Strategic steps of speaking.                |                |
| 2.4 Characteristics of effective oral messages. |                |
| 2.5 Communication trafficking.                  |                |
| 2.6 Oral presentation.                          |                |
| <b>3. QUESTIONING SKILLS</b>                    | <b>3 HOURS</b> |
| 3.1 Nature of question.                         |                |
| 3.2 Types of questions.                         |                |
| 3.3 Characteristics of a good question.         |                |
| 3.4 Questioning strategy.                       |                |
| <b>4. LISTENING SKILLS</b>                      | <b>5 HOURS</b> |
| 4.1 Principles of active listening.             |                |
| 4.2 Skills of active listening.                 |                |
| 4.3 Barriers to listening.                      |                |
| 4.4 Reasons of poor listening.                  |                |
| 4.5 Giving feedback.                            |                |
| <b>5. INTERVIEWING SKILLS</b>                   | <b>3 HOURS</b> |

- 5.1 Significance of interviews.
- 5.2 Characteristics of interviews.
- 5.3 Activities in an interviewing situation.
- 5.4 Types of interviews.
- 5.5 Interviewing strategy.
  
- 6. REPORT WRITING 3 HOURS**
  - 6.1 Goals of report writing.
  - 6.2 Report format.
  - 6.3 Types of reports.
  - 6.4 Report writing strategy.
  
- 7. READING COMPREHENSION 2 HOURS**
  - 7.1 Reading problems.
  - 7.2 Four reading skills.
  
- 8. GROUP COMMUNICATION 4 HOURS**
  - 8.1 Purposes of conducting meetings.
  - 8.2 Planning a meeting.
  - 8.3 Types of meetings.
  - 8.4 Selection of a group for meeting.
  - 8.5 Group leadership skills.
  - 8.6 Running a successful meeting.
  - 8.7 Active participation techniques.

**Books Recommended:**

- 1. Sh. Ata-ur-Rehman, Effective Business Communication and Report Writing.
- 2. Ulman J. N. Cloud JR. Technical Reporting.

**INSTRUCTIONAL OBJECTIVES**

**1. UNDERSTAND THE COMMUNICATION PROCESS**

- 1.1 State the benefits of two way of communication.
- 1.2 Describe a model of communication process.
- 1.3 Explain the major communication methods used in organizations.
- 1.4 Identify the barriers to communication and methods to overcoming these barriers.
- 1.5 Identify misconceptions about communication.

**2. UNDERSTAND THE PROCESS OF ORAL**

- 2.1 Identify speaking situations with other people.
- 2.2 Identify the strategic steps of speaking.
- 2.3 Identify the characteristics of effective oral messages.
- 2.4 State the principles of one-way communication.
- 2.5 State the principles of two-way communication.
- 2.6 Identify the elements of oral presentation skills.
- 2.7 Determine the impact of non-verbal communication on oral communication.

**3. DETERMINE THE USES OF QUESTIONING SKILLS TO GATHER AND CLARIFY INFORMATION IN THE ORAL COMMUNICATION PROCESS**

- 3.1 Identify different types of questions.
- 3.2 Determine the purpose of each type of question and its application.
- 3.3 Identify the hazards to be avoided when asking questions.
- 3.4 Demonstrate questioning skills.

**4. DEMONSTRATE THE USE OF ACTIVE LISTENING SKILLS IN THE ORAL COMMUNICATION PROCESS**

- 4.1 State the principles of active listening.
- 4.2 Identify skills of active listening.
- 4.3 Identify barriers to active listening.
- 4.4 State the benefits of active listening.
- 4.5 Demonstrate listening skills.
- 4.6 Explain the importance of giving and receiving feedback.

**5. DETERMINE THE APPROPRIATE INTERVIEW TYPE FOR THE SPECIFIC WORK-RELATED SITUATION AND CONDUCT A WORK-RELATED INTERVIEW**

- 5.1 State the significance of interviews.
- 5.2 State the characteristics of interviews.
- 5.3 Explain the activities in an interviewing situation.
- 5.4 Describe the types of interviews.
- 5.5 Explain the interviewing strategy.
- 5.6 Prepare instrument for a structured interview.

- 6. PREPARE A REPORT OUTLINE BASED ON SUBJECT MATTER AND AUDIENCE**
  - 6.1 Identify the different types of reports.
  - 6.2 Determine when to use an informal or formal report presentation.
  - 6.3 Identify the stages of planning a report.
  - 6.4 Identify the parts of a report and choose the parts appropriate for each type of report.
  - 6.5 Draft a report outline.
  
- 7. DEMONSTRATE READING COMPREHENSION**
  - 7.1 Identify major reading problems.
  - 7.2 Identify basic reading skills.
  - 7.3 State methods of previewing written material.
  - 7.4 Identify methods of concentration when reading.
  - 7.5 Demonstrate reading comprehension.
  
- 8. UNDERSTAND THE PRINCIPLES OF GROUP COMMUNICATION**
  - 8.1 State the purposes and characteristics of major types of meetings.
  - 8.2 Explain responsibilities of a meeting/committee.
  - 8.3 Identify problems likely to be faced at meeting and means to overcome these problems.
  - 8.4 Distinguish between content and process at meetings.
  - 8.5 Explain the key characteristics of a good group facilitator.

## **Mgm- 221 BUSINESS MANAGEMENT AND INDUSTRIAL ECONOMICS**

### **Total Contact Hours**

<b>Theory</b>	<b>32</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Practical</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>

**AIMS** The students will be able to develop management skills, get acquainted the learner with the principles of management and economic relations and develop commercial/economic approach to solve the problems in the industrial set-up.

### **COURSE CONTENTS**

- 1. ECONOMICS** **2 Hours**
  - 1.1 Definition: Adam Smith, Alfred Marshall, Prof. Robins.
  - 1.2 Nature and scope
  - 1.3 Importance for technicians.
- 2. BASIC CONCEPTS OF ECONOMICS** **1 Hour**
  - 2.1 Utility
  - 2.2 Income
  - 2.3 Wealth
  - 2.4 Saving
  - 2.5 Investment
  - 2.6 Value.
- 3. DEMAND AND SUPPLY.** **2 Hours**
  - 3.1 Definition of demand.
  - 3.2 Law of demand.
  - 3.3 Definition of supply.
  - 3.4 Law of supply.
- 4. FACTORS OF PRODUCTION.** **2 Hours**
  - 4.1 Land
  - 4.2 Labour
  - 4.3 Capital
  - 4.4 Organization.
- 5. BUSINESS ORGANIZATION.** **3 Hours**
  - 5.1 Sole proprietorship.
  - 5.2 Partnership
  - 5.3 Joint stock company.
- 6. ENTREPRENEURIAL SKILLS** **4 Hours**
  - 6.1 Preparing, planning, establishing, managing, operating and evaluating relevant resources in small business.
  - 6.2 Business opportunities, goal setting.
  - 6.3 Organizing, evaluating and analyzing opportunity and risk tasks.



<b>7.</b>	<b>SCALE OF PRODUCTION.</b>	<b>2 Hours</b>
7.1	Meaning and its determination.	
7.2	Large scale production.	
7.3	Small scale production.	
<b>8.</b>	<b>ECONOMIC SYSTEM</b>	<b>3 Hours</b>
8.1	Free economic system.	
8.2	Centrally planned economy.	
8.3	Mixed economic system.	
<b>9.</b>	<b>MONEY.</b>	<b>1 Hour</b>
9.1	Barter system and its inconveniences.	
9.2	Definition of money and its functions.	
<b>10.</b>	<b>BANK.</b>	<b>1 Hour</b>
10.1	Definition	
10.2	Functions of a commercial bank.	
10.3	Central bank and its functions.	
<b>11.</b>	<b>CHEQUE</b>	<b>1 Hour</b>
11.1	Definition	
11.2	Characteristics and kinds of cheque.	
11.3	Dishonour of cheque.	
<b>12.</b>	<b>FINANCIAL INSTITUTIONS</b>	<b>2 Hours</b>
12.1	IMF	
12.2	IDBP	
12.3	PIDC	
<b>13.</b>	<b>TRADE UNION</b>	<b>2 Hours</b>
13.1	Introduction and brief history.	
13.2	Objectives, merits and demerits.	
13.3	Problems of industrial labour.	
<b>14.</b>	<b>INTERNATIONAL TRADE.</b>	<b>2 Hours</b>
14.1	Introduction	
14.2	Advantages and disadvantages.	
<b>15.</b>	<b>MANAGEMENT</b>	<b>1 Hour</b>
15.1	Meaning	
15.2	Functions	
<b>16.</b>	<b>ADVERTISEMENT</b>	<b>2 Hours</b>
16.1	The concept, benefits and draw-backs.	
16.2	Principal media used in business world.	

**17. ECONOMY OF PAKISTAN**

**1 Hour**

17.1 Introduction

17.2 Economic problems and remedies.

**BOOKS RECOMMENDED**

1. Nisar-ud-Din, Business Organization, Aziz Publisher, Lahore
2. M. Saeed Nasir, Introduction to Business, Ilmi Kitab Khana, Lahore.
3. S.M. Akhtar, An Introduction to Modern Economics, United Limited, Lahore.

**INSTRUCTIONAL OBJECTIVES**

- 1. UNDERSTAND THE IMPORTANCE OF ECONOMICS.**
  - 1.1 State definition of economics given by Adam Smith, Alfred Marshall and Professor Robins.
  - 1.2 Explain nature and scope of economics.
  - 1.3 Describe importance of study of economics for technicians.
- 2. UNDERSTAND BASIC TERMS USED IN ECONOMICS.**
  - 2.1 Define basic terms, utility, income, wealth, saving, investment and value.
  - 2.2 Explain the basic terms with examples
- 3. UNDERSTAND LAW OF DEMAND AND LAW OF SUPPLY.**
  - 3.1 Define Demand.
  - 3.2 Explain law of demand with the help of schedule and diagram.
  - 3.3 State assumptions and limitation of law of demand.
  - 3.4 Define Supply.
  - 3.5 Explain law of Supply with the help of schedule and diagram.
  - 3.6 State assumptions and limitation of law of supply.
- 4. UNDERSTAND THE FACTORS OF PRODUCTION**
  - 4.1 Define the four factors of production.
  - 4.2 Explain labour and its features.
  - 4.3 Describe capital and its peculiarities.
- 5. UNDERSTAND FORMS OF BUSINESS ORGANIZATION.**
  - 5.1 Describe sole proprietorship, its merits and demerits.
  - 5.2 Explain partnership, its advantages and disadvantages.
  - 5.3 Describe joint stock company, its merits and demerits.
  - 5.4 Distinguish public limited company and private limited company.
- 6. UNDERSTAND ENTREPRENEURIAL SKILLS**
  - 6.1 Explain preparing, planning, establishing and managing small business set up
  - 6.2 Explain evaluating all relevant resources
  - 6.3 Describe organizing analyzing and innovation of risk of task
- 7. UNDERSTAND SCALE OF PRODUCTION.**
  - 7.1 Explain scale of production and its determination.
  - 7.2 Describe large scale production and its merits.
  - 7.3 Explain small scale of production and its advantages and disadvantages.
- 8. UNDERSTAND DIFFERENT ECONOMIC SYSTEMS.**
  - 8.1 Describe free economic system and its characteristics.
  - 8.2 Explain centrally planned economic system, its merits and demerits.
  - 8.3 State mixed economic system and its features.

- 9. UNDERSTAND WHAT IS MONEY**
  - 9.1 Define money
  - 9.2 Explain barter system and its inconveniences.
  - 9.3 Explain functions of money.
- 10. UNDERSTAND BANK AND ITS FUNCTIONS.**
  - 10.1 Define bank.
  - 10.2 Describe commercial bank and its functions.
  - 10.3 State central bank and its functions.
- 11. UNDERSTAND CHEQUE AND DISHONOR OF CHEQUE.**
  - 11.1 Define cheque.
  - 11.2 Enlist the characteristics of cheque.
  - 11.3 Identify the kinds of cheque.
  - 11.4 Describe the causes of dishonor of a cheque.
- 12. UNDERSTAND FINANCIAL INSTITUTIONS.**
  - 12.1 Explain IMF and its objectives.
  - 12.2 Explain organizational set up and objectives of IDBP.
  - 12.3 Explain organizational set up and objectives of PIDC.
- 13. UNDERSTAND TRADE UNION, ITS BACKGROUND AND FUNCTIONS.**
  - 13.1 Describe brief history of trade union.
  - 13.2 State functions of trade union.
  - 13.3 Explain objectives, merits and demerits of trade unions.
  - 13.4 Enlist problems of industrial labour.
- 14. UNDERSTAND INTERNATIONAL TRADE.**
  - 14.1 Explain international trade.
  - 14.2 Enlist its merits and demerits.
- 15. UNDERSTAND MANAGEMENT**
  - 15.1 Explain meaning of management.
  - 15.2 Describe functions of management.
  - 15.3 Identify the problems of business management.
- 16. UNDERSTAND ADVERTISEMENT.**
  - 16.1 Explain the concept of advertisement.
  - 16.2 Enlist benefits and drawbacks of advertisement.
  - 16.3 Describe principal media of advertisement used in business world.
- 17. UNDERSTAND THE ECONOMIC PROBLEMS OF PAKISTAN.**
  - 17.1 Describe economy of Pakistan.
  - 17.2 Explain economic problems of Pakistan
  - 17.3 Explain remedial measures for economic problems of Pakistan.  
measure.

**PHY-242      APPLIED MECHANICS**

<b>Total Contact Hours</b>		<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory:</b>	<b>32 Hours</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Practical:</b>	<b>96 Hours</b>			

- AIMS**
1. Apply the concepts of Applied Physics to understand Mechanics
  2. Apply laws and principles of Mechanics in solving technological problems
  3. Use the knowledge of App. Mechanics in learning advance technical courses.
  4. Demonstrate efficient skill of practical work in Mechanics Lab.

**COURSE CONTENTS**

- 1. MEASUREMENTS** **2 Hrs**
  - 1.1 Review: Dimensional formula of Equations of Motion
  - 1.2 Review: Systems of measurement, S.I. Units, conversion
  - 1.3 Significant Figures
  - 1.4 Degree of accuracy
- 2. EQUILIBRIUM OF CONCURRENT FORCES** **3 Hrs**
  - 2.1 Concurrent forces
  - 2.2 Addition and Resolution of Vectors
  - 2.3 Toggle Joint, Hanging Chains
  - 2.4 Roof Trusses, Cranes.
  - 2.5 Framed structures
- 3. MOMENTS AND COUPLES:** **2 Hrs**
  - 3.1 Principle of Moments - Review
  - 3.2 Levers
  - 3.3 Safety valve
  - 3.4 Steel yard
  - 3.5 Parallel forces, couple
  - 3.6 Torque
- 4. EQUILIBRIUM OF NON-CONCURRENT FORCES:** **3 Hrs**
  - 4.1 Non-concurrent forces
  - 4.2 Free body diagram
  - 4.3 Varignon's theorem
  - 4.4 Conditions of total Equilibrium.
  - 4.5 Ladders
- 5. MOMENT OF INERTIA:** **3 Hrs**
  - 5.1 Review: Rotational Inertia
  - 5.2 Moment of Inertia, Theorems
  - 5.3 Moment of Inertia of symmetrical bodies
  - 5.4 M.I. of Fly wheel with applications
  - 5.5 Energy stored by Fly wheel
- 6. FRICTION:** **2 Hrs**
  - 6.1 Review: Laws of friction
  - 6.2 Motion of body along an inclined plane (up & down)

6.3	Rolling friction & Ball Bearings	
6.4	Fluid Friction, Stokes' Law	
<b>7.</b>	<b>WORK, ENERGY AND POWER</b>	<b>3 Hrs</b>
7.1	Work-Energy relationship	
7.2	Work done by variable force.	
7.3	Power	
7.4	I.H.P, B.H.P and Efficiency	
7.5	Dynamometer.	
<b>8.</b>	<b>TRANSMISSION OF POWER:</b>	<b>3 Hrs</b>
8.1	Belts, Ropes.	
8.2	Chains.	
8.3	Gears.	
8.4	Clutches, functions and types with application	
<b>9.</b>	<b>MACHINES:</b>	<b>3 Hrs</b>
9.1	Efficiency of machines	
9.2	Inclined plane - Review	
9.3	Reversibility of machines	
9.4	Single purchase crab	
9.5	Double purchase crab.	
9.6	Worm and worm wheel.	
9.7	Differential Screw Jack.	
9.8	Differential Pulley, Wheel and Axle	
<b>10.</b>	<b>VIBRATORY MOTION:</b>	<b>2 Hrs</b>
10.1	S.H.M. - Review	
10.2	Pendulums	
10.3	Speed Governors.	
10.4	Helical spring.	
10.5	Cams	
10.6	Quick return motion	
<b>11.</b>	<b>ELASTICITY:</b>	<b>3 Hrs</b>
11.1	Three Moduli of Elasticity	
11.2	Loaded Beams, Types of Beam & Loads	
11.3	Bending Stress	
11.4	S.F & B.M diagram	
11.5	Torsion and Torsional Stresses	
<b>12.</b>	<b>SIMPLE MECHANISM:</b>	<b>1 Hr</b>
12.1	Introduction	
12.2	Kinematic link or Element	
12.3	Kinematic pair and types.	
12.4	Kinematic chains and types.	

**13. VELOCITY IN MECHANISM:**

**2 Hrs**

- 13.1 Introduction.
- 13.2 Instantaneous centre.
- 13.3 Instantaneous velocity.
- 13.4 Velocity of a link by instantaneous centre method.
- 13.5 Relative velocity of two bodies in the straight line
- 13.6 Velocity of a link by relative velocity method.

**BOOKS RECOMMENDED:**

1. Text Book of Phy-242, Vol-I, developed by Curriculum Section, Academics wing TEVTA and published by National Book Foundation (NBF)

**INSTRUCTIONAL OBJECTIVES**

- 1.      USE THE CONCEPTS OF MEASUREMENT IN PRACTICAL SITUATIONS/PROBLEMS**
  - 1.1      Explain Dimensional formula
  - 1.2      Explain systems of measurement
  - 1.3      Use concept of significant figures and degree of accuracy to solve problems
  
- 2.      USE THE CONCEPT OF ADDITION AND RESOLUTION OF VECTORS TO PROBLEMS ON EQUILIBRIUM INVOLVING CONCURRENT FORCES**
  - 2.1      Describe concurrent forces
  - 2.2      Explain resolution of vectors
  - 2.3      Use the analytical method of addition of vectors for solving problems.
  - 2.4      Use the graphical method of addition of vectors for solving problems.
  - 2.5      Solve problems on forces with emphasis on roof trusses, cranes simple frames and framed structures.
  
- 3.      USE THE PRINCIPLE OF MOMENTS AND CONCEPT OF COUPLE TO SOLVE PROBLEMS.**
  - 3.1      Describe the principle of moments.
  - 3.2      Use the principle of moments to solve problems on compound levers, safety valve, steel-yard.
  - 3.3      Describe couple and torque.
  - 3.4      Use the concept to solve problems on torque.
  
- 4.      USE THE LAWS OF TOTAL EQUILIBRIUM OF FORCES TO SOLVE PROBLEMS INVOLVING FORCES IN EQUILIBRIUM.**
  - 4.1      Distinguish between concurrent and non-concurrent forces.
  - 4.2      Prepare a free body diagram of an object or a      structure.
  - 4.3      Explain Varignon's theorem.
  - 4.4      Explain the second condition of equilibrium.
  - 4.5      Use laws of total equilibrium to solve problems on forces involving framed structure and ladders.
  
- 5.      USE CONCEPTS OF MOMENT OF INERTIA TO PRACTICAL SITUATIONS AND PROBLEMS.**
  - 5.1      Explain moment of inertia.
  - 5.2      Explain the theorems of Parallel and perpendicular Axis.
  - 5.3      Describe the M.I. of regular bodies
  - 5.4      Explain M.I. of Fly wheel
  - 5.5      Explain Energy stored by Fly Wheel
  - 5.6      Use these concepts to solve simple problems.
  
- 6.      UNDERSTAND THE CONCEPTS AND LAWS OF SOLID AND FLUID FRICTION.**
  - 6.1      Define Coefficient of friction between a body placed on an inclined plane and the surface.
  - 6.2      Explain motion of a body placed on an inclined plane
  - 6.3      Calculate the force needed to move a body up and down an inclined plane.
  - 6.4      Explain rolling friction and use of ball bearings.



6.5 Describe fluid friction and Stoke's law.

**7. UNDERSTAND WORK, ENERGY AND POWER.**

- 7.1 Derive work-energy relationship
- 7.2 Use formulae for work done by a variable force to solve problems.
- 7.3 Explain Power, I.H.P, B.H.P and efficiency.
- 7.4 Describe dynamometers.
- 7.5 Use the concepts to solve problems on power and work-energy

**8. UNDERSTAND TRANSMISSION OF POWER THROUGH ROPES AND BELTS.**

- 8.1 Describe the need for transmission of power.
- 8.2 Describe methods of transmission of power.
- 8.3 Describe transmission of power through ropes and belts.
- 8.4 Write formula for power transmitted through ropes and belts.
- 8.5 Describe transmission of power through friction gears and write formula.
- 8.6 Describe transmission of power through chains and toothed wheels/gears.
- 8.7 Use the formulae to solve/problems on transmission of power.
- 8.8 Describe types and function of clutches with applications

**9. USE THE CONCEPTS OF MACHINES TO PRACTICAL SITUATIONS.**

- 9.1 Explain theoretical, actual mechanical advantage and efficiency of simple machines.
- 9.2 Use the concept to calculate efficiency of an inclined plane.
- 9.3 Describe reversibility of machines.
- 9.4 Calculate the efficiency of:
  - i. Single purchase crab.
  - ii. Double purchase crab.
  - iii. Worm and worm wheel.
  - iv. Differential screw jack, Diff. Pulley, Wheel and Axle.
- 9.5 Use the formulae to solve the problems involving efficiency, M.A of the above machines.

**10. USE THE CONCEPTS OF VIBRATORY MOTION TO PRACTICAL SITUATIONS.**

- 10.1 Define vibratory motion giving examples.
- 10.2 Describe circular motion and its projection on diameter of the circular path.
- 10.3 Relate rotatory motion to simple vibratory motion.
- 10.4 State examples of conversion of rotatory motion to vibratory motion and vice versa.
- 10.5 Describe speed governors, cams quick return motion.
- 10.6 Derive formulae for position, velocity and acceleration of a body executing S.H.M.
- 10.7 Use the concept of S.H.M to helical springs.
- 10.8 Use the concept S.H.M to solve problems on pendulum.

**11. UNDERSTAND BENDING MOMENTS AND SHEARING FORCES.**

- 11.1 Define three types of stresses and moduli of elasticity.
- 11.2 Describe types of beams and loads.
- 11.3 Explain shearing force and bending moment.
- 11.4 Use these concepts to calculate S.F and B.M in a given practical situation for point loads, uniformly distributed loads.
- 11.5 Prepare S.F and B.M diagram for loaded cantilever and simply supported beams.

11.6 Describe torsion and torsional stresses giving formula

**12. UNDERSTAND SIMPLE MECHANISMS.**

- 12.1 Define simple mechanisms.
- 12.2 Define kinematics.
- 12.3 Explain kinematic link or element.
- 12.4 Explain kinematic chains.
- 12.5 Distinguish between types of kinematic chains.

**13. UNDERSTAND THE METHOD OF FINDING VELOCITY IN MECHANISMS.**

- 13.1 Explains relative velocity.
- 13.2 Explain instantaneous center.
- 13.3 Explain instantaneous velocity.
- 13.4 Explain the method of finding velocity of a link by:
  - i. Relative velocity method.
  - ii. Instantaneous center method.

**LIST OF EXPERIMENTS**

1. Find the weight of the given body using Law of Polygon of forces.
2. Find unknown forces in a given set of concurrent forces in equilibrium using Grave-sands apparatus
3. Set a jib crane and analyse forces in its members
4. Set a Derrick Crane and analyse forces in its members
5. Study forces shared by each member of a Toggle Joint
6. Set a Roof Truss and find forces in its members
7. Verify Principle of Moments in a compound lever
8. Calibrate a steelyard
9. Find the Reactions at the ends of a loaded beam
10. Use Reaction of Beams apparatus to study resultant of Parallel forces
11. Find the Moment of Inertia of a Flywheel
12. Find the angle of reaction for a wooden block placed on an inclined plane
13. Find the B.H.P. of a motor
14. Study the transmission of Power through friction gears
15. Study the transmission of power through belts
16. Study the transmission of Power through toothed wheels
17. Study the function of clutches
18. Find M.A. and efficiency of worm and worm wheel
19. Find M.A. and efficiency of differential wheel and axle
20. Find the efficiency of a screw
21. Find the efficiency of a differential pulley
22. Study conversion of rotatory motion to S.H.M. using S.H.M. Model/Apparatus
23. Study conversion of rotatory motion to vibratory motion of the piston in a cylinder
24. Study the reciprocating motion
25. Study the working of cams
26. Study the quick return motion
27. Compare the Elastic constants of the given wires
28. Verify Hooke's Law using Helical Spring
29. Find the coefficient of Rigidity of a wire using Maxwell's needle
30. Find the coefficient of Rigidity of a round bar using torsion apparatus
31. Find the coefficient of Rigidity of a rectangular bar using Deflection of Beam Apparatus
32. Determine S.F. and B.M. in a loaded cantilever (Point Loads)
33. Determine S.F. and B.M. in a simply supported Beam (Point Loads)
34. Determine S.F. and B.M. in a simply supported Beam (Point loads and uniformly distributed load)
35. Determine S.F. and B.M. in a simply supported Beam (Point loads and uniformly distributed)
36. Study working and function of link mechanism of different types

**TW-213      FABRIC DESIGN AND STRUCTURE**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>3</b>	<b>3</b>

**TOTAL CONTACT HOURS:****Theory      :      64****Practical    :      96****Pre-requisite:** TT-123 Fundamental of Textile Technology**AIMS OF SUBJECT:**

1. Knowledge of different textile weaves.
2. To analyze the given fabric sample.
3. To develop the skill in designing and its practical application in weaving of fabric.

**DETAIL COURSE CONTENTS:**

- |  |                |
|--|----------------|
| <b>1. FABRIC STRUCTURE:</b>                  | <b>2 HOURS</b> |
| 1.1 Introduction of woven fabric.            |                |
| 1.2 Classification of woven fabric.          |                |
| <b>2. PARAMETERS OF FABRIC CONSTRUCTION:</b> | <b>4 HOURS</b> |
| 2.1 Warp & Weft                              |                |
| 2.2 Weave & Design                           |                |
| 2.3 Peg plain / Lifting plan.                |                |
| 2.4 Draft construction.                      |                |
| 2.5 Read / Denting plan.                     |                |
| <b>3. BASIC WEAVES:</b>                      | <b>2 HOURS</b> |
| 3.1 Plain weave                              |                |
| 3.2 Twill Weave,                             |                |
| 3.3 Satin and Sateen Weaves.                 |                |
| <b>4. PLAIN WEAVE &amp; DERIVATIVES</b>      | <b>6 HOURS</b> |
| 4.1 Derivatives of Plain weaves.             |                |
| 4.2 Rib Weaves                               |                |
| 4.3 Mat/Basket Weaves                        |                |
| <b>5. TWILL WEAVES:</b>                      | <b>8 HOURS</b> |
| 5.1 Classification of twill weaves           |                |
| 5.2 Construction and uses of Twill weaves.   |                |
| 5.3 Angles of inclination of twill weave     |                |
| 5.4 Broken twills.                           |                |
| 5.5 Zigzag & Herring Bone twills.            |                |
| <b>6. SATIN WEAVE AND SATEEN WEAVES:</b>     | <b>4 HOURS</b> |
| 6.1 Construction of Diamond weaves.          |                |
| 6.2 Characteristics of Diamond weave.        |                |
| 6.3 Uses of Diamond weave.                   |                |
| <b>7. DIAMOND DESIGN:</b>                    | <b>2 HOURS</b> |
| 7.1 Construction of Diamond weaves.          |                |
| 7.2 Characteristics of Diamond weave.        |                |
| 7.3 Uses of Diamond weave.                   |                |

<b>8. HONEY COMB DESIGN:</b>	<b>4 HOURS</b>
8.1 Construction of Honey Comb weaves.	
8.2 Characteristics of Honey Comb weave.	
8.3 Uses of Honey Comb weave.	
<b>9. BED FORD CORD WEAVE:</b>	<b>2 HOURS</b>
9.1 Construction of Bedford cord weaves.	
9.2 Characteristics of Bedford cord weave.	
9.3 Uses of Bedford cord weave.	
<b>10. SPECIAL WEAVE:</b>	<b>8 HOURS</b>
10.1 Cork screw weaves.	
10.2 Huck a back weaves	
10.3 Birds eye weave.	
10.4 Crepe weaves	
<b>11. STRIPES PATTERN OF COLOUR FABRIC AND WOVEN FABRIC:</b>	<b>4 HOURS</b>
11.1 Importance of stripes.	
11.2 How stripes are planned.	
11.3 Stripes on woven fabric.	
<b>12. BASIC KNIT DESIGN</b>	<b>4 HOURS</b>
12.1 Warp Knit	
12.2 Weft knit	
<b>13. DESIGN AND WEAVE ANALYSIS</b>	<b>6 HOURS</b>
13.1 Objectives	
13.2 Methods of Analysis	
<b>14. COLOR AND WEAVE EFFECTS:</b>	<b>8 HOURS</b>
14.1 Color introduction.	
14.2 Light theory of color.	
14.3 Primary colors.	
14.4 Secondary colors.	
14.4 Warm and cold colors.	
14.5 Different Effects of Colour and Weave.	

**BOOKS RECOMMENDED:**

Watson's Textile Design and Colour by Grosicki.  
 Butterworth World Student Reprint.

## **TW-213 FABRIC DESIGN AND STRUCTURE:**

### **INSTRUCTIONAL OBJECTIVE:**

#### **1. UNDERSTAND FABRIC STRUCTURE:**

- 1.1 State introduction and classification of woven fabric.
- 1.2 Explain elements of woven design.

#### **2. UNDERSTAND THE TERMINOLOGY RELATED TO FABRICS:**

- 2.1 Define warp.
- 2.2 Define weft.
- 2.3 Define peg plan.
- 2.4 Define lifting plan.
- 2.5 Define draft and its construction.
- 2.6 State Read & Denting plan.

#### **3. UNDERSTAND THE BASIC WEAVES:**

- 3.1 State introduction of Plain weave,
- 3.2 State introduction of Twill Weave,
- 3.3 State introduction of Satin and Sateen Weaves.

#### **4. UNDERSTAND PLAIN WEAVE & DERIVATIVES:**

- 4.1 Explain Derivatives of Plain weaves.
- 4.2 Explain Rib Weaves
- 4.3 Explain Mat Weaves.
- 4.4 State its uses

#### **5. UNDERSTAND TWILL WEAVES:**

- 5.1 Define Right and left hand twills
- 5.2 Define Warp face and Weft face twill
- 5.3 Define Angles of inclination of twill weave
- 5.4 State Pointed or Zigzag twill.
- 5.5 State Herring Bone twill
- 5.6 State broken twill.

#### **6. UNDERSTAND SATIN WEAVE AND SATEEN WEAVE:**

- 6.1 Explain construction of sateen weave.
- 6.2 Explain construction of satin weave.
- 6.3 Explain uses of satin weave and sateen weave.

#### **7. UNDERSTAND DIAMOND DESIGN:**

- 7.1 State characteristics of diamond design.
- 7.2 Explain construction of diamond design
- 7.3 Explain uses of diamond design.

#### **8. UNDERSTAND HONEY COMB DESIGN:**

- 8.1 State characteristics of Honey Comb design.
- 8.2 Explain construction of Honey Comb design.
- 8.3 Explain uses of Honey Comb design.

#### **9. UNDERSTAND BED FORD CORD WEAVE:**

- 8.1 State characteristics of Bedford weave.
- 8.2 Explain construction of Bedford weave.

8.3 Explain uses of Bedford weave.

**10. UNDERSTAND SPECIAL WEAVE:**

10.1 Explain construction of Cork screw weaves.

10.2 Explain construction of Huck-a-back weaves.

10.3 Explain construction of Birds eye weave.

10.4 Explain construction of Crepe weaves.

10.5 Explain uses of Special weave.

**11. PLANNING STRIP PATTERN OF WOVEN FABRIC:**

11.1 Explain importance of stripes.

11.2 Explain how stripes are planned.

11.3 Describe stripes on woven fabric.

**12. UNDERSTAND KNIT DESIGN**

12.1 Explain methods of Warp Knit design.

12.2 Explain methods of Weft knit design.

**13. UNDERSTAND DESIGN AND WEAVE ANALYSIS:**

13.1 State methods of weave analysis.

13.2 Explain analysis techniques.

**14. UNDERSTAND WEAVE AND COLOUR EFFECTS:**

14.1 Explain color introduction.

14.2 Explain light theory of color.

14.3 State primary & secondary color.

14.4 Explain warm and cold color.

14.5 Explain different effects of color and weave

**TW-213 FABRIC DESIGN AND STRUCTURE:****Practical : 96 Hours****LIST OF PRACTICALS:**

1. Use of graph paper for Designing.	6 HOURS
2. Designing of plain weave on graph paper.	6 HOURS
3. Designing of Rib and Hop Sack /Basket weaves.	6 HOURS
4. Designing of Different Twill weaves.	6 HOURS
5. Designing Angles of inclination of Twill weave.	6 HOURS
6. Designing of Satin & Sateen weaves.	6 HOURS
7. Designing of Zigzag & Herring Bone twill.	6 HOURS
8. Designing of Diamond weaves.	6 HOURS
9. Designing of Honey Comb weaves.	6 HOURS
9. Designing of Bed Ford Cord weaves.	6 HOURS
11. Designing of Cork screw & Crepe weaves.	6 HOURS
12. Designing of Huck-a-Back weaves.	6 HOURS
13. Designing of Stripes on woven fabric.	6 HOURS
14. Designing of Basic Knit Design.	6 HOURS
15. Analysis of Plain & Twill fabrics.	6 HOURS
16. Produce different Effects of Colour and Weave.	6 HOURS



## **TW-224 FABRIC MANUFACTURING TECHNOLOGY**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>6</b>	<b>4</b>

### **TOTAL CONTACT HOURS:**

**Theory : 64 Hours**

**Practical : 192 Hours**

**Pre-requisite:** TT-123 Fundamental of Textile Technology

### **AIMS:**

1. To acquaint the students with the elementary principles of weaving Technology.
2. To teach the student proper handling and operation of Machine.

### **DETAIL COURSE CONTENTS:**

- 1. INTRODUCTION TO WEAVING 4 HOURS**
  - 1.1 History.
  - 1.2 Weaving Machinery Sequence of operation (Warping to Inspection and folding).
- 2. WARPING 8 HOURS**
  - 2.1 Types of warping.
  - 2.2 Study of creel and its types
  - 2.3 Study of Head stock
- 3. SIZING 8 HOURS**
  - 3.1 Purpose of sizing the yarn.
  - 3.2 Components of sizing machine.
  - 3.3 Tension zone on sizing machine.
  - 3.4 Size recipe/ingredient.
- 4. DRAWING-IN 4 HOURS**
  - 4.1 Objectives
  - 4.2 Methods of drawing-in
- 5. LOOM MOTION 8 HOURS**
  - 5.1 Primary Motion of loom.
  - 5.2 Secondary Motion loom.
  - 5.3 Supplementary Motion of loom.
- 6. WEAVING 16 HOURS**
  - 6.1 Introduction of weaving
  - 6.2 Types of loom.
  - 6.3 Shuttle loom.
  - 6.4 Terry loom.
  - 6.5 Shuttle less loom.
    - 6.5.1 Air jet loom.
    - 6.5.2 Water jet loom.
    - 6.5.3 Rapier loom
    - 6.5.4 Projectile loom.
    - 6.5.5 Multiphase Loom

<b>7. DOBBY MOTION &amp; JACQUARD MOTION</b>	<b>4 HOURS</b>
7.1 Types of dobbies.	
7.2 Types of Jacquard	
<b>8. DENIM WEAVING</b>	<b>6 HOURS</b>
8.1 Process of Denim weave	
8.2 Features of Denim fabric	
<b>9. FOLDING AND INSPECTION</b>	<b>6 HOURS</b>
9.1 Inspection Methods	
9.2 Grading System	
9.3 Study of different fabric Faults	

**TEXT / REFERENCE BOOKS:**

1. Textile (Fibre to Fabric) by Bernard (Mc-Graw Hill).
2. Manual of Cotton Spinning by A.E. Debarr (The Textile Institute U.K.)
3. Practical Weaving Course by P.R. Jarvis (India).
4. Cotton Spinning by William Scott Taggart. (India).

## **TW-224 FABRIC MANUFACTURING TECHNOLOGY**

### **INSTRUCTIONAL OBJECTIVE:**

#### **1. WEAVING**

- 1.1 Elaborate History of weaving.
- 1.2 State Weaving process Sequence of operation (Warping to Inspection and folding).

#### **2. WARPING**

- 2.1 Define Types of warping.
- 2.2 Explain creel and its types
- 2.3 Define Head stock

#### **3. SIZING**

- 3.1 Narrate purpose of sizing of yarn.
- 3.2 Explain construction of sizing machine.
- 3.3 Explain working of sizing machine.

#### **4. DRAWING-IN**

- 4.1 Define Objectives of drawing-in process
- 4.2 Explain Design technique used in Drawing-in process
- 4.3 State methods of drawing-in process.

#### **5. LOOM MOTION**

- 5.1 Define Primary Motion of loom
- 5.2 Describe Secondary Motion of loom.
- 5.3 Explain Supplementary Motion of loom.

#### **6. WEAVING**

- 6.1 Define weaving process.
- 6.2 Explain types of loom.
- 6.3 Explain working of Shuttle loom.
- 6.4 Explain working of Terry loom.
- 6.5 Explain working of Shuttle less loom.
  - 6.5.1 Explain working of Air jet loom.
  - 6.5.2 Explain working of Water jet loom.
  - 6.5.3 Explain working of Rapier loom
  - 6.5.4 Explain working of Projectile loom.
  - 6.5.5 Explain working of Multiphase Loom

#### **7. DOBBY MOTION & JACQUARD MOTION**

- 7.1 State Types of dobbies.
- 7.2 Explain different types of Jacquard

#### **8. DENIM WEAVING**

- 8.1 Explain process of Denim Fabric
- 8.2 Explain different stages of denim process

#### **9. FOLDING AND INSPECTION**

- 9.1 Elaborate Inspection Methods
- 9.2 Narrate Grading System
- 9.3 Deduction of different fabric Faults

## **TW-224 FABRIC MANUFACTURING TECHNOLOGY**

**Practical : 192 Hours.**

### **LIST OF PRACTICALS:**

1. General survey of weaving system and machinery layout plan.	12 HOURS
2. Study of Warping Machine.	9 HOURS
3. Study of Warping Faults.	9 HOURS
4. Study of Sizing Machine.	9 HOURS
5. Study of Sizing Faults.	9 HOURS
6. Make Sizing solution.	9 HOURS
7. Study of primary motions and their diagrams.	9 HOURS
8. Study of power transmission of loom and its diagram.	9 HOURS
9. Study of shedding motion and picking motion relation of each.	9 HOURS
10. Preparation of heald frames, and reed and its calculation.	9 HOURS
11. Study of tappets and their setting.	9 HOURS
12. Study of knotting process on loom.	9 HOURS
13. Take up motion-calculation and diagram.	9 HOURS
14. Study of let off motion.	9 HOURS
15. Study of Beating up motion.	9 HOURS
16. Operation and diagram of dobby parts.	9 HOURS
17. Study of warp and weft stop motion.	9 HOURS
18. Study of different types of selveges.	9 HOURS
19. Study of Shuttle box with diagram.	9 HOURS
20. Detail study of crank sley, loose reed and back up.	9 HOURS
21. Study of different fabric Faults.	9 HOURS

## **TW-232 KNITTING TECHNOLOGY- I**

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>3</b>	<b>2</b>

**Theory : 32 Hours**

**Practical : 96 Hours**

### **AIM:**

Fabric Formation is major process in Textile industry in which yarn is converted into fabric. Studying the different techniques of fabric formation like Weaving, Knitting and Non- Woven techniques are very important for a DAE. Textile. This subject will cover the knitted fabric construction and its structures.

### **OBJECTIVES:**

At the end of the study the student will be able to

- Understand the basic terminology & elements in knitting
- Know the basic principles & working of plain weft knitting machines.

### **DETAIL COURSE CONTENTS:**

#### **1. INTRODUCTION TO KNITTING TECHNOLOGY: 4 HOURS**

- 1.1 History and Evolution of Knitting Technology
- 1.2 Reasons for the growth of the knitting industry.
- 1.3 Comparison of Knitting with other fabric forming methods.

#### **2. GENERAL KNITTING TERMINOLOGIES. 4 HOURS**

- 2.1 Knitting – Definition, Classification –
- 2.2 Important Knitting terms  
Course, Wales, Texture, Gauge, Loop length, Loop density, Face loop, Back loop-
- 2.3 Knitting elements  
Needles (Latch, Beard and Compound),  
Sinker, Cam- Passage of material in a Circular plain Weft knitting machine –
- 2.4 Knitting cycle of Latch needle in plain weft knitting machine-  
Uses of Double Jersey,  
Flat and Warp knitting machine.

#### **3. CLASSIFICATION OF KNITTING MACHINES 4 HOURS**

- 3.1 Circular and Flat-bed weft knitting machines;
- 3.2 Tricot Warp knitting Machines
- 3.3 Raschel Warp knitting Machines.

#### **4. COMPARISON OF WEFT AND WARP KNITTING TECHNOLOGY 4 HOURS**

- 4.1 Classification,
- 4.2 Sequence of loop formation,
- 4.6 Comparison

#### **5. Weft knitting technology: 4 HOURS**

- 5.1 Features of weft knitting,
- 5.2 Mechanisms of weft knitting,
- 5.3 Loop formation sequence
- 5.4 Productivity of Flat-bed and Circular knitting machines.

**6. WARP KNITTING TECHNOLOGY:****4 HOURS**

- 6.1 Features of warp knitting
- 6.2 Mechanisms of warp knitting
- 6.3 Loop formation sequence,
- 6.4 Productivity of Tricot and Raschel knitting machines.

**7. KNIT FABRIC STRUCTURES****4 HOURS**

- 7.1 Knit, Tuck and Miss Stitches –
- 7.2 Drawing of Graphical and Needle (Diagrammatic) notation of single jersey Plain, purl and Double jersey Rib.
- 7.3 Drawing of Needle (Diagrammatic) notation of Interlock and Lacoste fabrics.
- 7.4 Quality control in knitted fabric production;
- 7.5 Production calculation.

**8. MECHANISM involved in knitting Machines****4 HOURS**

- 8.1 Chain links,
- 8.2 Pattern drive,
- 8.3 SU drive,
- 8.4 Electronic guide bar control.
- 8.5 Yarn let off systems
- 8.6 fabric take up systems.
- 8.7 Yarn directing devices
- 8.8 tensioning devices.

**Recommended Books:**

Principles of Knitting D B Ajgaonkar Universal Publishing Corporation

Knitting Technology David J Spencer Pergamon Press Oxford

## **TW-232 KNITTING TECHNOLOGY-I**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. UNDERSTAND INTRODUCTION TO KNITTING TECHNOLOGY:**

- 1.1 Elaborate History and Evolution of Knitting Technology
- 1.2 Narrate Reasons for the growth of the knitting industry.
- 1.3 Comparison of Knitting with other fabric forming methods.

#### **2. UNDERSTAND GENERAL KNITTING TERMINOLOGIES.**

- 2.1 Knitting – Definition, Classification –
- 2.2 Learn Important Knitting terms  
Course, Wales, Texture, Gauge, Loop length, Loop density, Face loop, Back loop-
- 2.3 Learn Knitting elements  
Needles (Latch, Beard and Compound),  
Sinker, Cam- Passage of material in a Circular plain Weft knitting machine –
- 2.4 Understand Knitting cycle of Latch needle in plain weft knitting machine-  
Uses of Double Jersey, Flat and Warp knitting machine.

#### **3. UNDERSTAND CLASSIFICATION OF KNITTING MACHINES**

- 3.1 State Circular and Flat-bed weft knitting machines;
- 3.2 Describe Tricot Warp Knitting Machines
- 3.3 Narrate Raschel Warp Knitting Machines.

#### **4. UNDERSTAND COMPARISON OF WEFT AND WARP KNITTING TECHNOLOGY**

- 4.1 State the Classification,
- 4.2 Narrate Sequence of loop formation,
- 4.3 Comparison of woven and knitted fabric

#### **5. UNDERSTAND Weft knitting technology:**

- 5.1 Elaborate Features of weft knitting,
- 5.2 Narrate Mechanisms of weft knitting,
- 5.3 Understand Loop formation sequence
- 5.4 Narrate Productivity of Flat-bed and Circular knitting machines.

#### **6. UNDERSTAND WARP KNITTING TECHNOLOGY:**

- 6.1 Elaborate Features of warp knitting
- 6.2 State Mechanisms of warp knitting
- 6.3 Describe Loop formation sequence,
- 6.4 Narrate Productivity of Tricot and Raschel knitting machines.

#### **7. UNDERSTAND KNIT FABRIC STRUCTURES**

- 7.1 Describe Knit, Tuck and Miss Stitches –
- 7.2 Elaborate Drawing of Graphical and Needle (Diagrammatic) notation of single jersey Plain, purl and Double jersey Rib.
- 7.3 Narrate Drawing of Needle (Diagrammatic) notation of Interlock and Lacoste fabrics.
- 7.4 Describe Quality control in knitted fabric production;
- 7.5 Production calculation.

#### **8. UNDERSTAND MECHANISM INVOLVED IN KNITTING MACHINES**

- 8.1 Describe Chain links,

- 8.2 Narrate Pattern drive,
- 8.3 Elaborate SU drive,
- 8.4 Narrate Electronic guide bar control.
- 8.5 Describe Yarn let off systems
- 8.6 Narrate fabric take up systems.
- 8.7 Elaborate Yarn directing devices
- 8.8 Describe tensioning devices.



## **TW-232 KNITTING TECHNOLOGY-I**

### **PRACTICALS : 96 HOURS**

#### **LIST OF PRACTICALS:**

1. Identification of knitted and woven fabric
2. Demonstrate the knitting cycle
3. Demonstrate the knitting elements
4. General Demonstration about Warp Knitting Machine
5. Demonstrate the Warp Knitted Structures – Lapping Diagram  
and draw the five basic lapping variations
6. General Demonstration about Hosiery Machine – Knitting Elements
7. Exhibit the arrangement of various knitting elements of Single Cylinder hosiery machine  
and explain their functions
8. Demonstrate the arrangement of various knitting elements of Double Cylinder hosiery machine and  
explain their functions
9. Passage of material through a hosiery machine

## **TW-242 TEXTILE WEAVING CALCULATIONS**

### **TOTAL CONTACT HOURS:**

**Theory : 64 HOURS**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>0</b>	<b>2</b>

**Pre-requisite :** TT-123 Fundamental of Textile Technology

### **AIM:**

1. To provide knowledge of Textile counting system.
2. To enable students to solve common technical and textile trade problem.
3. To acquaint the students with the efficiency.

### **DETAIL COURSE CONTENTS:**

- |   |                 |
|---|-----------------|
| <b>1. YARN NUMBERING SYSTEM</b>                                   | <b>12 HOURS</b> |
| 1.1 Count definition.   |                 |
| 1.2 Indirect systems of yarn numbering.                           |                 |
| 1.3 Direct system of yarn numbering.                              |                 |
| 1.4 Universal system of numbering.                                |                 |
| 1.5 Inter conversion of count.                                    |                 |
| 1.6 Problems to all yarn numbering systems                        |                 |
| <b>2. FOLDED YARN.</b>  | <b>04 HOURS</b> |
| 2.1 Numbering of folded yarn.                                     |                 |
| 2.2 Resultant counts.   |                 |
| 2.3 Average counts.   |                 |
| 2.4 Folded yarn of different materials.                           |                 |
| 2.5 Calculation of costing of folded yarn.                        |                 |
| <b>3. SPEED CALCULATION</b>                                       | <b>04 HOURS</b> |
| 3.1 Different types of gears.                                     |                 |
| 3.2 Problem of speed calculation.                                 |                 |
| 3.3 Speed Calculation by belt, pulleys and rope.                  |                 |
| 3.4 Slippage calculation.   |                 |
| 3.5 Worm, Worm Wheel. Ratchet Wheel and mangle wheel calculation. |                 |
| <b>4. YARN DIAMETER CALCULATION</b>                               | <b>04 HOURS</b> |
| 4.1 Introduction of diameter.                                     |                 |
| 4.2 Diameter of cotton yarn.                                      |                 |
| 4.3 Diameter of worsted yarn.                                     |                 |
| 4.4 Examples and numerical related to yarn diameter.              |                 |
| <b>5. WARP AND WARPING CALCULATION.</b>                           | <b>08 HOURS</b> |
| 5.1 Factors involved in warping calculation.                      |                 |
| 5.2 Warping calculation.  |                 |
| 5.3 Production of warping.  |                 |
| 5.4 Examples and numerical related to warping.                    |                 |
| <b>6. SIZING CALCULATION.</b>                                     | <b>08 HOURS</b> |
| 6.1 Factors involved in sizing calculation.                       |                 |
| 6.2 Sizing calculation.   |                 |
| 6.3 Size percentage calculation.                                  |                 |
| 6.4 Examples and numerical related to sizing.                     |                 |

<b>7. REED &amp; HEALD CALCULATION.</b>	<b>08 HOURS</b>
7.1 Reed Counting System.	
7.2 Inter conversion of reed count.	
7.3 Heald Counting System.	
7.4 Examples and numerical related to reeds & healds	
<b>8. COVER FACTOR</b>	<b>04HOURS</b>
8.1 Cover Factor of warp	
8.2 Cover Factor of weft	
8.3 Cover Factor of different fabrics.	
<b>9. CLOTH CALCULATION.</b>	<b>08 HOURS</b>
9.1 Warp and weft contraction.	
9.2 Warp calculation.	
9.3 Weft calculation.	
9.4 Calculation per yard of running fabric.	
9.5 Calculation square per yard of fabric.	
9.6 Material and labour cost of fabric.	
<b>10. LOOM PRODUCTION CALCULATION.</b>	<b>04 HOURS</b>
10.1 Production of loom.	
10.2 Efficiency of loom.	
10.3 Examples and numerical related to loom Production.	

**REFERENCE BOOKS: -**

1. Weaving Calculation by sen Gupta D.B. Tara Porewala Son & Co Boruby (India)
2. Cotton Spinning Calculation Saddique Pakistan.

## **TW-242 TEXTILE WEAVING CALCULATIONS**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. UNDERSTAND YARN NUMBER SYSTEM.**

- 1.1 State yarn numbering.
- 1.2 Explain direct system.
- 1.3 Explain indirect system.
- 1.4 Explain Metric system.
- 1.5 Explain worsted system.
- 1.6 Evaluate all yarn numbering systems.
- 1.7 Calculate different count and inter-conversion different counts.

#### **2. UNDERSTAND FOLDED YARN.**

- 2.1 Calculate count of folded yarn.
- 2.2 Manipulate count of folded yarn.
- 2.3 Determine average count.
- 2.4 Manipulate count of folded yarn of different material.
- 2.5 Calculate the cost of folded yarn.

#### **3. UNDERSTAND UNIVERSAL NUMBER SYSTEM.**

- 3.1 Define universal number system.
- 3.2 Manipulate universal number system.
- 3.3 Define Tex, Grex and Denier.
- 3.4 Calculation in Tex, Grex and Denier.

#### **4. UNDERSTAND SPEED CALCULATION**

- 4.1 Calculate the speed by gear methods.
- 4.2 Calculate the speed by gear and belt methods.
- 4.3 Compare the slippage percentage.
- 4.4 Calculate the speed of worm, worm wheel, Ratchet wheel and mangle wheel.

#### **6. UNDERSTAND YARN DIAMETER CALCULATION.**

- 6.1 Explain yarn diameter.
- 6.2 Calculate yarn diameter in millimeter.
- 6.3 Calculate yarn diameter in inches.

#### **7. UNDERSTAND WARP CALCULATION.**

- 7.1 Define formula for warping calculation.
- 7.2 Manipulate warping production.
- 7.2 Manipulate Production, time and costing of warping.

#### **8. UNDERSTAND SIZE CALCULATION.**

- 7.1 Define formula for size calculation.
- 7.2 Manipulate sizing production.
- 7.3 Calculate size content for different count
- 7.4 Manipulate Production, time and costing of sizing.

#### **9. UNDERSTAND REED CALCULATION.**

- 9.1 Manipulate reed calculation.
- 9.2 Calculate reed width

- 10. UNDERSTAND FACTOR INVOLVED IN CLOTH CALCULATION.**
  - 10.1 Calculate warp of running fabric using different count & different material.
  - 10.2 Manipulate warp of running fabric.
  - 10.3 Manipulate weft of fabric.
- 11. CLOTH CALCULATION**
  - 11.1 Determine material cost of cloth.
  - 11.2 Determine labour cost for a piece of cloth.
  - 11.3 Determine total cost of fabric.
- 12. UNDERSTAND LOOM PRODUCTION CALCULATION.**
  - 12.1 Determine loom production calculation.
  - 12.2 State factor effecting loom production.
  - 12.3 Determine loom efficiency.

## **TT-202 INTRODUCTION TO TEXTILE TESTING & QUALITY CONTROL**

<b>TOTAL CONTACT HOURS:</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory : 32 HOURS.</b>	<b>1</b>	<b>3</b>	<b>2</b>
<b>Practical : 96 HOURS.</b>			

### **AIMS:**

1. To develop the knowledge and skill in students to make them fit for working in any textile testing Laboratory.
2. To train the student in the assessment of quality of textile materials.

### **DETAIL COURSE CONTENTS:**

- 1. TEXTILE TESTING: 2HOURS**
  - 1.1 Introduction to textile testing.
  - 1.2 Importance of textile testing.
  - 1.3 Standard Conditions for Textile Testing lab.
- 2. TEXTILE FIBRES: 2HOURS**
  - 2.1 Natural fibers.
  - 2.2 Manmade fibres.
- 3. COTTON FIBRE TESTING: 2HOURS**
  - 3.1 Importance of cotton fibre testing.
  - 3.2 Important Cotton fiber parameter and different tests of cotton fiber
  - 3.3 Study of AFIS testing for cotton fiber
- 4. YARN EVENESS TESTING. 2HOURS**
  - 4.1 Study of uniformity of yarn.
  - 4.2 IPI and CV of yarn.
- 5. YARN COUNT AND STRENGTH. 2 HOURS**
  - 5.1 Introduction of yarn count.
  - 5.2 Yarn count or numbering systems.
  - 5.3 Yarn CLSP.
- 6. SINGLE YARN STRENGTH: 2 HOURS**
  - 6.1 Introduction.
  - 6.2 Factors effecting on yarn strength.

6.3	Tensorapid test of yarn.	
<b>7.</b>	<b>YARN TWIST:</b>	<b>2 HOURS</b>
7.1	Introduction and importance of yarn twist	
7.2	Types of yarn twist	
<b>8.</b>	<b>APPEARANCE OF YARN:</b>	<b>2HOURS</b>
8.1	Introduction to appearance test of yarn.	
8.2	Common yarn faults.	
<b>9.</b>	<b>ANALYSIS OF FABRIC:</b>	<b>2HOURS</b>
9.1	Identification of warp and weft direction in fabric.	
9.2	Picks per inch and ends per inch of fabric.	
<b>10.</b>	<b>FABRIC DENSITY:</b>	<b>2HOURS</b>
10.1	Fabric thickness.	
10.2	GSM weight of fabric,	
<b>11.</b>	<b>STRENGTH OF FABRIC:</b>	<b>2HOURS</b>
11.1	Introduction to fabric strength.	
11.2	Different tests of fabric strength.	
<b>12.</b>	<b>APPEARANCE OF FABRIC:</b>	<b>2HOURS</b>
12.1	Fabric inspection.	
12.2	Common fabric faults.	
<b>13.</b>	<b>MOISTURE TESTING:</b>	<b>2HOURS</b>
13.1	Importance of moisture in textile material.	
13.2	Moisture content and moisture regain.	
<b>14.</b>	<b>CROCK TEST OF FABRIC:</b>	<b>2HOURS</b>
14.1	Define the crock test.	
14.2	Importance for crocking test.	
<b>15.</b>	<b>ABRASION TEST OF FABRIC:</b>	<b>2HOURS</b>
15.1	Fabric pilling.	
15.2	Abrasion test of fabric.	
<b>16.</b>	<b>FABRIC WASHING:</b>	<b>2HOURS</b>
16.1	Effects of washing on died fabric	
16.2	Effects of washing on printed fabric.	

## **TT-202 INTRODUCTION TO TEXTILE TESTING & QUALITY CONTROL**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. TEXTILE TESTING:**

- 1.1 State the introduction to textile testing.
- 1.2 Explain the importance of textile testing.
- 1.3 State the standard Conditions for Textile Testing lab.

#### **2. TEXTILE FIBRES:**

- 2.1 Enlist the natural fibers with specifications.
- 2.2 Enlist the manmade fibres with specifications.

#### **3. COTTON FIBRE TESTING:**

- 3.1 Explain the importance of cotton fibre testing.
- 3.2 State the different tests of cotton fibre (with reference systems i.e. ISO, ASTM and standard methods)
- 3.3 Study of AFIS testing for cotton fiber

#### **4. MEASUREMENT OF YARN REGULARITY.**

- 4.1 Explain the uniformity of yarn.
- 4.2 Explain the IPI and CV of yarn.

#### **5. YARN COUNT AND STRENGTH.**

- 5.1 Discuss the yarn count or yarn numbering system.
- 5.2 Enlist the yarn count or numbering systems.
- 5.3 Explain the yarn CLSP.

#### **6. SINGLE YARN STRENGTH:**

- 6.1 Introduction to single yarn strength.
- 6.2 Explain the factors effecting on yarn strength.
- 6.3 Describe the Tensorapid test of yarn.

#### **7. YARN TWIST:**

- 7.1 Discuss the yarn twist and state its importance.
- 7.2 Explain the types of yarn twist

#### **8. APPEARANCE OF YARN:**

- 8.1 Discuss the appearance test of yarn.



8.2 Describe the common yarn faults.

**9. ANALYSIS OF FABRIC:**

9.1 How can be identified the warp and weft direction of yarn in fabric.

9.2 Explain the picks per inch and ends per inch of fabric.

**10. FABRIC DENSITY:**

10.1 How can be identifies the fabric thickness.

10.2 How can be identified the GSM weight of fabric,

**11. STRENGTH OF FABRIC:**

11.1 Explain the fabric strength.

11.2 Enlist the different tests of fabric strength.

**12. APPEARANCE OF FABRIC:**

12.1 Discuss the fabric inspection.

12.2 Enlist the common fabric faults.

**13. MOISTURE TESTING:**

13.1 State the importance of moisture in textile material.

13.2 Explain the moisture content and moisture regain.

**14. CROCK TEST OF FABRIC:**

14.1 Describe the crock test.

14.2 Describe the importance for crocking test.

**15. ABRASION TEST OF FABRIC:**

15.1 Explain the fabric pilling.

15.2 Explain the abrasion test of fabric.

**16. FABRIC WASHING:**

16.1 Determine the effects of washing on died fabric

16.2 Determine the effects of washing on printed fabric.

## **TT-202 INTRODUCTION TO TEXTILE TESTING & QUALITY CONTROL**

**PRACTICAL : 96 Hours**

### **LIST OF PRACTICAL**

1.	Relative humidity calculations by the help of dry and wet bulb hygrometer reading	6 HOURS
2.	Identification of textile fibers.	6 HOURS
3.	Demonstration on estimating fiber staple length by hand sampling.	6 HOURS
4.	Demonstration on different types of fiber tests	6 HOURS
5.	Measurement of count and strength of spun yarn.	6 HOURS
6.	Measurement of single yarn strength.	6 HOURS
7.	Measurement of twist in yarn.	6 HOURS
8.	Analysis common yarn faults by yarn examining board method.	6 HOURS
9.	Identification of warp and weft direction.	6 HOURS
10.	Measurement of cloth thickness and fabric density	6 HOURS
11.	Demonstration on different fabric strength tests.	6 HOURS
12.	Analysis of common fabric defects by inspection table method.	6 HOURS
13.	Moisture testing in textile material.	6 HOURS
14.	Crocking test of fabric	6 HOURS
15.	Abrasion test of fabric	6 HOURS
16.	Washing test of dyed and printed fabric.	6 HOURS

**TT-221        TECHNICAL TEXTILE****Theory        :    32 HOURS**

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>0</b>	<b>1</b>

**DESCRIPTION:**

The consumption of technical textile is around 24 million tons of that value is around US Dollars 127 billion by the year 2011. This uses of technical textiles growth is estimated 4.6% per annum in Asia, by 2.8% in US and Europe, but Pakistan's contribution in technical textile is hardly 1%. Therefore, the objective of this course is to get familiarize students with technical textile, its history, its big market, its extensive growth and its vast end-use in modern world

This course is design for 2<sup>nd</sup> Year students of DAE's in Textile Spinning Technology, Textile Weaving Technology, and Textile Dyeing & Printing Technology.

**OBJECTIVES**

- To know about the Technical textiles and classification of technical textiles.
- To know about Non-Woven textiles and its Manufacturing, classification and characteristics of material used.
- To know about the textile composites and its classification and characteristics of material used.
- To familiar Technical textiles applications in diverse fields, classification and characteristics of material used.

**DETAIL COURSE CONTENTS:****1. INTRODUCTION & CLASSIFICATION OF TECHNICALTEXTILE****8 Hrs****1.1. Introduction to Technical Textile**

- 1.1.1 Basic concepts,
- 1.1.2 Growth of industrial textiles,
- 1.1.3 Engineering textile structures for industrial purposes.
- 1.1.4 Difference with non-industrial textiles;
- 1.1.5 Classification;
- 1.1.6 Types of fibers used and properties Ultra fine, Micro fibers, Nano fibers, Hollow fibers  
Aramid fibers, Carbon, Nomex, Kevlar and glass fibers.

**1.2. Introduction to Non-woven textile**

- 1.2.1 Introduction to non-woven fabrics
- 1.2.2 Fiber and polymer selection
- 1.2.3 Web formation processes
- 1.2.4 Web handling and transport processes
- 1.2.5 Web bonding processes

### 1.3. Introduction to Textile Composites

- 1.3.1 Production, Properties and use of textile composites like tyres, hoses and belts,
- 1.3.2 Uses of textiles in rigid composites,
- 1.3.3 Properties and applications.

## 2. NON-WOVEN TEXTILES

**8 Hrs.**

### 2.1 Manufacture Techniques of Non-Woven fabric-

- 2.1.1 The manufacture-structure-property relations of selected nonwoven materials
- 2.1.2 Study of nonwoven manufacturing routes for different product types
- 2.1.3 Adhesive bonded,
- 2.1.4 Needle punched,
- 2.1.5 Stitch bonded and
- 2.1.6 Spun bonded fabrics, woven fabrics.

### 2.2 Properties of Non-Woven Fabrics

- 2.2.1 Finishing and functionalization of nonwoven fabrics
- 2.2.2 Characterization and testing,
- 2.2.3 Principles of design for performance
- 2.2.4 Adhesive bonded,
- 2.2.5 Needle punched,
- 2.2.6 Stitch bonded and
- 2.2.7 Spun bonded fabrics, woven fabrics.
- 2.2.8 Various uses of non-woven fabrics and their applications.

## 3. TEXTILE COMPOSITES AND ITS APPLICATIONS

**6 Hrs.**

### 3.1 Composites for Mobile Tech

### 3.2 Composites for Indu Tech

### 3.3 Composites for Geo Tech

## 4. APPLICATIONS OF TECHNICAL TEXTILE IN DIFFERENT FIELDS

**10 Hrs.**

### 4.1. Agro tech

- 1.1.1 Introduction of Agricultural application of textiles:
- 1.1.2 Erosion control of soil,
- 1.1.3 Application for drainage.

### 4.2 Build tech

- 4.2.1 Introduction of Textiles in civil engineering applications, Uses and Properties
- 4.2.2 Road construction,
- 4.2.3 Sewerage control etc.
- 4.2.4 Awnings and canopies;
- 4.2.5 Roofing material;
- 4.2.6 Fiber reinforced concrete and cement;
- 4.2.7 Acoustic and heat insulation textiles;

### 4.3 Cloth tech

#### 4.3.1 Definition

#### 4.3.2 Classification

#### 4.3.3 Safety and Protective Clothing (Environmental hazard)

#### 4.3.4 Types of Fibers used,

#### **4.3.5 Coated fabrics:**

- Design,
- Production,
- Base cloth commonly used materials,
- coating techniques,
- Waterproof fabrics,
- Gauze fabrics.
- Properties and Application
- Properties and application of High temperature clothing, flame protective clothing – chemical Protective Clothing – Electro Protective Clothing - High visibility clothing,
- Defense clothing (Camouflage dress, Bullet proof, Non visibility clothing, tent and parachute)

### 4.4 Mobi tech

#### 4.4.1 Definition

#### 4.4.2 Raw material used,

#### 4.4.3 Applications

### 4.5 Medical Textiles

#### 4.5.1 Definitions

#### 4.5.2 Material used in bio-textiles;

#### 4.5.3 Characteristics of material used.

#### 4.5.4 Classification of Surgical textiles

##### 4.5.4.1 Non-implantations textiles;

- Application and Fibers used in Non-implantable materials like wound dressing, Bandage and gauze cloth.

##### 4.5.4.2 Textiles for implantations;

- Application and Fibers used in implantable materials like vascular graft, sutures and heart valves.

##### 4.5.4.3 Textiles for extracorporeal devices;

- Fiber requirements for extra corporeal devices such as skin, liver and kidney.

##### 4.5.4.4 Application and fiber requirements in healthcare and hygiene products such as surgical gowns, masks and wipes.

### 4.6 Pro tech

#### 4.6.1 Introduction of Textiles in protective clothing,

#### 4.6.2 Protection against heat, impact and others for safety.

#### 4.6.3 Fabrics in defense system and weapons;

- 4.6.4 Other applications
- 4.7 Packtech
  - 4.7.1 Definition
  - 4.7.2 Raw material used,
  - 4.7.3 Applications
- 4.8 Sports tech
  - 4.8.1 Introduction of Sports and recreation textiles,
  - 4.8.2 General; Sports uniforms;
  - 4.8.3 Applications (Baseball, Tennis; Football; Golf and hockey equipment's; Skates; Bikes; Marine products; Textiles in sports surfaces; Fabrics for children fun and play.)
- 4.9 Indu tech
  - 4.9.1 Introduction of Textiles in miscellaneous industrial applications,
  - 4.9.2 Raw Material / Properties Applications

## REFERENCES

1. Anand S.C., "Medical Textiles", Textile Institute, Manchester, 2001, ISBN:185573494X
2. Medical Textiles-International Conference on Medical Textiles, Bolton, Woodhead Publication, Cambridge, 1997
3. Mukhopadhyay S.K. and Partridge J.F., "Automotive Textiles", Textile Progress, Vol.29, No1/2, 1999, ISBN:1870372212
4. Horrocks A.R. and Anand S.C., "Handbook of Technical Textiles", The Textile Institute, Manchester, 2000, ISBN:1855733854
5. Adanur S., "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., 1995, ISBN :1-56676-340-1
6. Scott.A., "Textiles for Protection", Wood head Publishing Limited, Cambridge, UK, 2005, ISBN1-85573-921-6
7. Saville.B.P, "Physical Testing of Textiles", Woodhead Publishing Limited, Cambridge, UK, 1999, ISBN1-85573-367-6
8. Long.A.C, "Design and Manufacture of Textile Composites", Woodhead Publishing Ltd, Cambridge, UK, 2005, ISBN1-85573-744-2
9. Fung.W, "Coated and Laminated Textiles", Woodhead Publishing Ltd., Cambridge, UK, 2002, ISBN1-85573-576-8
10. Anand.S.C, Kennedy.J.F, Miraftab.M and Rajendran.S., "Medical Textiles and Biomaterials for Health Care", Wood head Publishing Ltd, Cambridge, UK, 2006, ISBN 1-85573-683-7
11. Fung.W and Hardcastle, "Textiles in Automotive Engineering", Wood head Publishing Ltd., Cambridge, UK, 2001, ISBN1-85573-493-1
12. John.N.W.M, "Geo Textile", Blackie and Sons Ltd., London, UK., 1987, ISBN 0-412- 01351-7
13. Wellington Sears Handbook of Industrial Textiles by S. Adanur,

## **TT-221 TECHNICAL TEXTILE**

### **INSTRUCTIONAL OBJECTIVE: -**

#### **1. UNDERSTAND TECHNICALTEXTILE**

##### **1.1. Learn Introduction to Technical Textile**

- Basic concepts,
- Growth of industrial textiles,
- Engineering textile structures for industrial purposes.
- Difference with non-industrial textiles;
- Classification;
- Types of fibers used and properties Ultra fine, Micro fibers, Nano fibers, Hollow fibers  
Aramid fibers, Carbon, Nomex, Kevlar and glass fibers.

##### **1.2. Learn Introduction to Non-woven textile**

- Introduction to non-woven fabrics
- Fiber and polymer selection
- Web formation processes
- Web handling and transport processes
- Web bonding processes

##### **1.3. Learn Introduction to Textile Composites**

- Production, Properties and use of textile composites like tyres, hoses and belts,
- Uses of textiles in rigid composites,
- Properties and applications.

#### **2. UNDERSTAND NON-WOVEN TEXTILES**

##### **2.1 Learn Manufacture Techniques of Non-Woven fabric-**

- The manufacture-structure-property relations of selected nonwoven materials
- Study of nonwoven manufacturing routes for different product types
- Adhesive bonded,
- Needle punched,
- Stitch bonded and
- Spun bonded fabrics, woven fabrics.

##### **2.2 Learn Properties of Non-Woven Fabrics**

- Finishing and functionalization of nonwoven fabrics
- Characterization and testing,
- Principles of design for performance
- Adhesive bonded,
- Needle punched,
- Stitch bonded and
- Spun bonded fabrics, woven fabrics.
- Various uses of non-woven fabrics and their applications.

### 3. UNDERSTAND TEXTILE COMPOSITES AND ITS APPLICATIONS

3.1 Learn Composites for Mobile Tech

3.2 Composites for Indu Tech

3.3 Composites for Geo Tech

### 4. UNDERSTAND APPLICATIONS OF TECHNICAL TEXTILE IN DIFFERENT FIELDS

4.1. Learn Agro tech

- Introduction of Agricultural application of textiles:
- Erosion control of soil,
- State Application for drainage.

4.2 Learn Build tech

- Introduction of Textiles in civil engineering applications, Uses and Properties
- Road construction,
- Sewerage control etc.
- Awnings and canopies;
- Roofing material;
- Fiber reinforced concrete and cement;
- Learn Acoustic and heat insulation textiles;

4.3 Learn Cloth tech

- Definition
- Classification
- Safety and Protective Clothing (Environmental hazard)
- Types of Fibers used,
- **Coated fabrics:**
  - Design,
  - Production,
  - Base cloth commonly used materials,
  - coating techniques,
  - Waterproof fabrics,
  - Gauze fabrics.
- Properties and Application
- Properties and application of High temperature clothing, flame protective clothing – chemical Protective Clothing – Electro Protective Clothing - High visibility clothing,
- Defense clothing (Camouflage dress, Bullet proof, Non visibility clothing, tent and parachute)

4.4 Learn Mobi tech

- Definition



- Raw material used,
- Applications

#### 4.5 Learn Medical Textiles

- Definitions
- Material used in bio-textiles;
- Characteristics of material used.
- Classification of Surgical textiles
  - Non-implantations textiles;

Application and Fibers used in Non-implantable materials like wound dressing, Bandage and gauze cloth.

- Textiles for implantations;

Application and Fibers used in implantable materials like vascular graft, sutures and heart valves.

- Learn Textiles for extra-corporeal devices;

Fiber requirements for extra corporeal devices such as skin, liver and kidney.

- Application and fiber requirements in healthcare and hygiene products such as surgical gowns, masks and wipes.

#### 4.6 Learn Pro tech

- Introduction of Textiles in protective clothing,
- Protection against heat, impact and others for safety.
- Fabrics in defense system and weapons;
- other applications

#### 4.7 Learn Packtech

- Definition
- Raw material used,
- Applications

#### 4.8 Learn Sports tech

- Introduction of Sports and recreation textiles,
- General; Sports uniforms;
- Applications (Baseball, Tennis; Football; Golf and hockey equipment's; Skates; Bikes; Marine products; Textiles in sports surfaces; Fabrics for children fun and play.)

#### 4.9 Learn ndu tech

- Introduction of Textiles in miscellaneous industrial applications,
- Raw Material / Properties
- Applications

3rd Year

## اسلامیات / مطالعہ پاکستان

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کس وقت: 20 بجے

نصاب (اصل سوئٹ)

حمد اور اسلامیات

حصہ دوم مطالعہ پاکستان

موضوعات:

قرآن مجید

1-

سورۃ الفاتحہ۔ ایہ النہی۔ سورۃ البقرۃ کی آخری آیات از اسم الرسول سے آغاز کو سورۃ الفاتحہ مع ترجمہ و تفسیر

2- میں منتخب احادیث سے ترجمہ و تفسیر

2-

بنی اسلام علی خمس شہادت لا الہ الا اللہ و اقامہ الصلوٰۃ و ایتانہ الزکوٰۃ و حج البیت و صوم رمضان

الذین انصبحتہ

3-

المنشاء مومن

4-

للمومن علی المؤمن سنت خصی یعود ما دامرض و تشہدہ لزامات و وجبہ لنا دعا

لیم علیہ انقلبہ و لیشتہ انا عظمی و فصیحہ لانا غاب و شہد

5-

لا یخس من غنک

6-

لا یفحل الحننہ فاطم

7-

ان اللہ حرم علیکم حقوق المہات و مضاعفہ اعمال

8-

لیسر اولاً تعسر اولاً تنفرا

9-

دقی طعم الایمان من مرضی باللہ و بالاسلام بیت بمجمہدینیا

10-

لنقص الذکر لا الہ الا اللہ

11-

حقوق و فرائض

12-

حصہ تعلیم بطور فرس۔ والدین اور نولاء کے حقوق و فرائض۔ مسجد کے حقوق

13-

مسلمہ کی اخلاقی اقدار

14-

مہرہ اشتغالی۔ غلو و رکود۔ ایفائے عہد۔ منوت۔ ایمان و قرین

سال سوئم  
حصہ اول اسلامیات

### تدریس مقاصد

قرآن حکیم

عمومی مقصد: منتخب سورتوں اور آیات کی روشنی میں اسلام کے بنیادی مقاصد اور عبادات جان سکے  
خصوصی مقاصد: طالب علم اس قتل ہو جائے گا کہ  
سورۃ الفاتحہ: آیت الکرسی۔ سورۃ بقرۃ کی آخری آیات از امن الرسول سے اور سورۃ اخلاق کا ترجمہ و تشریح کر سکے  
طالب علم درج ذیل کا مفہوم بیان کر سکے

☆ رب العالمین صرف اللہ تعالیٰ ہے

☆ اللہ رحم کرنے والا ہے

☆ قیامت کے دن پادشاہی اللہ کی ہوگی

☆ عبادت اور استعانت کا حقدار صرف اللہ ہے

☆ طالب علم درج ذیل کا مفہوم بیان کر سکے

☆ اللہ پاک ہر عیب سے پاک ہے

☆ اللہ کے اسمائے حسنہ حق اور قیوم ہیں

☆ تعلیم انبیاء پر ایمان لانا ضروری ہے

☆ رسول، ملائکہ، کتب سلوہ پر ایمان لانا فرض ہے

☆ اطاعت حقیقی صرف اللہ کے لیے ہے

☆ اسلامی احکامات پر عمل کرنا انسانی بلال میں ہے

☆ کفر کو اللہ کی مدد کے بغیر کھست نہیں دی جاسکتی

☆ اللہ ایک ہے

☆ اللہ کسی کا محتاج نہیں نہ اس کا کوئی شریک ہے

☆ منتخب احادیث

عمومی مقصد: احادیث کی روشنی میں اسلامی تعلیمات پر عمل پیرا ہو سکے

☆ خصوصی مقصد:

☆ احادیث کا ترجمہ بیان کر سکے

- ۱۰۰ احادیث کی تشریح کر سکے
- ۱۰۱ معاشرتی اور انفرادی زندگی میں احادیث سے راہنمائی حاصل کر سکے
- حقوق و فرائض**
- عمومی مقصد: اسلامی معاشرے کا ایک اچھا فرد بن سکے
- خصوصی مقاصد:
- ۱۰۲ والدین کے حقوق و فرائض بیان کر سکے
- ۱۰۳ دسیوں کے حقوق بیان کر سکے
- ۱۰۴ اسلام میں حقوق و فرائض کی صورت میں اپنے اندر خدمت مطلق کا جذبہ پیدا کر سکے
- اسلامی اقدار
- عمومی مقصد: طالب علم بہن سکے گا کہ تعلیم کا مقصد حسن اخلاق ہے متعسف ہوگا ہے
- خصوصی مقاصد
- ۱۰۵ اخلاق کے معنی و مفہوم کو بیان کر سکے
- ۱۰۶ اسلام میں حسن اخلاق کی اہمیت بیان کر سکے
- ۱۰۷ قرآن و سنت کی روشنی میں صبر و استقامت کی اہمیت بیان کر سکے
- ۱۰۸ اسلام میں غفور و رحیم کی اہمیت بیان کر سکے
- ۱۰۹ انصاف و عدل کی اہمیت بیان کر سکے
- ۱۱۰ اخوت کے معنی و مفہوم کو بیان کر سکے
- ۱۱۱ اخوت اسلامی کی اہمیت بیان کر سکے
- ۱۱۲ اسلام کی اعلیٰ قدر کو اپنا کر مثالی معاشرہ پیدا کر سکے

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QEN 311

نصاب (سہل سوئم)  
مظاہرہ پاکستان  
حصہ دوم

### موضوعات

- ☆ قیام پاکستان
- ☆ پونڈری کمیشن
- ☆ ریڈ کلف ایوارڈ
- ☆ تقسیم بنگلہ و کلکتہ
- ☆ تقسیم پنجاب
- ☆ مسئلہ مہاجرین
- ☆ ریاست کا الحاق
- ☆ ریاست جموں و کشمیر
- ☆ سری پانی کا تنازعہ
- ☆ قرار و اہم مقاصد
- ☆ علماء کے پانچ نکات
- ☆ 1956-1962 اور 1973 کے دستاویز کی اسلامی دفعات
- ☆ پاکستان کا محل وقوع اور اس کی جغرافیائی اہمیت
- ☆ قدرتی وسائل (تیل، گیس، کوئلہ)

## مطالعہ پاکستان (حصہ دوم) قیام پاکستان

### تدریس مقاصد

عمومی مقاصد: قیام پاکستان کے بعد درپیش مسائل سے آگاہی حاصل کرے اور بیان کرے  
خصوصی مقصد:

- ☆ باؤنڈری کمیشن تشکیل اور اس کے فرائض بیان کر سکے
- ☆ ریڈ کلف اور اس کے ایوارڈ کے بارے میں بیان کر سکے
- ☆ بنگل اور کلکتہ کی تقسیم کی وجوہات بیان کر سکے
- ☆ پنجاب کی تقسیم کی تفصیل بیان کر سکے
- ☆ مہاجرین کی آمد سے جو مسائل پیدا ہوئے انہیں بیان کر سکے
- ☆ ریاستوں کے الحاق کے بارے میں تفصیل بیان کر سکے
- ☆ ریاست جموں کشمیر کے بارے میں بیان کر سکے
- ☆ سری پانی کے تنازعہ کو بیان کر سکے
- ☆ قرار داد مقاصد کی تفصیلات بیان کر سکے
- ☆ 22 علماء کے متفقہ اسلامی نکات بیان کر سکے
- ☆ قیام پاکستان کے بعد نفاذ اسلام کی کوششوں کو بیان کر سکے
- ☆ پاکستان کے محل وقوع اور اس کی جغرافیائی اہمیت بیان کر سکے
- ☆ پاکستان میں قدرتی وسائل (تیل۔ گیس۔ کوئلہ) کے بارے میں بیان کر سکے

## (غیر مسلم طلباء کے لئے)

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Gen 311

نصاب اختلاقیات

سال سوئم

موضوعات

☆ احساس ذمہ داری

☆ مثبت ذہن

☆ عدل و انصاف

☆ قوی خدمت کا جذبہ

☆ ذکر و نظر کی پاکیزگی

☆ احترام آدمیت

☆ شائستگی

☆ عضو و درگزر

☆ بردباری

☆ خود انحصاری

☆ اثر و نفوذ

☆ جامعیت

☆ اپنی ذات کی معرفت (پذیرا ہوں ہم عمر طلباء اساتذہ اہم شخصیات ادارہ)



## **Mgm-311 INDUSTRIAL MANAGEMENT AND HUMAN RELATIONS**

### **TOTAL CONTACT HOURS:**

		<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory</b>	<b>:</b>	<b>32</b>	<b>1</b>	<b>0</b>
<b>Practical</b>	<b>:</b>	<b>00</b>	<b>1</b>	

### **AIMS:**

Enable students to develop management skills acquaint with principles of management and human relations and develop psychological approach to solve the labour.

### **COURSE CONTENTS:**

- 1. INDUSTRIAL PSYCHOLOGY:** **Hours-02**
  - 1.1 History and definition.
  - 1.2 Nature and scope.
- 2. LEADERSHIP** **Hours-01**
  - 2.1 Definition and types
  - 2.2 Qualities of good leader.
- 3. MOTIVATION** **Hours-02**
  - 3.1 Definition.
  - 3.2 Types (financial and non-financial motives)
  - 3.3 Content of motives.
- 4. MORALE** **Hours-01**
  - 4.1 Importance
  - 4.2 Development.
  - 4.3 Measurement.
- 5. HUMAN ENGINEERING** **Hours-01**
  - 5.1 Importance of Human factor in Industry.

- 5.2 Man machine system.
- 5.3 Strategy for making allocation decisions.

**6. INDUSTRIAL FATIGUE AND BOREDOM** **Hours-02**

- 6.1 Definition and distinction.
- 6.2 Psychological and distinction.
- 6.3 Objective causes.
- 6.4 Prevention.

**7. INDUSTRIAL ACCIDENTS** **Hours-02**

- 7.1 Psychological causes.
- 7.2 Objective causes.
- 7.3 Prevention.

**8. INDUSTRIAL PREJUDICE** **Hours-02**

- 8.1 Causes.
- 8.2 Remedies

**9. PUBLIC RELATIONS** **Hours-02**

- 9.1 Importance
- 9.2 Functions

**10. GUIDANCE AND COUNSELING** **Hours-02**

- 10.1 Importance
- 10.2 Choice of job.
- 10.3 During service.

**11. JOB EVALUATION** **Hours-02**

- 11.1 Importance
- 11.2 Methods.
- 11.3 Job satisfaction.

11.4 Work simplification.

**12. INDUSTRIAL MANAGEMENT**

**Hours-02**

12.1 Introduction

12.2 Functions of management

12.3 Sub divisions of industrial management.

**13. PERSONAL SELECTION**

**Hours-02**

13.1 Recruitment of employees.

13.2 Training.

13.3 Effect of training on production and product cost.

**14. WORKING CONDITIONS**

**Hours-02**

14.1 Importance and consideration.

14.2 Effect on efficiency and per unit Cost.

**15. TIME AND MOTION STUDY**

**Hours-03**

15.1 Concepts and importance.

15.2 Sequence of motion study.

15.3 Principles of motion study.

15.4 Steps to time study.

15.5 Determination of operations time.

**16. QUALITY CONTROL**

**Hours-02**

16.1 Concepts and advantages.

16.2 Methods.

## **17. ROLE OF FOREMAN IN MANAGEMENT**

**Hours-02**

17.1 Foreman abilities.

17.2 Duties and functions.

### **BOOKS RECOMMENDED:-**

1. C.S. Meyers. Industrial Psychology Oxford University Press.
2. Smith Wakley. Psychology of Industrial behaviours. Mc-Graw Hill. New York.
3. Ghulam Hussain, Nizamat-e-Sanaat Aur Insani Rawabat, Ilmi Kitab Khana.
4. Andrew R, McGill, The Process of management William M. Nevman.
5. Richard N Omen. Management of Industrial Enterprises.

## **Mgm-311 INDUSTRIAL MANAGEMENT AND HUMAN RELATIONS**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. KNOW INDUSTRIAL PSYCHOLOGY**

- 1.1 Describe brief history of industrial psychology.
- 1.2 Describe in detail definition of industrial psychology.
- 1.3 State nature and scope of industrial psychology.

#### **2. KNOW LEADERSHIP**

- 2.1 Define leadership.
- 2.2 Describe types of leadership.
- 2.3 State qualities of a good leader.

#### **3. UNDERSTAND MOTIVATION**

- 3.1 Define motivation.
- 3.2 Describe financial and non-financial motives.
- 3.3 Explain conflict of motives.

#### **4. KNOW MORALE**

- 4.1 State importance of morale.
- 4.2 Describe development of morals.
- 4.3 State the method of measurement of morals.

#### **5. UNDERSTAND HUMAN ENGINEERING**

- 5.1 Explain importance of human engineering in the industry.
- 5.2 Explain man-machine system.
- 5.3 Explain strategy for making allocation decisions.

#### **6. UNDERSTAND INDUSTRIAL FATIGUE AND BOREDOM**

- 6.1 Define fatigue and boredom.

- 6.2 Describe psychological causes of fatigue and boredom.
- 6.3 Describe objective causes of fatigue and boredom
- 6.4 Explain measures to prevent fatigue and boredom.

## **7. UNDERSTAND INDUSTRIAL ACCIDENTS**

- 7.1 explain psychological causes of industrial accidents.
- 7.2 Explain objective causes of industrial accidents.
- 7.3 Explain measure to prevent industrial accidents.

## **8. UNDERSTAND INDUSTRIAL PREJUDICE**

- 8.1 Define Prejudice.
- 8.2 Explain causes of industrial prejudice.
- 8.3 Explain remedies of industrial prejudice.

## **9. UNDERSTAND THE SIGNIFICANCE OF PUBLIC RELATIONS**

- 9.1 Explain importance of public relations.
- 9.2 Explain functions of public relations.

## **10. UNDERSTAND THE NEED FOR GUIDANCE AND COUNSELLING**

- 10.1 State importance of guidance and counseling/
- 10.2 Explain the role of guidance and counseling in handling the job.
- 10.3 Describe help of guidance and counseling during service.

## **11. UNDERSTAND JOB EVALUATION**

- 11.1 Explain importance of job evaluation.
- 11.2 Explain methods of job evaluation.
- 11.3 Explain job satisfaction.
- 11.4 Explain work simplification.

## **12. UNDERSTAND INDUSTRIAL MANAGEMENT**

- 12.1 Define management.
- 12.2 State functions of management.

- 12.3 Enlist subdivision of management.
- 12.4 Explain objectives of industrial management.

**13. UNDERSTAND TRAINING AND ITS EFFECTS**

- 13.1 Describe the recruitment procedure of employees to an industrial concern.
- 13.2 Explain training.
- 13.3 Identity the kinds of training.
- 13.4 Explain the effects of training on production and product cost.

**14. EFFECTS OF WORKING CONDITON ON EFFICIENCY**

- 14.1 Explain importance of working condition.
- 14.2 Describe air-conditioning, ventilation, lighting and noise.
- 14.3 State effects of good working conditions on efficiency and per unit cost.

**15. UNDERSTAND TIME AND MOTION STUDY**

- 15.1 Explain the concept.
- 15.2 Describe the importance of work study.
- 15.3 Explain the sequence of motion study.
- 15.4 State the principles of motion study.
- 15.5 Describe the steps for carrying out time study.
- 15.6 Explain the method of determination of operations time.

**16. UNDERSTAND THE METHODS OF QUALITY CONTROL**

- 16.1 Define quality control.
- 16.2 State the advantages of quality control.
- 16.3 Explain methods of quality control.

**17. THE ROLE OF FOREMAN IN AN INDUSTRIAL UNDERTAKING**

- 17.1 Explain ability of the foreman.
- 17.2 Enlist duties of foreman.
- 17.3 Describe functions of foreman as middle management.

Total Contact Hours		T	P	C
Theory:	32 HOURS	1	0	1
Practical:	0 HOURS			

**Pre-requisites:** Nil

**AIMS:** At the end of this course students will understand modern concepts of TQM and will be able to apply them for improving quality of yarn. Moreover, they will learn modern methods of controlling spinning process

**DETAIL COURSE CONTENTS:**

- |  |                |
|--|----------------|
| <b>1. ENTREPRENEURIAL MINDSET</b><br>1.1. Who are entrepreneurs and what are their common characteristics?<br>1.2. How entrepreneurs think?<br>1.3. The dark side of entrepreneurship<br>1.4. Entrepreneurial motivation | <b>3 HOURS</b> |
| <b>2. ETHICS AND ENTREPRENEURSHIP</b><br>2.1. Ethics, enterprise, and laws<br>2.2. Ethical responsibility<br>2.3. Ethics and business decisions  | <b>3 HOURS</b> |
| <b>3. OPPORTUNITY ASSESSMENT OF NEW VENTURES</b><br>3.1. Critical factors to new venture development<br>3.2. Reasons for failure of new ventures<br>3.3. The evaluation process  | <b>3 HOURS</b> |
| <b>4. MARKETING RESEARCH FOR NEW VENTURES</b><br>4.1. Marketing philosophy<br>4.2. Market segmentation<br>4.3. Consumer behavior<br>4.4. Marketing stages for growing ventures<br>4.5. Marketing and pricing strategies  | <b>4 HOURS</b> |
| <b>5. FINANCIAL PLANNING FOR ENTREPRENEURIAL VENTURES</b><br>5.1. Importance of financial information for entrepreneurs<br>5.2. Introduction to key financial statements   | <b>3 HOURS</b> |
| <b>6. BUSINESS PLAN FOR ENTREPRENEURIAL VENTURES</b>   | <b>3 HOURS</b> |



- 6.1. Benefits of a business plan
- 6.2. Elements of a business plan
- 6.3. Presentation of a business plan
- 7. LEGAL FORMS OF ENTREPRENEURIAL ORGANIZATIONS 3 HOURS**
  - 7.1. Different types of legal structures- advantages and disadvantages of each
- 8. LEGAL ENVIRONMENT AND ENTREPRENEURSHIP 3 HOURS**
  - 8.1. Patents, copyrights, and trademarks
  - 8.2. Bankruptcy
- 9. STRATEGIC PLANNING FOR GROWTH AND DEVELOPMENT 3 HOURS**
  - 9.1. Value of strategic planning
  - 9.2. Implementing a strategic plan
  - 9.3. Venture development stages
- 10. VALUATING THE VENTURE 3 HOURS**
  - 10.1. The importance for business valuation
  - 10.2. Analyzing the business
  - 10.3. Establishing a firm's value
- 11. HARVESTING THE VENTURE 4 HOURS**
  - 11.1. Key factors in succession
  - 11.2. Developing a succession strategy
  - 11.3. The harvest strategy
  - 11.4. Complete sale of the venture

**RECOMMENDED BOOKS:**

- i. Entrepreneurship 10<sup>th</sup> Edition by Robert Hisrich, Michael Peters and Dean Shepherd, McGraw Hill, 2016
- ii. Entrepreneurship 7<sup>th</sup> Edition by Donald Kuratko and Richard Hodgetts, Thomson South-Western, 2007

**INSTRUCTIONAL OBJECTIVES:****1. ENTREPRENEURIAL MINDSET**

- 1.1. To know about who are entrepreneurs and what are their common characteristics?
- 1.2. To learn how entrepreneurs think?
- 1.3. To know about the dark side of entrepreneurship
- 1.4. To understand entrepreneurial motivation

**2. ETHICS AND ENTREPRENEURSHIP**

- 2.1. To know about ethics, enterprise, and laws
- 2.2. To become familiar with ethical responsibility
- 2.3. To know about ethics of business decisions

**3. OPPORTUNITY ASSESSMENT OF NEW VENTURES**

- 3.1. To understand the critical factors to new venture development
- 3.2. To know about reasons for failure of new ventures
- 3.3. To apprehend the evaluation process

**4. MARKETING RESEARCH FOR NEW VENTURES**

- 4.1. To understand the marketing philosophy
- 4.2. To know about market segmentation
- 4.3. To become familiar with consumer behavior
- 4.4. To be able to explain marketing stages for growing ventures
- 4.5. To be able to explain marketing and pricing strategies

**5. FINANCIAL PLANNING FOR ENTREPRENEURIAL VENTURES**

- 5.1. To understand the importance of financial information for entrepreneurs
- 5.2. To become introduced to key financial statements

**6. BUSINESS PLAN FOR ENTREPRENEURIAL VENTURES**

- 6.1. To know about the benefits of a business plan
- 6.2. To know about the elements of a business plan
- 6.3. To know how to present a business plan

**7. LEGAL FORMS OF ENTREPRENEURIAL ORGANIZATIONS**

- 7.1. To know about different types of legal structures- advantages and disadvantages of each

**8. LEGAL ENVIRONMENT AND ENTREPRENEURSHIP**

- 8.1. To understand the importance of patents, copyrights, and trademarks
- 8.2. To know what is bankruptcy and how is it important for an entrepreneur?

## **9. STRATEGIC PLANNING FOR GROWTH AND DEVELOPMENT**

- 9.1. To understand the value of strategic planning
- 9.2. To know how to implement a strategic plan
- 9.3. To know about venture development stages

## **10. VALUATING THE VENTURE**

- 10.1. To know about the importance for business valuation
- 10.2. To know basics of analyzing a business
- 10.3. To understand how to establish a firm's value?

## **11. HARVESTING THE VENTURE**

- 11.1. To become familiar with key factors in succession
- 11.2. To know how to develop a succession strategy
- 11.3. To understand the harvest strategy
- 11.4. To become familiar with process of complete sale of the venture

**TW-315 SPECIAL PROJECT ON WEAVING**

<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>6</b>	<b>5</b>

**TOTAL CONTACT HOURS:****Theory : 96****Practical : 192****PRE-REQUISITE:**

Fundamental of Weaving.

**AIM:** The course is designed to acquaint the students with weaving machinery.**TOPIC/SUB TOPIC:****(Part-A)**

- |   |                 |
|---|-----------------|
| <b>1. CONE WINDING:</b>   | <b>08 HOURS</b> |
| 1.1 Manual cone winding.  |                 |
| 1.2 Auto cone winding.  |                 |
| 1.3 Knottier and splices  |                 |
| 1.4 Yarn tensioners; patterning, reasons and their remedies;              |                 |
| 1.5 Yarn faults classifying systems;                                      |                 |
| 1.4 Calculation related to Cone Winding                                   |                 |
| <b>2. WARPING:</b>  | <b>08 HOURS</b> |
| 2.1 Warping Creel Types   |                 |
| 2.2 Sectional Warping   |                 |
| 2.3 Direct Warping  |                 |
| 2.4 Ball Warping  |                 |
| 2.5 Yarn breakage rate,   |                 |
| 2.6 Calculation related to warping  |                 |
| 2.7 Efficiency and machine speed; cost factors.                           |                 |
| <b>3. SIZING:</b>   | <b>08 HOURS</b> |
| 3.1 Sizing ingredients properties of sizing materials                     |                 |
| 3.2 Size mixing.  |                 |
| 3.3 Drying theory.  |                 |
| 3.4 Size percentage. recipe of sizing, pick-up of sizing liquor           |                 |
| 3.5 Sizing Machine, variations of the process for terry towel, and denim. |                 |
| 3.6 machine drive; tension control and advanced mechanisms;               |                 |
| 3.7 wastages & losses in sizing process                                   |                 |
| 3.7 yarn breakage rate; its effects and production and efficiency         |                 |
| 3.8 Calculation related to Sizing   |                 |
| <b>4. DRAWING -IN AND KNOTTING</b>  | <b>06 HOURS</b> |
| 4.1 Manual Drawing-In   |                 |
| 4.2 Mechanical Drawing-In   |                 |
| 4.3 Manual Knotting   |                 |
| 4.4 Mechanical Knotting   |                 |
| <b>5. HEALDS AND REEDS:</b>   | <b>06 HOURS</b> |

5.1	Types of Healds	
5.2	Types of Reeds	
5.3	Calculation related to Heald and Reed	
<b>6.</b>	<b>TENSION DEVICES FOR YARN AND FABRIC</b>	<b>06 HOURS</b>
6.1	Yarn Tension Devices	
6.2	Effects of Tension on Fabric	
6.3	Load Cells	
6.4	Temples	
<b>7.</b>	<b>STOP MOTIONS</b>	<b>06 HOURS</b>
7.1	Warp Stop Motion	
7.2	Weft Stop Motion	
7.3	Feelers	
	<b>(Part-B)</b>	
<b>8.</b>	<b>SALVEDGE</b>	<b>06 HOURS</b>
8.1	Leno Selvedge	
8.2	Tuck-In Selvedge	
8.3	Melt Selvedge	
8.4	Stitched Selvedge	
<b>9.</b>	<b>LOOM SETTING:</b>	<b>06 HOURS</b>
9.1	Setting of Tappets.	
9.2	Setting of Shed.	
9.3	Timings of Different Motions.	
<b>10.</b>	<b>FABRIC CALCULATION</b>	<b>08 HOURS</b>
10.1	Warp Contraction	
10.2	Weft Contraction	
10.3	Weight of Warp	
10.4	Weight of Weft	
10.5	Weight of Fabric	
10.6	Weight of Square Yard Fabric	
<b>11.</b>	<b>WEFT INSERTION:</b>	<b>08 HOURS</b>
11.1	Shuttle picking.	
11.2	Projectile weft insertion.	
11.3	Air Jet weft insertion	
11.4	Repair weft insertion	
<b>12.</b>	<b>DOBBY AND JACQUARD MACHINES</b>	<b>08 HOURS</b>
12.1	Single left Jacquard.	
12.2	Centre shed Jacquard.	
12.3	Harness Arrangement	
12.4	Card Punching	
12.5	Working of Dobby	
12.6	Preparation of Dobby Chain	
<b>13.</b>	<b>PRODUCTION AND EFFICIENCY OF LOOM:</b>	<b>06 HOURS</b>
13.1	Loom efficiency	

- 13.2 Factors involved in Efficiency and Production
- 13.3 Weaver Work Load
- 13.4 Calculation related to Efficiency and Production

**14. LOOM MODIFICATIONS:**

**06 HOURS**

- 14.1 Automation of Loom
- 14.2 Electronic Dobby
- 14.3 Electronic Jacquard

## **TW-315 SPECIAL PROJECT ON WEAVING INSTRUCTIONAL OBJECTIVES**

### **1. CONE WINING**

- 1.1 Understand cone winding.
  - 1.1.1 Describe manual cone winding.
  - 1.1.2 Describe working of Auto cone winding.
  - 1.1.3 Draw a passage of yarn on cone winding machine.
  - 1.1.4 Describe knottier and splicer.
  - 1.1.5 Describe automatic doffing.

### **2. WARPING.**

- 2.1 Understand warping.
  - 2.1.1 State types of warping creel.
  - 2.1.2 Explain sectional warping.
  - 2.1.3 Explain direct warping.
  - 2.1.4 Discussion on making a beam set for given order.

### **3. SIZING**

- 3.1 Understand sizing.
  - 3.1.1 Explain sizing ingredients.
  - 3.1.2 Describe size mixing.
  - 3.1.3 Explain drying theory.
  - 3.1.4 Explain size percentage on warp.
  - 3.1.5 Explain construction & working of sizing machine.
  - 3.1.6 Discussion on sizing Calculation.

### **4. DRAWING-IN**

- 4.1 Understand drawing-in.
  - 4.1.1 Explain Drawing-in.
  - 4.1.2 Discuss knotting machine.
  - 4.1.3 Discuss gaiting process.

### **5. HEALDS FRAME, REEDS AND DROPPERS**

- 5.1 Understand Healds and Reeds.
  - 5.1.1 Explain types of healds.
  - 5.1.2 Explain types of reeds.
  - 5.1.3 Enlist various systems of Reed counting.
  - 5.1.4 Discuss Heald frame and droppers.

### **6. TENSION DEVICES FOR YARN AND FABRIC**

- 6.1 Understand Tension devices for Yarn and Fabric.
  - 6.1.1 State types of Tension devices.
  - 6.1.2 Explain working of Load cell.
  - 6.1.3 State types of Temples.
  - 6.1.4 Explain setting of temples.

### **7. STOP MOTIONS**

- 7.1 Understand stop motions.
  - 7.1.1 Explain warp stop motions.

- 7.1.2 Explain weft stop motions.
- 7.1.3 Discuss Feelers.

**(Part-B)**

**8. SELVEDGE.**

- 8.1 Understand selvages.
  - 8.1.1 State types of selvages.
  - 8.1.2 Explain Leno selvages.
  - 8.1.3 Explain Tuck-in selvages.
  - 8.1.4 Discussion melts & stitched selvages.

**9. LOOM SETTING**

- 9.1 Understand loom setting.
  - 9.1.1 Explain setting of tappets.
  - 9.1.2 Explain setting of shed.
  - 9.1.3 Discuss Timings of different motions.

**10. FABRIC CALCULATION**

- 10.1 Understand Fabric calculation.
  - 10.1.1 Describe contraction of warp.
  - 10.1.2 Describe contraction of weft.
  - 10.1.3 Discussion on Fabric calculation.
  - 10.1.4 Discussion on per yard & square per yard calculation.
  - 10.1.5 Explain material & labor cost calculation.

**11. WEFT INSERTION**

- 11.1 Understand weft insertion.
  - 11.1.1 Explain Shuttle weft insertion.
  - 11.1.2 Explain Air-jet weft insertion.
  - 11.1.3 Explain Projectile weft insertion.
  - 11.1.4 Explain Rapier weft insertion.

**12. DOBBY AND JACQUARD MACHINES.**

- 12.1 Understand Dobby and Jacquard machines.
  - 12.1.1 Explain single left Jacquard.
  - 12.1.2 Describe centre shed Jacquard.
  - 12.1.3 Explain harness Arrangement.
  - 12.1.4 Explain card Punching.
  - 12.1.5 Explain Working of Dobby.
  - 12.1.6 Discussion on Dobby chain.

**13. PRODUCTION AND EFFICIENCY OF LOOM.**

- 13.1 Understand Production & Efficiency of loom.
  - 13.1.1 Explain Loom efficiency.
  - 13.1.2 Discuss factors involved in efficiency and production



13.1.3 Explain weaver work load.

13.1.4 Discussion on calculation related to efficiency and production.

#### **14. LOOM MODIFICATIONS.**

14.1 Understand loom modifications.

14.1.1 Explain automation of loom.

14.1.2 Explain electronic dobby.

14.1.3 Explain electronic jacquard.

## **TW-315 SPECIAL PROJECT ON WEAVING**

**Practical: 192 Hours**

### **PRACTICAL LIST**

1. Study of Winding Machine.	12 Hours
2. Study of Warping Machine.	12 Hours
3. Plan a Beam set on warping machine.	09 Hours
4. Study of back process of sizing machine.	09 Hours
5. Study of Drying Cylinder and Splitting section of sizing machine.	09 Hours
6. Study of Headstock of sizing machine.	09 Hours
7. Study of Sizing ingredients and recipe preparation.	09 Hours
8. Study of Drawing-in process.	12 Hours
9. Study of Knotting process.	12 Hours
10. Study of different types of Reeds, Droppers and Heald frames.	12 Hours
11. Study of Electronically warp and weft stop mechanism of looms.	12 Hours
12. Study of Temples & Tension Devices.	12 Hours
13. Study of different types of Selvedges.	12 Hours
14. Study of picking mechanism of shuttle loom.	09 Hours
15. Study of picking mechanism of Air jet loom.	09 Hours
16. Study of picking mechanism of Rapier and Projectile loom.	09 Hours
17. Study of Dobby mechanism of looms.	12 Hours
18. Study of Jacquard mechanism of looms.	12 Hours

## **TW-303     FABRIC DESIGN AND ANALYSIS**

<b>T</b>	<b>P</b>	<b>C</b>
<b>2</b>	<b>3</b>	<b>3</b>

**TOTAL CONTACT HOURS: 64 HOURS**

**Theory : 64**

**Practical : 96**

**Pre-requisite: Fabric Design and Structure.**

**AIM:** The course is designed to acquaint the students with fabric designing and cloth analysis.

**Detail Course Contents:**

- |  |                |
|--|----------------|
| <b>1. DRAFT:</b>                                       | <b>4 HOURS</b> |
| 1.1 Objects of Draft Plan.                             |                |
| 1.2 Indicating Methods.                                |                |
| 1.3 Types of Draft Plan.                               |                |
| <b>2. ANALYSIS OF FABRIC:</b>                          | <b>8 HOURS</b> |
| 2.1 Objects of Analysis.                               |                |
| 2.2 Physical Analysis for Draft & Lifting plan.        |                |
| 2.3 Chemical Analysis.                                 |                |
| <b>3. SPECIAL CLASS OF PLAIN WEAVES.</b>               | <b>5 HOURS</b> |
| 3.1 Warp or Long Rib.                                  |                |
| 3.2 Weft or Cross Rib.                                 |                |
| 3.3 Fancy Rib Weaves.                                  |                |
| 3.4 Mat Weave.   |                |
| 3.5 Twilled Hopsack.                                   |                |
| <b>4. SPECIAL CLASS OF TWILL WEAVES.</b>               | <b>5 HOURS</b> |
| 4.1 S & Z Twills.                                      |                |
| 4.2 Herring Bone Twill.                                |                |
| 4.3 Bedford Card Twill.                                |                |
| 4.4 Bird Eyes Twill.                                   |                |
| <b>5. SPECIAL CLASS OF SATIN &amp; SATEEN WEAVES.</b>  | <b>5 HOURS</b> |
| 5.1 Standard Satin & Sateen Weaves.                    |                |
| 5.2 Stripe Satin.                                      |                |
| 5.3 Crepe Weaves.                                      |                |
| 5.4 Cork Screw Weaves.                                 |                |
| <b>6. EXTRA WARP &amp; EXTRA WEFT FIGURED FABRICS.</b> | <b>5 HOURS</b> |
| 6.1 Introduction of Figured Fabrics.                   |                |
| 6.2 Methods of Construction.                           |                |
| 6.3 Extra Warp Figured Fabrics.                        |                |
| 6.4 Extra Weft Figured Fabrics.                        |                |
| <b>7. PILE FABRICS.</b>                                | <b>5 HOURS</b> |
| 7.1 Classification of Pile Fabrics.                    |                |
| 7.2 Warp Pile Fabrics.                                 |                |
| 7.3 Weft Pile Fabrics.                                 |                |
| 7.4 Terry Fabrics.                                     |                |

<b>8. BACKED FABRICS</b>	<b>5 HOURS</b>
8.1 Principle of Construction.	
8.2 Warp Backed Fabrics.	
8.3 Weft Backed Fabrics.	
<b>9. DOUBLE CLOTHS.</b>	<b>5 HOURS</b>
9.1 Classification of Double Cloths.	
9.2 Self Stitched Double Cloths.	
9.3 Center Stitched Double Cloths.	
9.4 Wadded Threads Double Cloths.	
<b>10. COLORS AND WEAVE EFFECTS.</b>	<b>5 HOURS</b>
10.1 Light Theory of Colors.	
10.2 Modification of Colors.	
10.3 Classification of Colors and Weave Effects.	
10.4 Effects of Weaves and Colors Combination.	
<b>11. STRIPES FABRICS.</b>	<b>5 HOURS</b>
11.1 Introduction of Stripe Fabrics.	
11.2 Warp Stripe Fabrics.	
11.3 Weft Stripe Fabrics.	
11.4 Check Fabrics.	
<b>12. FABRIC SETTING &amp; COVER FACTOR.</b>	<b>5 HOURS</b>
12.1 Diameter of Yarn.	
12.2 Setting of Simple Fabrics.	
12.3 Setting of Fabrics having different Yarn diameter, EPI & PPI.	
12.4 Cover Factor of Cloths.	

## **TW-303     FABRIC DESIGN AND ANALYSIS**

### **INSTRUCTIONAL OBJECTIVE:**

#### **1.     DRAFT**

- 1.1    To understand draft.
  - 1.1.1    Discuss objects of draft.
  - 1.1.2    Explain indicating methods of draft.
  - 1.1.3    Explain the different types of draft.

#### **2.     ANALYSIS FABRIC**

- 2.1    Understand analysis of fabric.
  - 2.1.1    Analysis sample of cloth.
  - 2.1.2    Draw design of cloth.
  - 2.1.3    Draw draft and peg plan of different designs.

#### **3.     SPECIAL CLASS OF PLAIN WEAVES.**

- 3.1    Understand extra warp and weft fabric.
  - 3.1.1    Describe warp or long rib.
  - 3.1.2    Describe weft or cross rib.
  - 3.1.3    Describe fancy rib weave.
  - 3.1.4    Explain Hopsack or Mat weave.

#### **4.     SPECIAL CLASS OF TWILL WEAVES.**

- 4.1    Understand Special classes of twill weaves.
  - 4.1.1    Explain S & Z Twills
  - 4.1.2    Explain warp and weft face twills
  - 4.1.3    Explain Herring bone twill.
  - 4.1.4    Explain Bedford card twill.
  - 4.1.5    Explain Bird eyes twill.

#### **5.     SPECIAL CLASS OF SATIN & SATEEN WEAVES.**

- 5.1    Understand Special classes of satin & sateen weaves
  - 5.1.1    Standard Satin & Sateen weaves.
  - 5.1.2    Discuss Stripe satin.
  - 5.1.3    Explain Crepe weaves.
  - 5.1.4    Discuss Cork screw weaves.

#### **6.     EXTRA WARP & EXTRA WEFT FIGURED FABRICS.**

- 6.1    Understand special weave fabric.
  - 6.1.1    Introduce Figured fabrics.
  - 6.1.2    Explain methods of construction.
  - 6.1.3    Explain Extra warp figured fabrics.
  - 6.1.4    Explain Extra weft figured fabrics.

#### **7.     PILE FABRICS.**

- 7.1    Understand Pile fabrics
  - 7.1.1    State classification of Pile fabrics.
  - 7.1.1    Explain warp pile fabrics.
  - 7.1.2    Explain weft pile fabrics.
  - 7.1.3    Explain Terry fabrics.

## **8. BACKED FABRICS.**

- 8.1 Understand backed fabrics.
  - 8.1.1 State principles of construction of backed fabrics.
  - 8.1.2 Explain Warp backed fabrics.
  - 8.1.3 Explain Weft backed fabrics.

## **9. DOUBLE CLOTHS.**

- 9.1 Understand double cloths.
  - 9.1.1 State classification of double cloths.
  - 9.1.2 Explain Self stitched double cloths.
  - 9.1.3 Discuss center stitched double cloths.
  - 9.1.4 Explain wadded threads double cloths.

## **10. COLOUR AND WEAVE EFFECT**

- 10.1 Understand color and weave effects.
  - 10.1.1 State light theory of colors.
  - 10.1.2 State modification of colors
  - 10.1.3 State classification of colors and weave effects.
  - 10.1.4 Discuss weave and color effects with warp and weft color pattern.

## **11. STRIPES FABRICS.**

- 11.1 Understand stripe fabrics.
  - 11.1.1 State introduction of stripe fabrics.
  - 11.1.2 Explain warp stripe fabrics.
  - 11.1.3 Explain weft stripe fabrics.
  - 11.1.4 Discuss check fabrics

## **12. FABRIC SETTING & COVER FACTOR.**

- 12.1 Understand cloth setting and cover factor.
  - 12.1.1 Explain diameter of yarn.
  - 12.1.2 Explain setting of simple fabric.
  - 12.1.3 Explain setting of fabrics having different Yarn diameter, EPI & PPI
  - 12.4 Discuss cover factor of cloths

## **TW-303     FABRIC DESIGN AND ANALYSIS**

### **Practical List**

**Practical                :        96 Hours**

- |  |          |
|--|----------|
| 1. Practice of making Draft & Lifting planes from different designs.       | 06 Hours |
| 2. Study of Parameters involving in Fabric Analysis & Designing.           | 06 Hours |
| 3. Analysis & Designing of a Rib weave fabric.                             | 06 Hours |
| 4. Analysis & Designing of a Mat/ Basket weave fabric.                     | 06 Hours |
| 5. Analysis & Designing of a "S" Twill fabric.                             | 06 Hours |
| 6. Analysis & Designing of a "Z" Twill fabric.                             | 06 Hours |
| 7. Analysis & Designing of a Jeans.  | 06 Hours |
| 8. Analysis & Designing of a Satin fabric.                                 | 06 Hours |
| 9. Analysis & Designing of a Stripe Satin fabric.                          | 06 Hours |
| 10. Analysis & Designing of a Herring Bone fabric.                         | 06 Hours |
| 11. Analysis & Designing of a Bedford cord fabric.                         | 06 Hours |
| 12. Analysis & Designing of any Figured fabric.                            | 06 Hours |
| 13. Analysis & Designing of any Pile fabric.                               | 06 Hours |
| 14. Analysis & Designing of a Double cloth.                                | 06 Hours |
| 15. Do setting of a fabric which have different diameter of warp and weft. | 06 Hours |
| 16. Designing of different effects by weave and colors.                    | 06 Hours |

## TW-333 KNITTING TECHNOLOGY-II

T	P	C
2	3	3

**Theory : 64 Hours**

**Practical : 96 Hours**

### OBJECTIVES:

At the end of the study the student will be able to

- Know and analyze the different types of knit structure.
- Know and analyze the different types of Hosiery structure.
- Know and analyze the different types of Hosiery Machines.

### DETAIL COURSE CONTENTS:

#### 1. KNITTING TECHNOLOGY

**4 HOURS**

- 1.1 Yarn quality requirements for knitting.
- 1.2 Preparation of staple yarns for weft and warp knitting.

#### 2. WEFT KNITTING

**12 HOURS**

- 2.1 Weft knitted structures plain, rib, interlock and purl;
- 2.2 Formation of knit, tuck and float stitches;
- 2.3 Factors affecting the formation of loop;
- 2.4 Effect of loop length and shape on fabric properties;
- 2.5 Analysis of various types of weft knitted structure.
- 2.6 Weft knitted fabric geometry.

#### 3. WARP KNITTING

**12 HOURS**

- 3.1 Basic principles;
- 3.2 Elements of warp knitted loop – open loop, closed loop;
- 3.3 Warp knitting elements- chain link, chain links for simple patterns, guide bar movement mechanism.
- 3.4 Tricot and Rachel warp knitting machines.
- 3.5 Principles of double needle bar patterning,
- 3.6 Terry pile fabric production. Let off system;
- 3.6 Take up system;

#### 4. HOSIERY MACHINE

**12 HOURS**

- 4.1 Classification of hosiery products based on length –
- 4.2 Hosiery Articles – Brief study of Ladies Panty hose, Men's half hose –
- 4.3 Classification of hosiery machine - Single Cylinder machine –
- 4.4 Knitting cycle Knitting Elements - Types of needles – Cylinder - Cam system - Sinkers - Sinker cams - Switch cam –
- 4.5 Hosiery machine - Driving mechanism and gearing
- 4.6 Timing and control mechanism (chain and drum)- pattern wheel - Clutch action – Clutch control cams - Pickers - Picker Narrowing - Picker control - Hosiery stitch length control.



## **5. HOSIERY STRUCTURES**

**16 HOURS**

- 5.1 Scott & William Inturned Welt system –
- 5.2 Method of producing mock –rib - Production of heel & toe –
- 5.3 various types of heel & toe –
- 5.4 Various types of yarns used for Hosiery –
- 5.5 Plating – Plain plating – Reverse Plating – Float Plating –
- 5.6 Hosiery Patterns – Horizontal stripe, vertical stripe, float stitch, micro-mesh, cross-tuck
- 5.7 Production of Terry Structure - Eyelet patterning – wrap patterning- Intarsia patterning
- 5.8 Special Warp knitted structures for Technical Textile applications
- 5.9 Garment Length Sequence Knitting;
- 5.10 Application of CAD/CAM.
- 5.11 Whole Garment knitting system.
- 5.12 Seamless Gloves and Socks knitting machines.

## **6. Defects in Weft knit fabrics**

**8 HOURS**

- 6.1 Vertical lines,
- 6.2 Horizontal lines,
- 6.3 Drop stitches,
- 6.7 Distorted stitches and Press off

### **Recommended Books:-**

Principles of Knitting D B Ajgaonkar Universal Publishing Corporation

Knitting Technology David J Spencer Pergamon Press Oxford

## **TW-333 KNITTING TECHNOLOGY II**

### **INSTRUCTIONAL OBJECTIVES**

#### **1. UNDERSTAND KNITTING TECHNOLOGY**

- 1.1 Yarn quality requirements for knitting.
- 1.2 Preparation of staple yarns for weft and warp knitting.

#### **2. UNDERSTAND WEFT KNITTING**

- 2.1 Weft knitted structures plain, rib, interlock and purl;
- 2.2 Narrate Formation of knit, tuck and float stitches;
- 2.3 Factors affecting the formation of loop;
- 2.4 Narrate Effect of loop length and shape on fabric properties;
- 2.5 Analysis of various types of weft knitted structure.
- 2.6 Weft knitted fabric geometry.

#### **3. UNDERSTAND WARP KNITTING**

- 3.1 Basic principles;
- 3.2 Elements of warp knitted loop – open loop, closed loop;
- 3.3 Narrate Warp knitting elements- chain link, chain links for simple patterns, guide bar movement mechanism.
- 3.4 Tricot and Rachel warp knitting machines.
- 3.5 Elaborate Principles of double needle bar patterning,
- 3.6 Narrate Terry pile fabric production. Let off system;
- 3.6 Take up system;

#### **4. UNDERSTAND HOSIERY MACHINE**

- 4.1 Classification of hosiery products based on length –
- 4.2 Hosiery Articles – Brief study of Ladies Panty hose, Men's half hose –
- 4.3 Classification of hosiery machine - Single Cylinder machine –
- 4.4 Narrate Knitting cycle Knitting Elements - Types of needles – Cylinder - Cam system - Sinkers - Sinker cams - Switch cam –
- 4.5 Elaborate Hosiery machine - Driving mechanism and gearing
- 4.6 Timing and control mechanism (chain and drum)- pattern wheel - Clutch action – Clutch control cams - Pickers - Picker Narrowing - Picker control - Hosiery stitch length control.

#### **5. UNDERSTAND HOSIERY STRUCTURES**

- 5.1 Scott & William Inturned Welt system –
- 5.2 Narrate Method of producing mock –rib - Production of heel & toe –
- 5.3 various types of heel & toe –
- 5.4 Elaborate Various types of yarns used for Hosiery –
- 5.5 Narrate Plating – Plain plating – Reverse Plating – Float Plating –
- 5.6 State Hosiery Patterns – Horizontal stripe, vertical stripe, float stitch, micro-mesh, cross-tuck
- 5.7 Production of Terry Structure - Eyelet patterning – wrap patterning- Intarsia patterning
- 5.8 Elaborate Special Warp knitted structures for Technical Textile applications

- 5.9 Narrate Garment Length Sequence Knitting;
- 5.10 Elaborate Application of CAD/CAM.
- 5.11 Narrate Whole Garment knitting system.
- 5.12 Seamless Gloves and Socks knitting machines.

## **6. UNDERSTAND DEFECTS IN WEFT KNIT FABRICS**

- 6.1 State Vertical lines,
- 6.2 Narrate Horizontal lines,
- 6.3 Elaborate Drop stitches,
- 6.7 Narrate Distorted stitches and Press off

## **TW-333 KNITTING TECHNOLOGY-II**

### **PRACTICAL**

**96 Hours**

1. Draw the five basic lapping variations.
2. Draw the knitting cycle of Tricot and Raschel machine.
3. Find out the important knitting elements of a warp knitting machine.
4. Draw the assembling of chain links for simple designs.
5. Draw the lapping diagram of various warp knitted structures.
6. Calculate the production of warp knitting machine both from the given yarn and fabric particulars.
7. Draw the working principle of Let-off and Take-up mechanism used in the warp knitting machine.
8. Trace the passage of material through a hosiery machine.
9. Demonstrate the arrangement of knitting elements in a hosiery machine (Needle, sinker, Cam Arrangement and Picker Arrangement)
10. Draw the parts of a Half-hose sample given and describe how to produce each part.
11. Draw the knitting cycle of Single cylinder Hosiery machine.
12. Trace and draw the gearing mechanism, machine drives and controls in automatic plain hosiery machine.
13. Demonstrate the method of producing various hosiery patterns. (any four socks samples)
14. Demonstrate the method of producing of Terry and Jacquard socks.
15. Demonstrate the method of knitting of heel & toe and list the various types of heel & toe.

## **TW-354; TEXTILE WEAVING REPAIR & MAINTENANCE**

		<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>	<b>:</b>	<b>64 HOURS</b>	<b>2</b>	<b>6</b>
<b>PRACTICAL:</b>		<b>192 HOURS</b>	<b>4</b>	

### **PRE-REQUISITE:**

TT-103 Fundamental of Textile Technology and TT-123 Workshop Practice

### **AIM:**

To enable the students to operate, make the maintenance schedule and the students familiar with oiling, greasing, cleaning the Textile machine.

### **OBJECTIVES:**

- To know about the basics of maintenance
- To understand about planning, scheduling and controlling.

### **DETAILED COURSE CONTENTS:**

#### **1. BASICS OF MAINTENANCE, PLANNING, SCHEDULING AND CONTROLLING**

**8 Hours**

- 1.1. Objects, types, scope and limitations of maintenance -
- 1.2. Need for maintenance organization with responsibilities of vital maintenance personnel
- 1.3. Systems and procedures involved in planning, scheduling and controlling and their components
- 1.4. Records and norms for maintenance

#### **2. STORES, ASSESSMENT OF MAINTENANCE, APPLICATION OF NEW CONCEPTS**

**8 Hours**

- 2.1. Stores and inventory control -
- 2.2. Importance of co-ordination between maintenance, quality and production departments
- 2.3. Maintenance audit, Total Productive Maintenance (TPM) and Selective Maintenance Program (SMP)
- 2.4. Housekeeping,
- 2.5. Application of Computers for maintenance

#### **3. GAUGES AND ERECTION**

**4 Hours**

- 3.1. Study of tools and gauges used in Weaving Mills
- 3.2. Study of Erection procedures, tools and gauges used in erection of Weaving Machines
- 3.3. Vibration and Control of Vibration, Balancing of Machines

#### **4. MAINTENANCE OF WEAVING MACHINES**

**22 Hours**

- 4.1. Routine and Preventive maintenance programs and Lubrication charts of;
  - 4.1.1. Warp and Weft winding machines,

- 4.1.2. Warping machines,
- 4.1.3. Sizing machines,
- 4.1.4. Plain and Auto weaving machines
- 4.2. Plan daily based maintenance schedule of back process
  - 4.2.1. Monitor general maintenance and cleaning of warping creel.
  - 4.2.2. Check general maintenance and cleaning of warping head stock.
  - 4.2.3. Monitor general maintenance and cleaning of warping Hydraulic & pneumatic system.
  - 4.2.4. Check general maintenance and cleaning of Sizing creel.
  - 4.2.5. Monitor general maintenance and cleaning of Size box.
  - 4.2.6. Check general maintenance and cleaning of Drying Section.
  - 4.2.7. Monitor general maintenance and cleaning of Head Stock.
  - 4.2.8. Check general maintenance and cleaning of cooking area.
  - 4.2.9. Prepare cleaning and inspection schedule.
- 4.3. Plan daily maintenance schedule up to six months for back process
  - 4.3.1. Check general maintenance and cleaning of pneumatic cylinder & chain.
  - 4.3.2. Monitor general maintenance and cleaning of brake leather, bearing and pneumatic valve.
  - 4.3.3. Check general maintenance and cleaning of oil filter, oil pressure valves and hydraulic pump.
  - 4.3.4. Monitor general maintenance and cleaning of jacks and brake leathers of pneumatic system.
  - 4.3.5. Check general maintenance and cleaning of circulation pump and pneumatic system.
  - 4.3.6. Monitor general maintenance and cleaning of PT 100, Teflon coated cylinder dry machine and steam system.
  - 4.3.7. Check general maintenance and cleaning of waxing device, leasing rods etc.
  - 4.3.8. Monitor general maintenance and cleaning of PT 100, auto leveler, and steam system
- 4.4. Check the cleaning of total machine parts of back process
  - 4.4.1. Check Cleaning of bearings.
  - 4.4.2. Check Cleaning of belts.
  - 4.4.3. Check Cleaning of gear box.
  - 4.4.4. Check Cleaning of chain.
- 4.5. Adjust sizing beam parameters of back process
  - 4.5.1. Fix the length of beam according to quality.
  - 4.5.2. Fix the beam flange according to quality
  - 4.5.3. Fix the beam adopter according to quality
- 4.6. Supervise size cooking area process of back process
  - 4.6.1. Supervise maintenance of impeller of cooking tank.
  - 4.6.2. Supervise maintenance of impeller of storage tank.
  - 4.6.3. Supervise maintenance of size circulation.

- 4.7. Check the sub store of back process
  - 4.7.1. Check the quantity of new machine parts
  - 4.7.2. Check the quantity of damaged machine parts.
  - 4.7.3. Check the quantity of lubricants.
- 4.8. Check the machine after feedback from loom shed and folding
  - 4.8.1. Detect the faults of material and their types.
  - 4.8.2. Detect the fault of machine.
- 4.9. Plan cleaning and maintenance schedule on daily bases of weaving shed maintenance
  - 4.9.1. Check general maintenance and cleaning of left and right side of picking mechanism.
  - 4.9.2. Monitor general maintenance and cleaning of outer part of loom.
  - 4.9.3. Check oiling and greasing of machine parts and knowledge of different types of greases.
  - 4.9.4. Monitor general maintenance and cleaning of seal points
- 4.10. Plan cleaning and maintenance schedule on weekly and months bases of weaving shed maintenance
  - 4.10.1. Monitor oiling and greasing of inner areas
  - 4.10.2. Check grease points in back rest, leno and tuck in assembly.
  - 4.10.3. Check grease points in picking area.
  - 4.10.4. Check grease points in take up area.
  - 4.10.5. Check manual grease points in shedding area.
  - 4.10.6. Check manual grease points in cam box area and oil level.
- 4.11. Plan cleaning and maintenance schedule on annual bases of weaving shed maintenance
  - 4.11.1. Check oil change of cam box.
  - 4.11.2. Check oil change of let off and take up.
  - 4.11.3. Check air pressure valve.
  - 4.11.4. Check oil change of tuck in and rotary leno
- 4.12. Monitor the loom running of weaving shed maintenance
  - 4.12.1. Check vibration and sound of loom.
  - 4.12.2. Supervise damage in all mechanisms.
  - 4.12.3. Check the pick length according to draw width.
  - 4.12.4. Check selvedge faults.
  - 4.12.5. Check air pressure air leakage and oil leakage.
- 4.13. Check the sub store materials of weaving shed maintenance
  - 4.13.1. Check the quantity of new and used replaced machine parts.
  - 4.13.2. Check the quantity of damaged machine Parts.
  - 4.13.3. Check the quantity of lubricants.
- 4.14. Detect the maintenance problem and removal of weaving shed maintenance
  - 4.14.1. Detect the sizing faults and their types.
  - 4.14.2. Detect the Electric/Electronic faults.
  - 4.14.3. Detect faults of Loom and their types.

- 4.14.4. Detect faults of materialist's types.
- 4.14.5. Detect drawing faults
- 4.15. Submit report the daily based and shift wise work of weaving shed maintenance
  - 4.15.1. Report of maintenance area.
  - 4.15.2. Report of production area.
  - 4.15.3. Report of in or out time and additional work.
  - 4.15.4. Report of shed pressure.

## **5. MAINTENANCE OF KNITTING MACHINES**

**22 Hours**

- 5.1. Routine and Preventive maintenance programs and Lubrication charts of Knitting machines.
- 5.2. Maintain single knit machine
  - 5.2.1. Check parts of machine
  - 5.2.2. Check needle break
  - 5.2.3. Check yarn break problem
  - 5.2.4. Check yarn Fly
  - 5.2.5. Identify MPF Problem
  - 5.2.6. Lubricate Machine
- 5.3. Adjust part of the single knit machine
  - 5.3.1. Adjust cams
  - 5.3.2. Adjust air pressure
  - 5.3.3. Adjust needle gauge
  - 5.3.4. Adjust stitch length meter
  - 5.3.5. Check stop motion
  - 5.3.6. Adjust thread tension
- 5.4. Repair single knit machine
  - 5.4.1. Disassemble machinery or equipment
  - 5.4.2. Examine parts for defects
  - 5.4.3. Clean and lubricate parts
  - 5.4.4. Repair or replace broken or malfunctioning components
  - 5.4.5. Reassemble equipment
  - 5.4.6. Operate newly repaired machinery
  - 5.4.7. Record repairs and maintenance performed.
  - 5.4.8. Study manufacturers' manuals to determine correct installation
  - 5.4.9. Analyze test results,
  - 5.4.10. Record parts or materials used
  - 5.4.11. Order or requisition new parts or materials as necessary.
  - 5.4.12. Demonstrate equipment functions and features to machine operators.
  - 5.4.13. Enter codes and instructions to program computer-controlled machinery
- 5.5. Maintain circular double knit machine
  - 5.5.1. Check parts of machine
  - 5.5.2. Check needle break
  - 5.5.3. Check yarn break problem



- 5.5.4. Check yarn fly
- 5.5.5. identify MPF Problem
- 5.5.6. Lubricate Machine
- 5.6. Adjust part of the circular double knit machine
  - 5.6.1. Adjust cam
  - 5.6.2. Adjust air pressure
  - 5.6.3. Adjust needle gauge
  - 5.6.4. Adjust stitch length meter
  - 5.6.5. Check yarn stop motion
  - 5.6.6. Adjust yarn tension
- 5.7. Repair circular double knit machine
  - 5.7.1. Disassemble machinery or equipment
  - 5.7.2. Examine parts for defects
  - 5.7.3. Clean and lubricate parts
  - 5.7.4. Repair or replace broken or malfunctioning components
  - 5.7.5. Reassemble equipment
  - 5.7.6. Operate newly repaired machinery
  - 5.7.7. Record repairs and maintenance performed.
  - 5.7.8. Study manufacturers' manuals to determine correct installation
  - 5.7.9. Analyze test results,
  - 5.7.10. Record parts or materials used
  - 5.7.11. Order or requisition new parts or materials as necessary.
  - 5.7.12. Demonstrate equipment functions and features to machine operators.
  - 5.7.13. Enter codes and instructions to program computer-controlled machinery
- 5.8. Maintain V-Bed flat knit machine
  - 5.8.1. Check parts of machine
  - 5.8.2. Check needle break
  - 5.8.3. Check yarn break problem
  - 5.8.4. Check yarn fly
  - 5.8.5. Lubricate Machine
- 5.9. Adjust parts of the V-Bed flat knit machine
  - 5.9.1. Adjust cams
  - 5.9.2. Adjust needle
  - 5.9.3. Adjust stitch length
  - 5.9.4. Adjust thread tension
  - 5.9.5. Bed setting
  - 5.9.6. Cone Position
- 5.10. Repair V-Bed flat knit machine
  - 5.10.1. Disassemble machinery or equipment
  - 5.10.2. Examine parts for defects
  - 5.10.3. Clean and lubricate parts
  - 5.10.4. Repair or replace broken or malfunctioning components
  - 5.10.5. Reassemble equipment

- 5.10.6. Operate newly repaired machinery
- 5.10.7. Record repairs and maintenance performed.
- 5.10.8. Study manufacturers' manuals to determine correct installation
- 5.10.9. Analyze test results,
- 5.10.10. Record parts or materials used
- 5.10.11. Order or requisition new parts or materials as necessary.
- 5.10.12. Demonstrate equipment functions and features to machine operators.
- 5.10.13. Enter codes and instructions to program computer-controlled machinery.

## **REFERENCE BOOKS:**

- Maintenance of Textile Machinery (Spinning, Weaving and Processing)  
TAIRO publication Baroda (1970)
- Repair and Adjustment of Textile Machineries T.Granovsky MIR  
Publisher Moscow (1984)
- Contemporary Textile Engineering Prof. F. Happy  
University of Bradford Academic press 24/28 Oval road, London LW 1
- Knitting Machine Mechanic Manual Textile

## **TW-354 TEXTILE WEAVING REPAIR & MAINTENANCE**

### **INSTRUCTIONAL OBJECTIVES**

#### **UNDERSTAND BASICS OF MAINTENANCE, PLANNING, SCHEDULING AND CONTROLLING**

- 1.1. State Objects, types, scope and limitations of maintenance -
- 1.2. Justify Need for maintenance organization with responsibilities of vital maintenance personnel
- 1.3. Narrate Systems and procedures involved in planning, scheduling and controlling and their components -
- 1.4. Understand Records and norms for maintenance

#### **2. UNDERSTAND STORES, ASSESSMENT OF MAINTENANCE, APPLICATION OF NEW CONCEPTS**

- 2.1. Stores and inventory control -
- 2.2. Importance of co-ordination between maintenance, quality and production departments
- 2.3. Narrate Maintenance audit, Total Productive Maintenance (TPM) and Selective Maintenance Program (SMP)
- 2.4. Housekeeping,
- 2.5. Application of Computers for maintenance

#### **3. UNDERSTAND GAUGES AND ERECTION**

- 3.1. Study of tools and gauges used in Weaving Mills
- 3.2. Study of Erection procedures, tools and gauges used in erection of Weaving Machines
- 3.3. Narrate Vibration and Control of Vibration, Balancing of Machines

#### **4. UNDERSTAND MAINTENANCE OF WEAVING MACHINES**

- 4.1. Narrate Routine and Preventive maintenance programs and Lubrication charts of;
  - 4.1.1. Warp and Weft winding machines,
  - 4.1.2. Warping machines,
  - 4.1.3. Sizing machines,
  - 4.1.4. Plain and Auto weaving machines
- 4.2. Plan daily based maintenance schedule of back process
  - 4.2.1. Monitor general maintenance and cleaning of warping creel.
  - 4.2.2. Check general maintenance and cleaning of warping head stock.
  - 4.2.3. Monitor general maintenance and cleaning of warping Hydraulic & pneumatic system.
  - 4.2.4. Check general maintenance and cleaning of Sizing creel.
  - 4.2.5. Monitor general maintenance and cleaning of Size box.
  - 4.2.6. Check general maintenance and cleaning of Drying Section.
  - 4.2.7. Monitor general maintenance and cleaning of Head Stock.
  - 4.2.8. Check general maintenance and cleaning of cooking area.

- 4.2.9. Prepare cleaning and inspection schedule.
- 4.3. State the daily maintenance schedule up to six months for back process
  - 4.3.1. Check general maintenance and cleaning of pneumatic cylinder & chain.
  - 4.3.2. Monitor general maintenance and cleaning of brake leather, bearing and pneumatic valve.
  - 4.3.3. Check general maintenance and cleaning of oil filter, oil pressure valves and hydraulic pump.
  - 4.3.4. Monitor general maintenance and cleaning of jacks and brake leathers of pneumatic system.
  - 4.3.5. Check general maintenance and cleaning of circulation pump and pneumatic system.
  - 4.3.6. Monitor general maintenance and cleaning of PT 100, Teflon coated cylinder dry machine and steam system.
  - 4.3.7. Check general maintenance and cleaning of waxing device, leasing rods etc.
  - 4.3.8. Monitor general maintenance and cleaning of PT 100, auto leveler, and steam system
- 4.4. Narrate the cleaning of total machine parts of back process
  - 4.4.1. Check Cleaning of bearings.
  - 4.4.2. Check Cleaning of belts.
  - 4.4.3. Check Cleaning of gear box.
  - 4.4.4. Check Cleaning of chain.
- 4.5. Adjust sizing beam parameters of back process
  - 4.5.1. Fix the length of beam according to quality.
  - 4.5.2. Fix the beam flange according to quality
  - 4.5.3. Fix the beam adopter according to quality
- 4.6. Supervise size cooking area process of back process
  - 4.6.1. Supervise maintenance of impeller of cooking tank.
  - 4.6.2. Supervise maintenance of impeller of storage tank.
  - 4.6.3. Supervise maintenance of size circulation.
- 4.7. Check the sub store of back process
  - 4.7.1. Check the quantity of new machine parts
  - 4.7.2. Check the quantity of damaged machine parts.
  - 4.7.3. Check the quantity of lubricants.
- 4.8. Check the machine after feedback from loom shed and folding
  - 4.8.1. Detect the faults of material and their types.
  - 4.8.2. Detect the fault of machine.
- 4.9. Plan cleaning and maintenance schedule on daily bases of weaving shed maintenance
  - 4.9.1. Check general maintenance and cleaning of left and right side of picking mechanism.
  - 4.9.2. Monitor general maintenance and cleaning of outer part of loom.

- 4.9.3. Check oiling and greasing of machine parts and knowledge of different types of greases.
- 4.9.4. Monitor general maintenance and cleaning of seal points
- 4.10. Plan cleaning and maintenance schedule on weekly and months bases of weaving shed maintenance
  - 4.10.1. Monitor oiling and greasing of inner areas
  - 4.10.2. Check grease points in back rest, leno and tuck in assembly.
  - 4.10.3. Check grease points in picking area.
  - 4.10.4. Check grease points in take up area.
  - 4.10.5. Check manual grease points in shedding area.
  - 4.10.6. Check manual grease points in cam box area and oil level.
- 4.11. Plan cleaning and maintenance schedule on annual bases of weaving shed maintenance
  - 4.11.1. Check oil change of cam box.
  - 4.11.2. Check oil change of let off and take up.
  - 4.11.3. Check air pressure valve.
  - 4.11.4. Check oil change of tuck in and rotary leno
- 4.12. Monitor the loom running of weaving shed maintenance
  - 4.12.1. Check vibration and sound of loom.
  - 4.12.2. Supervise damage in all mechanisms.
  - 4.12.3. Check the pick length according to draw width.
  - 4.12.4. Check selvedge faults.
  - 4.12.5. Check air pressure air leakage and oil leakage.
- 4.13. Check the sub store materials of weaving shed maintenance
  - 4.13.1. Check the quantity of new and used replaced machine parts.
  - 4.13.2. Check the quantity of damaged machine Parts.
  - 4.13.3. Check the quantity of lubricants.
- 4.14. Detect the maintenance problem and removal of weaving shed maintenance
  - 4.14.1. Detect the sizing faults and their types.
  - 4.14.2. Detect the Electric/Electronic faults.
  - 4.14.3. Detect faults of Loom and their types.
  - 4.14.4. Detect faults of materialist's types.
  - 4.14.5. Detect drawing faults
- 4.15. Submit report the daily based and shift wise work of weaving shed maintenance
  - 4.15.1. Report of maintenance area.
  - 4.15.2. Report of production area.
  - 4.15.3. Report of in or out time and additional work.
  - 4.15.4. Report of shed pressure.

## **5. UNDERSTAND MAINTENANCE OF KNITTING MACHINES**

- 5.1. Narrate Routine and Preventive maintenance programs and Lubrication charts of Knitting machines.
- 5.2. Narrate Maintain single knit machine
  - 5.2.1. Check parts of machine

- 5.2.2. Check needle break
- 5.2.3. Check yarn break problem
- 5.2.4. Check yarn Fly
- 5.2.5. Identify MPF Problem
- 5.2.6. Lubricate Machine
- 5.3. Elaborate Adjust part of the single knit machine
  - 5.3.1. Adjust cams
  - 5.3.2. Adjust air pressure
  - 5.3.3. Adjust needle gauge
  - 5.3.4. Adjust stitch length meter
  - 5.3.5. Check stop motion
  - 5.3.6. Adjust thread tension
- 5.4. Narrate Repair single knit machine
  - 5.4.1. Disassemble machinery or equipment
  - 5.4.2. Examine parts for defects
  - 5.4.3. Clean and lubricate parts
  - 5.4.4. Repair or replace broken or malfunctioning components
  - 5.4.5. Reassemble equipment
  - 5.4.6. Operate newly repaired machinery
  - 5.4.7. Record repairs and maintenance performed.
  - 5.4.8. Study manufacturers' manuals to determine correct installation
  - 5.4.9. Analyze test results,
  - 5.4.10. Record parts or materials used
  - 5.4.11. Order or requisition new parts or materials as necessary.
  - 5.4.12. Demonstrate equipment functions and features to machine operators.
  - 5.4.13. Enter codes and instructions to program computer-controlled machinery
- 5.5. Elaborate Maintaining circular double knit machine
  - 5.5.1. Check parts of machine
  - 5.5.2. Check needle break
  - 5.5.3. Check yarn break problem
  - 5.5.4. Check yarn fly
  - 5.5.5. identify MPF Problem
  - 5.5.6. Lubricate Machine
- 5.6. Narrate Adjustment part of the circular double knit machine
  - 5.6.1. Adjust cam
  - 5.6.2. Adjust air pressure
  - 5.6.3. Adjust needle gauge
  - 5.6.4. Adjust stitch length meter
  - 5.6.5. Check yarn stop motion
  - 5.6.6. Adjust yarn tension
- 5.7. Repair circular double knit machine
  - 5.7.1. Disassemble machinery or equipment
  - 5.7.2. Examine parts for defects

- 5.7.3. Clean and lubricate parts
- 5.7.4. Repair or replace broken or malfunctioning components
- 5.7.5. Reassemble equipment
- 5.7.6. Operate newly repaired machinery
- 5.7.7. Record repairs and maintenance performed.
- 5.7.8. Study manufacturers' manuals to determine correct installation
- 5.7.9. Analyze test results,
- 5.7.10. Record parts or materials used
- 5.7.11. Order or requisition new parts or materials as necessary.
- 5.7.12. Demonstrate equipment functions and features to machine operators.
- 5.7.13. Enter codes and instructions to program computer-controlled machinery
- 5.8. Transmit Maintenance of V-Bed flat knit machine
  - 5.8.1. Check parts of machine
  - 5.8.2. Check needle break
  - 5.8.3. Check yarn break problem
  - 5.8.4. Check yarn fly
  - 5.8.5. Lubricate Machine
- 5.9. Describe Adjustable parts of the V-Bed flat knit machine
  - 5.9.1. Adjust cams
  - 5.9.2. Adjust needle
  - 5.9.3. Adjust stitch length
  - 5.9.4. Adjust thread tension
  - 5.9.5. Bed setting
  - 5.9.6. Cone Position
- 5.10. State Repair V-Bed flat knit machine
  - 5.10.1. Disassemble machinery or equipment
  - 5.10.2. Examine parts for defects
  - 5.10.3. Clean and lubricate parts
  - 5.10.4. Repair or replace broken or malfunctioning components
  - 5.10.5. Reassemble equipment
  - 5.10.6. Operate newly repaired machinery
  - 5.10.7. Record repairs and maintenance performed.
  - 5.10.8. Study manufacturers' manuals to determine correct installation
  - 5.10.9. Analyze test results,
  - 5.10.10. Record parts or materials used
  - 5.10.11. Order or requisition new parts or materials as necessary.
  - 5.10.12. Demonstrate equipment functions and features to machine operators.
  - 5.10.13. Enter codes and instructions to program computer-controlled machinery.

## **TW-354 TEXTILE WEAVING REPAIR & MAINTENANCE**

**PRACTICAL: 192 Hours**

### **PRACTICALS:**

1. General demonstration on Maintenance
2. Introduce with different tools & gauges used in maintenance.
3. Differentiate between Maintenance & over hauling.
4. Differentiate between BMRE & erection of Textile Machinery.
5. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of sectional warping.
6. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of sizing machine.
7. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of plain power loom.
8. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of modern loom. i.e, Rapier, Air-jet and projectile loom.
9. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of single-jersey machine.
10. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of interlock knitting machine.
11. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of dial linking machine.
12. Practice the cleaning, lubricating, setting adjustment and making the maintenance schedule of flatbed knitting machine.
13. Practice the cleaning, lubricating, setting, adjustment and making the maintenance schedule of Rib knitting machine.
14. Practice to dis-mantle & re-assemble the button hole & flat lock machine.
15. Practice to dismantle & reassemble the collar & cuff turning machine.
16. Practice to dismantle & re-assemble the fusing machine.
17. Practice to install the base of head for the flat & button hole machine.
18. Practice to adjust thread tension.



## TW-352 TEXTILE WEAVING QUALITY EVALUATION

<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>3</b>	<b>2</b>

### TOTAL CONTACT HOURS:

**Theory : 32 HOURS.**

**Practical : 96 HOURS.**

### Aim:

1. To develop the knowledge and skill in students to make him fit for working in any textile testing Laboratory.
2. To train the student in the assessment of quality of textile materials.

### DETAIL COURSE CONTENTS:

- |   |                |
|---|----------------|
| <b>1. YARN AND FABRIC TESTING:</b>                                | <b>3 HOURS</b> |
| 1.1 Introduction to yarn and fabric testing.                      |                |
| 1.2 Importance of yarn and fabric testing in textile industry.    |                |
| 1.3 Standard Conditions for Textile yarn and fabric Testing:      |                |
| 1.4 Standard humidity and temperature for yarn and fabric testing |                |
| <b>2. APPEARANCE TEST OF YARN.</b>                                | <b>2 HOURS</b> |
| 2.1 Introduction.   |                |
| 2.2 Appearance test of yarn by yarn board.                        |                |
| 2.3 Discussion on yarn faults by appearance test.                 |                |
| <b>3. MEASUREMENT OF YARN COUNT</b>                               | <b>3 HOURS</b> |
| 3.1 Introduction to yarn count or yarn number.                    |                |
| 3.2 Yarn numbering systems.                                       |                |
| 3.3 Measurement of yarn number                                    |                |
| <b>4. YARN TWIST:</b>   | <b>3 HOURS</b> |
| 4.1 Definition of Twist.  |                |
| 4.2 Direction of twist.   |                |
| 4.3 Effects of twist on yarn strength.                            |                |
| 4.4 Measurement of twist.   |                |
| <b>5. MEASUREMENT OF YARN STRENGTH:</b>                           | <b>3 HOURS</b> |
| 5.1 Factors effecting yarn strength.                              |                |
| 5.2 Lea strength testing.   |                |
| 5.3 Tensorapid test for yarn strength.                            |                |
| <b>6. YARN REGULARITY.</b>  | <b>3 HOURS</b> |
| 6.1 Uster test yarn.  |                |
| 6.2 Interpretation of Uster results.                              |                |
| 6.3 Result Analysis.  |                |
| <b>7. YARN CRIMPS.</b>  | <b>2 HOURS</b> |
| 7.1 Yarn crimps.  |                |
| 7.2 Identification of crimps %age.                                |                |
| 7.3 Importance of yarn crimps.                                    |                |
| <b>8. APPEARANCE TEST OF FABRIC:</b>                              | <b>2 HOURS</b> |
| 8.1 Appearance test of fabric.                                    |                |

8.2	Inspection and grading of fabric.	
8.3	Common fabric faults.	
<b>9.</b>	<b>ANALYSIS OF FABRIC:</b>	<b>2 HOURS</b>
9.1	Fabric Density	
9.2	Warp and weft count.	
9.3	Picks per inch and ends per inch.	
<b>10.</b>	<b>FABRIC WEIGHT AND THICKNESS.</b>	<b>3 HOURS</b>
10.1	GSM weight of fabric	
10.2	Fabric thickness test.	
<b>11.</b>	<b>FABRIC STRENGTH:</b>	<b>3 HOURS</b>
11.1	Fabric strength testing.	
11.2	Strip test.	
11.3	Grab test.	
11.4	Bursting test.	
11.5	Tearing test.	
<b>12.</b>	<b>FABRIC PILLING AND ABRASION.</b>	<b>3 HOURS</b>
12.1	Pilling test of fabric.	
12.2	Abrasion test of fabric.	

## **TW-352 TEXTILE WEAVING QUALITY EVALUATION**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. YARN AND FABRIC TESTING.**

- 1.1 Introduction to yarn and fabric testing.
- 1.2 State the importance of yarn and fabric testing in textile industry.
- 1.3 Discuss the standard Conditions for Textile yarn and fabric Testing:
- 1.4 State the standard humidity and temperature for yarn and fabric testing

#### **2. APPEARANCE TEST OF YARN.**

- 2.1 Introduction to appearance test of yarn.
- 2.2 Describe the appearance test of yarn by yarn board.
- 2.3 Discussion on yarn faults by appearance test.

#### **3. MEASUREMENT OF YARN COUNT.**

- 3.1 Introduction to yarn count or yarn number.
- 3.2 Describe the yarn numbering systems.
- 3.3 Measurement of yarn number/count by auto sorter.

#### **4. YARN TWIST:**

- 4.1 Definition of Twist.
- 4.2 Identification of direction of twist.
- 4.3 Describe the effects of twist on yarn strength.
- 4.4 Measurement of twist by twist tester.

#### **5. MEASUREMENT OF YARN STRENGTH:**

- 5.1 Describe the factors effecting yarn strength.
- 5.2 Lea making on wrapping reel and strength testing on lea strength tester.
- 5.3 Identification of single yarn strength by Tensorapid tester.

#### **6. YARN REGULARITY.**

- 6.1 Yarn evenness test by Uster tester.
- 6.2 Discussion and interpretation of Uster results.
- 6.3 Discussion on result Analysis of Uster test.

#### **7. YARN CRIMPS.**

- 7.1 Define yarn crimps.
- 7.2 Identification of crimps %age by crimps tester.
- 7.3 State the importance of yarn crimps.

#### **8. APPEARANCE TEST OF FABRIC:**

- 8.1 Define the appearance test of fabric.
- 8.2 Inspection and grading of fabric by the help of inspection frame.
- 8.3 Analysis of common fabric faults.

#### **9. ANALYSIS OF FABRIC:**

- 9.1 Describe the fabric Density
- 9.2 Identify the warp and weft count from fabric.
- 9.3 Identify the picks per inch and ends per inch from fabric.

#### **10. FABRIC WEIGHT AND THICKNESS.**

- 10.1 Identify the GSM weight of fabric by GSM cutter and weight balance.
- 10.2 Identify the fabric thickness by the help of dial thickness gauge.

**11. FABRIC STRENGTH:**

- 11.1 Define the fabric strength testing.
- 11.2 Identification of fabric strength by strip test.
- 11.3 Identification of fabric strength by grab test.
- 11.4 Identification of fabric strength by bursting test.
- 11.5 Identification of fabric strength by tearing test.

**12. FABRIC PILLING AND ABRASION.**

- 12.1 Describe the pilling test of fabric.
- 12.2 Describe the abrasion test of fabric.

## **TW-352 TEXTILE WEAVING QUALITY EVALUATION**

### **PRACTICALS:**

1. Identification of yarn faults by board making by the help of yarn board making machine. 6 HOURS
2. Determination of count and strength (CLSP) of spun yarn. 6 HOURS
3. Determination of single yarn strength by Tensorapid tester. 6 HOURS
4. Determination of twist and twist direction in yarn by twist tester. 6 HOURS
5. Determination of yarn faults by Uster tester. 6 HOURS
6. Determination of yarn crimps % age. 6 HOURS
7. Identification of fabric faults by the help of inspection frame. 6 HOURS
8. Analysis of the given piece of fabric. 6 HOURS
9. Identification of GSM weight of fabric. 6 HOURS
10. Identification of fabric thickness by the help of dial thickness gauge. 6 HOURS
11. Identification of fabric strength by grab test. 6 HOURS
12. Identification of fabric strength by strip test. 6 HOURS
13. Identification of fabric strength by tearing test. 6 HOURS
14. Identification of fabric strength by bursting test. 6 HOURS
15. Pilling test of fabric. 6 HOURS
16. Abrasion test of fabric. 6 HOURS

## **TT-312 MILL ENGINEERING & SERVICES**

**TOTAL CONTACT HOURS: 128 HOURS**

**T P C**

**Theory : 32 HOURS.**

**1 3 2**

**Practical : 96 HOURS.**

### **AIM OF SUBJECT:**

To develop the knowledge within students and understanding of mill engineering, including information relating to construction operation and maintenance of a mill.

### **DETAILED COURSE CONTENTS:**

- |  |                |
|--|----------------|
| <b>1. ELECTRICAL SUPPLY:</b>                                     | <b>2 HOURS</b> |
| 1.1 Electrical distribution                                      |                |
| 1.2 Electrical distribution different department in textile mill |                |
| <b>2 INDUCTION MOTOR</b>   | <b>2 HOURS</b> |
| 2.1 Operation of Induction motor.                                |                |
| 2.2 Parts of Induction motors.                                   |                |
| <b>3. A.C AND DC.</b>  | <b>2 HOURS</b> |
| 3.1 Conversion of A.C. to D.C                                    |                |
| 3.2 Rectifiers and diodes.                                       |                |
| <b>4. ILLUMINATIN IN TEXTILE MILL AND SAFETY.</b>                | <b>2 HOURS</b> |
| 4.1 Mills illumination.  |                |
| 4.2 Fire control instrument.                                     |                |
| <b>5. ENGINES AND GENERATORS.</b>                                | <b>2 HOURS</b> |
| 5.1 Types of Engines.  |                |
| 5.2 Petrol and CNG.  |                |
| 5.2 Power generator.   |                |
| <b>6. LUBRICANTS.</b>  | <b>2 HOURS</b> |
| 6.1 Oiling and greasing.   |                |
| 6.2 Different types of lubricants.                               |                |
| <b>7. MILL BUILDING</b>  | <b>2 HOURS</b> |
| 7.1 Layout plan of mill  |                |
| 7.2 Characteristics of mill building.                            |                |

7.3	Mill Planning.	
<b>8.</b>	<b>HUMIDIFICATION.</b>	<b>2 HOURS</b>
8.1	Types of humidifier.	
8.2	Working of humidifier.	
<b>9.</b>	<b>BOILERS.</b>	<b>2 HOURS</b>
9.1	Introduction to boiler.	
9.2	Types of boilers.	
9.3	Thermo oil boiler.	
<b>10.</b>	<b>STEAM.</b>	<b>2 HOURS</b>
10.1	Objectives of steam.	
10.2	Properties and uses of steam.	
<b>11.</b>	<b>PUMPS.</b>	<b>2 HOURS</b>
11.1	Characteristics of pumps.	
11.2	Types of pumps.	
<b>12.</b>	<b>WATER SOFTENING PLANTS.</b>	<b>2 HOURS</b>
12.1	Types of softening plants.	
12.2	Working method of a softening plant.	
<b>13.</b>	<b>WASTE WATER TREATMENT PLANTS.</b>	<b>2 HOURS</b>
13.1	Types of waste water treatment plants.	
13.2	Working method of a waste water treatment plant.	
<b>14.</b>	<b>AIR COMPRESSORS.</b>	<b>2 HOURS</b>
14.1	Types of air compressors.	
14.2	Uses of air compressor.	
<b>15.</b>	<b>BEARINGS.</b>	<b>2 HOURS</b>
15.1	Objects of bearings.	
15.1	Different types of bearing used in textile mills.	
<b>16.</b>	<b>AIR CONDITIONING.</b>	<b>2 HOURS</b>
16.1	Air conditioning systems.	
16.2	Air conditioners and air chillers	

## **TT-312 MILL ENGINEERING & SERVICES**

### **INSTRUCTIONAL OBJECTIVES:**

#### **1. UNDERSTAND ELECTRICAL SUPPLY:**

- 1.1 State the electrical distribution
- 1.2 Describe the electrical distribution different department in textile mill

#### **2 UNDERSTAND INDUCTION MOTOR**

- 2.1 Explain the working of Induction motor.
- 2.2 State the different parts of Induction motors.

#### **3. UNDERSTAND A.C AND DC.**

- 3.1 Describe the conversion of A.C. to D.C
- 3.2 Describe the rectifiers and diodes.

#### **4. UNDERSTAND ILLUMINATIN IN TEXTILE MILL AND SAFETY.**

- 4.1 Explain the mill illumination.
- 4.2 Explain the fire control instrument.

#### **5. UNDERSTAND ENGINES AND GENERATORS.**

- 5.1 Explain the types of Engines.
- 5.2 Explain the diesel engine.
- 5.2 Explain the power generator.

#### **6. UNDERSTAND LUBRICANTS.**

- 6.1 Explain the oiling and greasing.
- 6.2 State the different types of lubricants.

#### **7. UNDERSTAND MILL BUILDING.**

- 7.1 Sketch the layout plan of mill.
- 7.2 Explain the characteristics of mill building.
- 7.3 Explain the mill Planning.

#### **8. UNDERSTAND HUMIDIFICATION.**

- 8.1 State the types of humidifier.
- 8.2 Explain the working of humidifier.



**9. UNDERSTAND BOILERS.**

- 9.1 Introduction to boiler.
- 9.2 Explain the different types of boilers.
- 9.3 Explain the working of thermo oil boiler.

**10. UNDERSTAND STEAM.**

- 10.1 Explain the objects of steam.
- 10.2 Explain the properties and uses of steam.

**11. UNDERSTAND PUMPS.**

- 11.1 Explain the characteristics of pumps.
- 11.2 State the types of pumps.

**12. UNDERSTAND WATER SOFTNING PLANTS.**

- 12.1 State the types of softening plants.
- 12.2 Explain the working method of a softening plant.

**13. UNDERSTAND WASTE WATER TREATMENT PLANTS.**

- 13.1 State the types of waste water treatment plants.
- 13.2 Explain the working method of a waste water treatment plant.

**14. UNDERSTAND AIR COMPRESSORS.**

- 14.1 State the types of air compressors.
- 14.2 Explain the uses of air compressor.

**15. UNDERSTAND BEARINGS.**

- 15.1 Explain the objects of bearings.
- 15.1 State the different types of bearing uses in textile mills.

**16. UNDERSTAND AIR CONDITIONING.**

- 16.1 Explain the air conditioning systems.
- 16.2 Explain the air conditioners and air chillers

## **TT-312 MILL ENGINEERING & SERVICES**

**Practical : 96 HOURS.**

### **LIST OF PRACTICALS:**

- |   |         |
|---|---------|
| 1. First Aid and paramedical treatment                            | 6 HOURS |
| 2. Study of power transmission by gear belt chain rope and pulley | 6 HOURS |
| 3. Comparison of AC and DC.                                       | 6 HOURS |
| 4. Demonstration on illumination and its effects on Human beings. | 6 HOURS |
| 5. Demonstration on Engine types.                                 | 6 HOURS |
| 6. Demonstration on different types of lubricants.                | 6 HOURS |
| 7. Demonstration on textile mill building planning.               | 6 HOURS |
| 8. Study of atmospheric Humidification.                           | 6 HOURS |
| 9. Study of different types of boilers.                           | 6 HOURS |
| 10. Demonstration of steam and its utilization in textile         | 6 HOURS |
| 11. Study of different types of Water Pumps                       | 6 HOURS |
| 12. Study of different water softening plants.                    | 6 HOURS |
| 13. Study of waste water treatment.                               | 6 HOURS |
| 14. Study of air compressors.                                     | 6 HOURS |
| 15. Demonstration on bearings.                                    | 6 HOURS |
| 16. Demonstration on air conditioning and air chillers.           | 6 HOURS |

## **TT-321 SUSTAINABILITY: HEALTH, SAFETY & ENVIRONMENT**

<b>Total Contact HOURS</b>		<b>T</b>	<b>P</b>	<b>C</b>
<b>Theory:</b>	<b>32 HOURS</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>Practical:</b>	<b>0 HOUR</b>			

**Pre-requisites:** None

**AIMS:** At the end of this course students will understand about the concept of sustainable production and its relationship to environment. Students will also study about health and safety measures during different textile processes

### **DETAIL COURSE CONTENTS:**

- 1. Introduction to Sustainability 2 HOURS**
  - 1.1 Definitions of sustainability
  - 1.2 Four dimensions or pillars of sustainability
  - 1.3 Sustainable development and its principles
- 2. Introduction to sustainable textile production 4 HOURS**
  - 2.1. Introduction to sustainable materials and sustainable production
  - 2.2. Reasons for rise in demand for sustainable textile products
  - 2.3. Different sustainability trends in textile industry
  - 2.4. Labeling to promote sustainability
- 3. Environmental sustainability issues in Textile Industry 4 HOURS**
  - 3.1. Importance of environmental sustainability in textile industry
  - 3.2. Methods for ensuring environmental sustainability in textile industry
  - 3.3. Importance of recycling for sustainability in textile industry
  - 3.4. Importance of avoidance of hazardous substances in textile industry
  - 3.5. Importance of preventing wastages in textile industry
- 4. Regulations governing environmental issues 4 HOURS**
  - 4.1. Pakistan Environmental Protection Act (1997)
  - 4.2. ISO14000 series of standards
  - 4.3. Standard 100 by Oeko-Tex
  - 4.4. STEP by Oeko-Tex
  - 4.5. Made in Green by Oeko-Tex
  - 4.6. Eco Passport by Oeko-Tex
- 5. Hazardous materials in Textiles 4 HOURS**

- 5.1. Types of hazardous materials in textile industry
- 5.2. Health issues related to hazardous materials used in textile industry
- 5.3. REACH regulation by European Union to restrict hazardous materials
- 5.4. TSCA by US to control toxic substances
- 6. Introduction to risks to health and safety in textiles 4 HOURS**
  - 6.1. Occupational safety and health (OSH) defined
  - 6.2. Types of workplace hazards
  - 6.3. Workplace hazards associated with textile industry
  - 6.4. ISO 45001 (2018)
- 7. Environmental issues related to spinning sector of textile industry 3 HOURS**
  - 7.1. Issues related to air pollution
  - 7.2. Issues related to noise pollution
- 8. Environmental issues related to weaving sector of textile industry 3 HOURS**
  - 8.1. Issues related to air pollution
  - 8.2. Issues related to noise pollution
- 9. Environmental issues related to textile chemical processing 4 HOURS**
  - 9.1. Issues related to water pollution
  - 9.2. Issues related to air pollution

#### **Recommended Textbooks:**

- 1. Best Practices for Environmental Health: Environmental Pollution, Protection, Quality and Sustainability by Herman Koren. 1/E (2017 Taylor and Francis
- 2. Environment, Health, and Sustainable Development. Edited by: Aleya Abdel-Hadi, Mostafa K. Tolba, Salah Soliman (2010) Hogrefe Publication
- 3. Fundamental Principles of Occupational Health and Safety by Benjamin O. Alli. 2/E (2008) International Labour Organization.
- 4. Global Occupational Safety and Health Management Handbook by Thomas P. Fuller. 1/E (2019) Taylor and Francis

**Instructional Objectives:****1. Introduction to Sustainability**

- 1.1 To understand basic concepts of sustainability
- 1.2 To know about four dimensions or pillars of sustainability
- 1.3 To know about sustainable development and its principles

**2. Introduction to sustainable textile production**

- 2.1. Ability to explain sustainable materials and sustainable production
- 2.2. Ability to explain reasons for rise in demand for sustainable textile products
- 2.3. To know about different sustainability trends in textile industry
- 2.4. To know about labeling to promote sustainability

**3. Environmental sustainability issues in Textile Industry**

- 3.1. To understand importance of environmental sustainability in textile industry
- 3.2. Ability to explain methods for ensuring environmental sustainability in textile industry
- 3.3. To know about importance of recycling for sustainability in textile industry
- 3.4. To know about importance of avoidance of hazardous substances in textile industry
- 3.5. To know about importance of preventing wastages in textile industry

**4. Regulations governing environmental issues**

- 4.1. To know about Pakistan Environmental Protection Act (1997)
- 4.2. To know about ISO 14000 series of standards
- 4.3. To know about Standard 100 by Oeko-Tex
- 4.4. To know about STEP by Oeko-Tex
- 4.5. To know about Made in Green by Oeko-Tex
- 4.6. To know about Eco Passport by Oeko-Tex

**5. Hazardous materials in Textiles**

- 5.1. To know about types of hazardous materials in textile industry
- 5.2. To know about health issues related to hazardous materials used in textile industry
- 5.3. To understand REACH regulation by European Union to restrict hazardous materials
- 5.4. To understand TSCA by US to control toxic substances

**6. Introduction to risks to health and safety in textiles**

- 6.1. Ability to define occupational safety and health (OSH)
- 6.2. Ability to explain types of workplace hazards
- 6.3. Ability to explain workplace hazards associated with textile industry
- 6.4. To know about ISO 45001 (2018)

**7. Environmental issues related to spinning sector of textile industry**

- 7.1. To know about issues related to air pollution
- 7.2. To know about issues related to noise pollution

**8. Environmental issues related to weaving sector of textile industry**

- 8.1. To know about issues related to air pollution
- 8.2. To know about issues related to noise pollution

**9. Environmental issues related to textile chemical processing**

- 9.1. To know about issues related to water pollution
- 9.2. To know about issues related to air pollution