Three-year Diploma Curriculum

As Per

National EducationPolicy 2020
(3rd Semester)

Department of Skill Development
UT of Jammu & Kashmir

First of its kind Exercise undertaken in the country to develop Curriculum in accordance with NSQF Guidelines and as per NEP-2020 for AICTE approved Three year Diploma Courses in UT of Jammu & Kashmir.

CURRICULUM
FOR
THIRD SEMESTER
OF
THREE-YEAR DIPLOMA COURSE
IN
TEXTILE TECHNOLOGY

STUDY SCHEME 3RD SEMESTER

Code	Subjects	Study Scheme			Total Hours L+T+P	Credits			Total Credits L+T+P
		Periods Per Week				L	T	P	
		L	T	P					
TTPC 301	Spinning Technology – I	3	0	0	3	3	0	0	3
TTPC 302	Spinning Technology – I Lab	0	0	2	2	0	0	1	1
TTPC 303	Weaving Technology – I	3	0	0	3	3	0	0	3
TTPC 304	Weaving Technology – I Lab	0	0	2	2	0	0	1	1
TTPC 305	Textile Chemical Processing- I	3	0	0	3	3	0	0	3
TTPC 306	Textile Chemical Processing- I Lab	0	0	2	2	0	0	1	1
TTPC 307	Fabric Structure and analysis-II	3	0	0	3	3	0	0	3
TTPC 308	Fabric Structure and analysis-II Lab	0	0	4	4	0	0	2	2
TTPC 309	Fibre Science	3	0	0	3	3	0	0	3
TTPC 310	Fibre Science Lab	0	0	2	2	0	0	1	1
TTPC 311	Industrial Lecture/ Visit	1	0	0	1	1	0	0	1
TOTAL		**16**	**0**	**12**	**28**	**16**	**0**	**06**	**22**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 301	Course Title : Spinning Technology - I
Semester : 3rd	Credits: 3
Hours per week: 3 (L: 3 T: 0 P: 0)	

COURSE OBJECTIVE:

The student of textile technology after completing diploma has to work in textile mills/textile houses/quality control, therefore should know the basic principles and objectsof Ginning, Blow Room and Carding Machines, their working, quality and production and calculation.

COURSE CONTENT

1. Ginning, Mixing, Blending and Blow Room (24 hours)

1.1. Objects of ginning, ginning percentage, description and working of Double Knife Roller Gin, Double Macarthy Gin and Saw Gin

1.2. Importance of mixing and blending, mixing and blending techniques in Blow Room, description and working of Auto Mixer and Multi Mixer

1.3. Principle of opening and cleaning, opening by the action of nails, beaters and air currents.

1.4. Study of following opening and cleaning machines: Blending Bale Opener, Automatic Bale Plucker, Feeder; Super Jet Cleaner, Mono Cylinder Cleaner, ERM Cleaner, CVT-3 cleaner.

1.5. Objects of evener motion and its importance, construction and working of Piano Type Feed Regulating Motion, of Cone Drums

1.6. Objects, construction and working of Two Bladed Beater and Krischner Beater

1.7. Objects of calendaring in Scutcher and passage of cotton sheet through them

1.8. Necessity & working of Chute Feed System at Blow Room. Main features andadvantages of Modern Blow Room Line

1.9. Calculation of clearing efficiency of blow room line

1.10. Mixing and blending cost calculations

2. Carding (25 hours)

2.1 Objects of carding, Passage of material through Revolving Flat Card and functions of various parts i.e. licker-in, mote knives, back plate, front plate, cylinder, flats, doffer and undercasing

2.2 Difference between carding action and stripping action

2.3 Flexible and metallic card clothing, advantages of metallic card clothing.

2.4 Objects of stripping, procedure for Plain Roller stripping and Vacuum stripping.

2.5 Objects of grinding and Types of Grinding
2.6 Objects principle and working of Auto levelers at card
2.7 Defects in card web and their removal
2.8 Calculation of waste percentage of a card and Cleaning efficiency of Card.
2.9 Calculation of production and production constant

COURSE OUTCOME

After completion of the course the student will be able to

- Work in the Spinning department
- Operate different machinery of blow room and card.
- Calculate the production of blow room and card

RECOMMENDED BOOKS:

1. Spun Yarn Technology, Vol.1 Venkatasubramani
2. Cotton Opening and Picking-Gilbert R merril
3. Manual of Cotton Spinning. Vol.-II and part-I, Textile Institute.
4. Opening, Cleaning and Picking by Zoltan S Szaloki
5. Essential Elements of Practical Cotton Spinning by T.K. Pattabhiram
6. Essential Elements of Practical Cotton Spinning by T.K. Pattabhiram
7. A practical Guide to Combing by W Klein
8. Cotton Spinning by WS Taggart
9. Spun Yarn Technology by Venktasubramani

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No	Time Allotted (Hrs)	Marks Allotted (%)
1	24	50
2	25	50
Total	**49**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 302	Course Title : Spinning Technology – I Lab
Semester : 3rd	Credits: 1
Hours per week: 2 (L: 0 T: 0 P: 2)	

LIST OF PRACTIALS:

1. Study of various parts/motion in Blow Room
2. Practically study of the Chute Feed System during mill visit/mill training
3. Demonstrate the passage of material through the machine and to introducewithdifferent parts of Revolving Flat Card
4. Calculate production and production constant of Card
5. Study of various electronic Parts/Motion in carding
6. To sketch and understand the working of Krischner Beater.
7. Practical study of Automatic Lap doffing mechanism

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 303	Course Title : Weaving Technology-I
Semester : 3rd	Credits: 3
Hours per week: 3 (L: 3 T: 0 P: 0)	

COURSE OBJECTIVES

The Subject weaving technology will impart awareness to the students about differentweaving techniques to produce good quality of fabric.

COURSE CONTENT

1. General introduction to weaving (04 Hours)

1.1 Introduction to handloom, power loom

1.2 Technology of power loom

2. Shedding (08 Hours)

2.1 Introduction to different types of healds, reeds and shuttles

2.2 Introduction to types of sheds- their merits and demerits

2.3 Heald reversing motion Timing of shedding motion; early and late shedding,

2.4 Calculations regarding healds and reeds

2.5 Tappet shedding mechanism and existing motion (for tappet loom)

3. Picking (Overpick and Underpick) (06 Hours)

3.1 Introduction to various parts of picking Mechanism and their adjustment Mechanismof over and under pick motions. Their merits and demerits

3.2 Timing of picking motion

3.3 Early and late picking

4. Beating up Motion (04 Hours)

4.1 Mechanism of beating up motion.

4.2 Eccentricity of sley; methods of finding eccentricity of sley

5. Take up motion (06 hours)

5.1 Various types of take up motions

5.2 Study of 5 wheel take up motion

5.3 Study of 7 wheel take up motion

5.4 Calculations in take up motion for inserting specific number of picks/unit space

6. Let Off Motion (06 hours)

5.1 Various types of let off motion

5.2 Study of various parts and the working of negative let off motion

5.3 Study of various parts and the working of positive let off motion

5.4 Comparison of negative let off and positive let off motion

7. Study object, various parts and working of the following motions (06 hours)

6.1 Weft Stop Motion
6.2 Various types of weft fork motion.
6.3 Study of side weft fork motion
6.4 Study of Centre weft fork motion

8. Study object, various parts and working of the following motions (08 hours)

7.1 Warp Protectors
7.2 Study of loose reed motion
7.3 Study of fast reed motion

9. Temples- (04 hours)

8.1 Their types and their use in relation to different fabrics
8.2 Timing of different motion of loom.
8.3 Calculations relating to speed of loom

COURSE OUTCOME

After completion of the course the student be able to:

- Operate the loom
- Control the quality of the cloth on the loom
- Reduces the fabric defects.

RECOMMENDED BOOKS

1. Weaving Mechanism by T.W. Fox
2. Rapier Loom-WIRA
3. Shutters Weaving Mechanism-BTRA
4. Weaving Mechanism by N.N. Banerjee
5. Weaving Mechanism by DS Verma
6. Weaving Calculation by Sen Gupta
7. Weaving Technology in India by Kishar
8. Shuttle-less Weaving Mechanism-BTRA

SUGGESTED WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted(Hrs)	Marks Allotted (%)
01	04	10
02	08	10
03	06	10
04	04	10
05	06	15
06	06	15
07	06	10
08	08	10
09	04	10
TOTAL	**52**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 304	Course Title : Weaving Technology-I Lab
Semester : 3rd	Credits: 1
Hours per week: 2 (L: 0 T: 0 P: 2)	

LIST OF PRACTICALS

1. Study of take up motion and calculation of loom take up constant.
2. Study of positive let-off system.
3. Study of Warp protection motion (both loose reed and fast reed).
4. Study of warp stop motion.
5. Study of Beating up system.
6. Study of temple motions.
7. Study of side/centre weft fork mechanism.
8. Calculations regarding the weight of warp and weft
9. Fitting the temples on machine and resetting its parts
10. Dimensions of shuttle box, shuttle slay, picking stick with respect to width of loom

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 305	Course Title: Textile Chemical Processing – I
Semester : 3rd	Credits: 3
Hours per week: 3 (L: 3 T: 0 P: 0)	

COURSE OBJECTIVE:

Students of Textile Technology should have an overall view of all Textile Chemical Processing used in modern textile industries. In this subject, students learn about all the preparatory andpost dyeing processes in schematic manner.

COURSE CONTENT

1. Pretreatment (18 hours)

1.1 **Introduction**: Process line for pretreatment, Objectives of each process.

1.2 **Singeing**: Object of the process, types of singeing, details of varioussingeing methods, drawbacks and advantages.

1.3 **Desizing**: Objectives of desizing. Hydrolytic and Oxidative desizing: Rot, acid and enzyme, chlorine, chlorite, peroxide and bromite desizing;

1.4 **Scouring**: Objectives, mechanism of removal of impurities, recipe and controlling parameters involved. Kier, J-Box, pad-roll and V-loc P-loc methods. Scouring of coloured textiles. Scouring of wool, manmade and blended textiles. Bioscouring with enzymes. Degumming of silk

1.5 **Bleaching:** Objectives of bleaching: Hypochlorite, peroxide, chlorite and peracetic acid bleaching methods. Suitability and effectiveness of each methodfor various textiles. Concept of bio-bleaching with enzymes.

1.6 **Mercerization**: Objectives, mechanism related to various physical andchemical changes in cotton. Wet and hot mercerization, Ammonia treatment of cotton. Assessment of efficiency of mercerization: Barium activity number.

2. Color Theory (12 hours)

2.1 **Heat setting**: Objectives and mechanism. Different methods of heat settingand their effectiveness on various manmade textiles and blends.

2.2 **Concept of colour**: Visible spectrum, wavelength and blindness of colour. Metamerism/ isomerism.

2.3 **Theories of colour**: Additive and subtractive theories. Primary, secondary,tertiary, complementary and contrasting colours

2.4 **Theory of dyeing**: Various forces responsible for dye-fibre interaction andrelated colour fastness properties.

3. Dyeing (18 hours)

3.1 **Dyeing of textiles**: Dyeing technology of natural and manmade textiles with direct, reactive, vat, insoluble azoic, sulphur, solubilized vat, acid, metal- complex, basic and disperse dyes. Colouration with Pigments.

RECOMMENDED BOOKS

1. V A Shenai, Technology of Bleaching and Mercerising, Vol 2, SevakPublication, Mumbai(1991).
2. Peters R. H, "Textile Chemistry", Vol - II, Elsevier Publishing Company, London (1967).
3. Shore J, "Cellulosics dyeing", Society of Dyers and Colourists, Bradford, UK (1979).
4. Mittal R M and Trivedi S S, "Chemical Processing of polyester /cellulosic Blends",Ahmedabad Textile Industries Research Association,Ahmedabad, India (1983).
5. Karmakar S R, "Chemical Technology in the pretreatment processes of Textiles", TextileScience and Technology Series, Vol-12, 1st Edition, Elsevier(1999).

SUGGESTED WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No	Time Allotted (Hrs)	Marks Allotted (%)
01	18	40
02	12	20
03	18	40
TOTAL	**48**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 306	Course Title: Textile Chemical Processing – I Lab
Semester : 3rd	Credits: 1
Hours per week: 2 (L: 0 T: 0 P: 2)	

LIST OF PRACTICALS

1. Scouring of cotton
2. Scouring of polyester
3. Scouring of wool
4. Degumming of silk
5. Bleaching of cotton with NaOCl
6. Bleaching of cotton with H_2O_2
7. Bleaching of cotton with $NaClO_2$
8. Dyeing of cotton with direct dye
9. Dyeing of cotton with reactive dye
10. Dyeing of cotton with Sulphur dye
11. Dyeing of cotton with Vat dye
12. Dyeing of cotton with Azo dye
13. Dyeing of wool with acid dye
14. Dyeing of Silk with acid dye

PROGRAM :THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 307	Course Title: Fabric Structure and Analysis-II
Semester : 3rd	Credits: 3
Hours per week: 3 (L: 3 T: 0 P: 0)	

COURSE OBJECTIVE:

Skill regarding various basic weaves designs, their drafting and lifting plan constructions and properties of basic weaves is required in the students. The subject will provide knowledge of different methods of weaves employment to acquire competency for production of basic and advance woven designs.

COURSE CONTENT

1. **Gauze and Leno** **(08 hours)**

   Gauze and Leno Structures- Principle of leno structure, bottom and top douping, basic sheds of leno weaving. Russian cord & Spider Leno

2. **Weft pile Fabric** **(08 hours)**

   Weft pile Fabrics- construction of velveteen, weft plushes and corded velveteen

3. **Terry pile Fabric** **(05 hours)**

   Terry pile structures – principle of formation of three pick and four pick terry fabric

4. **Warp pile Fabric** **(08 hours)**

   Warp pile fabrics produced with the aid of wires-velvet, alternate pile ends of alternate wires

5. **Jacquard Calculations** **(06 hours)**

   Harness and design calculations – set of harness, casting-out in jacquards

6. **Backed Fabric** **(04 hours)**

   Backed fabrics, warp and weft backed fabrics, wadded warp and weft backed fabrics their beaming and drafting procedure.

7. **Double cloth** **(06 hours)**

   Double cloth- self stitched double cloth, reversible self-stitched double cloths, waddeddouble cloths. Center stitched double cloths-center warp stitching, center weft stitching.

COURSE OUTCOME

After completion of the course the student be able to::

- Construct Gauze and Leno Structure

- Construct velvet and velvetten structure
- Calculate the harness required for design
- Construct terry towel fabric.

RECOMMENDED BOOKS:

1. Grammar of Textile Design – Nisbet
2. Structural Fabric Design by – Kilby
3. Woven Structures and Design – Doris Goerner; British TextileTechnology GroupWIRA House, Leeds UK
4. Fibre to Fabric by Ghosh
5. Watson's Advance Textile Design and Colour
6. Watson's Textile Design and Colour
7. Knitting Technology – Spencer
8. Warp Knit Fabric Construction by Charis Wildens U. Wilkens Verlog Germany

SUGGESTED WEBSITES

1. https://online courses.nptel.ac.in/
2. https://swayam.gov.in/

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No	Time Allotted (Hrs)	Marks Allotted (%)
01	08	10
02	08	15
03	05	15
04	08	15
05	06	15
06	04	15
07	06	15
TOTAL	**45**	**100**

PROGRAM :THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 308	Course Title: Fabric Structure and Analysis-II
Semester : 3rd	Credits: 2
Hours per week: 4 (L: 0 T: 0 P: 4)	

LIST OF PRACTICALS

1. Analysis of fabrics

- Objects and methods of analyzing fabric
- Particulars to be analyzed
- Identifying warp and weft in the fabric

2. Analysis of following fabrics.

- Gents Shirting (Cotton)
  - Stripes on loom
  - Small geometrical motifs on dobby loom
- Gents Suitings
  - Trouser length with colour effect in plain weave in cotton
  - Tweed material for jackets in wool
- Ladies dress material
- Pile Fabrics

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 309	Course Title : FIBRE SCIENCE
Semester : 3rd	Credits: 3
Hours per week: (3L: 3 T: 0 P: 0)	

COURSE OBJECTIVE:

To understand the knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fibers, yarns and relevant properties affecting the ultimate performance and use of fabrics by the consumer.

COURSE CONTENT

1. **Overview of fibre:** **(04 hours)**

   Introduction to fibres, Global fibre market and production.

2. **Fibres and polymers:** **(08 hours)**

   Essential and desirable properties of textile fibers; Classification of textile fibers.

3. **Fibre Structure and structure property relation:** **(15 hours)**

   Importance of polymer as a basic building block; Effect of molecular arrangement and molecular weight on properties of polymers/fibers; Concept of thermoplastic and thermoset material.

4. **Commodity Fibres:** **(10 hours)**

   Basic requirements of commodity fibres. Natural and Manmade Commodity fibres.Concept of production of Manmade Fibres. Basic features, properties and applications of important commodity fibres, e.g., Cotton, Silk, Wool, Flax, Jute, Regenerated Cellulosics, Nylon, Polyester, PAN and PP.

5. **High Performance Fibres:** **(12 hours)**

   Basic concept of High Performance Fibres; Introduction, properties and applications of Aramids, Vectran, Zylon, Carbon and Glass fibres.
   Concept of Nano fibres and its applications.

COURSE OUTCOME

After completion of the course the student be able to:

- Develop the concept of natural and synthetic fibre
- Application or use of natural and made fibres

RECOMMENDED BOOKS

1. Cook Gordon J, "Hand Book of textile fibre", Vol. I and II, WoodheadFibre ScienceSeries, UK, 1984.
2. "Manufactured Fibre Technology", 1st Ed. V B Gupta and V K Kothari, 1st Ed.,Chapman and Hall, London, 1997.
3. "Hand Book of Fibre Chemistry", Ed. M Lewin and E M Pearce, Mercel Dekker Inc.,1998.
4. Hearle J.W.S., High Performance Fibres, Textile Institute, Woodhead Publishing, 2001.

SUGGESTED WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No	Time Allotted(Hrs)	Marks Allotted(%)
1	04	12
2	08	14
3	15	10
4	10	12
5	12	08
Total	**49**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 310	Course Title : FIBRE SCIENCE Lab
Semester : 3rd	Credits: 2
Hours per week: 2(L: 0 T: 0 P: 2)	

LIST OF PRACTICALS

Physical and Chemical identification of following textile fibres

1. Identification of cotton
2. Identification of wool
3. Identification of silk
4. Identification of Bast fibres
5. Identification of polyester
6. Identification of nylon
7. Identification of Acrylic
8. Identification of Polypropylene
9. Identification of High performance fibre
10. Identification of carbon fibre
11. Analysis of Aramid fibre
12. Analysis of Glass fibre
13. Estimation of fiber/filament fineness using projection microscope.