Evaluation Scheme & Syllabus

For

B.Tech. Second Year
Textile Chemistry

On
AICTE B.Tech Model Curriculum
(Effective from the Session: 2019-20)
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Subject Codes</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation Scheme</th>
<th>End Semester Total</th>
<th>Credit</th>
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*The Mini Project or internship (3-4 weeks) conducted during summer break after II semester and will be assessed during III semester.

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UNIT I
Introduction: various definitions related to textile fibres, classification of textile fibres, difference between staple & filament, essential & desirable properties of textile fibres, advantages & disadvantages of natural and man made fibres.

UNIT II
Cotton cultivation and harvesting, development of cotton fibres in seed, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications.

UNIT III
Jute cultivation, retting and extraction process, structure of jute fibre, physical and chemical properties of jute fibre and its applications, Introduction to other natural bast fibres like flax, hemp, ramie, banana, bamboo fibre etc. and their applications.

UNIT IV
Types of wool and its grading, Morphological structure, chemical composition, physical & chemical properties, varieties of wool fibres and their applications, introduction to other animal fibres like angora fibres, camel hair fibre, goat fibre etc. and their applications.

UNIT V
Types of silk and its production, chemical composition and morphological structure of silk, physical & chemical properties of silk and its applications.

References:
1.WE Morton & JWS Hearle, Physical properties of textile fibres, Textile Institute, U.K.
2.Progress in textiles: Science and technology Vol.-2 by Dr. VK Kothari, IIT Delhi.
3.Hand book of textile fibres by J. Gordon Cook
4.Fibre Science and Technology, SP Mishra
PRINCIPLES OF YARN MANUFACTURE

UNIT I
Cotton ginning. Name of ginning machines, different types of mixing. Different machines of blow room department with the basic idea of each machines along with their opening and cleaning principle. Lap formation and chute feed system.

UNIT II
Objectives of carding process. Description of carding machine parts with passage of materials, Carding and doffing actions. Flexible and metallic Card clothing. Carding, striping and grinding actions. Different carding engine setting and speed of different parts. Drafts (actual & mechanical) and draft constant, Quality of web and neps etc.

UNIT III
Objectives of Draw frame. Different types of drafting systems. Stop motion and their importance, weighting system used in draw frame, passage of material on modern draw frame machine, Concept of draft.

UNIT IV
Objectives of Comber, Passage of material of modern comber along with functions of various parts of comber machine, Fibre presentation and its effects on combing. Preparatory machines for comber and its working.

UNIT V
Objectives of speed frame, drafting, twisting & winding mechanism of speed frame. Package building on speed frame, ring frame, drafting twisting and winding on ring frame, double apron drafting system on ring frame.

References:
1. Essential elements of practical cotton spinning by TK Pattabhiram
2. Cotton blow room, carding, ring frame by Gilbert R. Merrill
3. Cotton spinning by W. Taggart
4. Spun yarn technology by Eric Oxtoby
PREPARATORY TO PROCESSING OF TEXTILES

UNIT I

UNIT II
Desizing- its objects, various desizing methods with its advantages, disadvantages and comparative study (hydrolytic, oxidative methods), Scouring of cotton and fabric: conventional and bio-scouring, Kiers –various types of kiers and their working.

UNIT III
Objectives of Bleaching, various types of bleaching agent such as NaOCl, CaOCl₂ and H₂O₂, NaClO₂. Bleaching chemistry and mechanism of above mentioned bleaching agents, batch wise, semi continuous and continuous bleaching processes: J-box, Continuous bleaching range (CBR).

UNIT IV
Methods used for determination of degradation of cotton during scouring and bleaching such as copper no., methylene blue absorption method, cuprammonium fluidity etc. optical whitening agent and their applications.

UNIT V
Objectives of mercerization, physical and chemical changes in cotton due to mercerization. Methods and equipment for yarn and fabric mercerization . various methods of determination of efficiency of mercerization.

References:
1. Technology of bleaching Vol. 3 by VA Shenai
2. Textile Scouring & Bleaching by ER Trotman
3. Bleaching & mercerization by JT Marsh
4. Bleaching & mercerization by BTRA

TEXTILE FIBRE-I LAB

Principle of microscopy, microscopic identification of natural fibres, preparation and mounting of specimen for longitudinal view, standard scheme of analysis of homogeneous fibre and blend by physical and chemical methods, preparation of reagents used for chemical analysis.
PRINCIPLE OF YARN MANUFACTURE LAB

Practice in handling and operation of blow room, study of constructional details of machinery in blow room, card, draw frame, speed frame & ring frame, calculating speed of different machine parts, Study of constructional details of card, change places and speed calculation of a carding machine, finding out individual draft and total draft in carding machine, draf frame, rinf frame and roving frame.

PREPARATORY TO PROCESSING OF TEXTILE LAB

Bleaching and mercerization of cotton fabric and to evaluate the effectiveness of each process using various test such as Tewega test, drop absorption test, whiteness index, barium activity number test, measure wax content, ash content and scouring loss of cotton fabric.
SEMESTER IV

PRINCIPLES OF FABRIC MANUFACTURE

UNIT I
Objects of winding process, working principles of automatic cone and cheese winders. Precision and drum winding machine, pirn winding, winding faults and remedies.

UNIT II
Objectives warping process, working principles of Beam warping m/c. Sectional warping m/c, beaming, warper beam defects: cause and remedies.

UNIT III
Objectives sizing process, Slasher Sizing machine, Brief description of modern sizing machine with proper function of each essential part, multicylinder drying, hot air drying and unconventional drying of sized yarns. Sizing ingredients used for cotton and synthetic yarns.

UNIT IV
Drawing-in process, Passage of material on handloom and power loom, Study and working principles of Handloom, Powerloom and Automatic Loom Primary, secondary and auxiliary motions of a power loom.

UNIT V
Comparison between shuttle and shuttleless looms, Basic concepts of shuttleless looms, Brief description of various shuttleless weft insertion principles, Fabric faults and remedies.

References:
1. Tablets (ATIRA) a. Winding b. Warping c. Sizing
2. Process control in warping, winding and sizing (ATIRA, BTRA)
4. Warp sizing by Rame Bottom
5. Yarn calculation by R. Sengupta
TECHNOLOGY OF DYEING-I

UNIT I
Classification of dyes according to the methods of application, general theory of dyeing, various method of dyeing- Batch, Semi continuous, Continuous dyeing. Dyeing of cellulosic fibres with direct dyes Reactive Dyes.

UNIT II
Dyeing of cellulosic fibres with Vat dyes-vatting, dyeing, oxidation, Solublised vat dyes. Sulphur dye dissolution, application, faults and remedies. Azoic-diazotization, naphtholation, coupling, Oxidation colour-aniline black, mineral colours-mineral khaki.

UNIT III
Dyeing of protein fibres – silk and wool with different types of acid dyes –its advantages and limitations, Metal Complex dyes- 1:1, 1:2, metal complex, Chrome dyes-pre, post & simultaneous mordanting, Basic Dyes.

UNIT IV

UNIT V

References:
1. Chemical processing of cotton and p/c blends – ATIRA
2. A glimpse on the chemical technology and textile fibres by RR Chackrawartty
3. Technology of Dyeing by VA Shenai
4. Chemical technology of fibrous material by F. Shadov
5. Physical chemistry of dyeing – Vickerstaff
PRINCIPLES OF FABRIC MANUFACTURE LAB

Study of cone winding, cheese winding, pirn winding and auto coner, constructional details of machine, types of packages produced by them and package faults, Calculations pertaining to cone winding, cheese winding, pirn winding
Study of beam warping & sectional warping machine, stop motion and tensioners in warping, Calculations pertaining to warping machines.
Study of different types of looms, their constructional details, working of dobbly & jacquards.
TECHNOLOGY OF DYEING-I LAB

Dye cotton with direct, reactive, vat and sulphur dye, dyeing polyester, wool, silk, acrylic and nylon using, appropriate disperse, acid and basic dyes, Print cotton fabric using various styles of printing, namely, direct, resist and discharge, Evaluate colour fastness to washing, light, perspiration and rubbing properties