Subject Code	Subject Name	Period Per Week		Credit
21362	ADVANCED WET PROCESSING-I	T	P	C
		2	3	3

Rationale	This course is designed to enrich students with the knowledge of various dyes, chemicals, auxiliaries and machineries used in the field of wet processing. Wet processing includes vast areas of textile process where the science behind the dyes, chemicals and auxiliaries; various application methods and working procedures of relevant machineries are very important. While fabric dyeing both knit and woven comprises the major portion of textile dyeing, yarn and garments dyeing are also getting considerable attention and the market volume is rising gradually. That's why, dyeing of yarn and garments, along with the fabric dyeing are included in this course. Dyeing industries are always in need of textile engineers and technologists with sufficient skill, knowledge and attitude to run the operations smoothly as well as meet the expectations of the ever changing market and advanced technologies. This course will help students to gain the skills, knowledge and attitude necessary to meet the demand of the industries which in turns help the economy and the country as well.
Learning Outcome (Theoretical)	**After completion of this course, students will be able to:** 1. Interpret different dyes, chemicals and auxiliaries used in wet processing 2. Clarify the process sequence of wet processing 3. Formulate recipe to obtain given shade 4. Interpret different dyestuffs, chemical & auxiliaries based on their compatibility with various fibrous materials 5. Assess special preparation required before dyeing 6. Illustrate special preparation required after dyeing 7. State the requirements and technology of garments dyeing 8. Explian the requirements and technology of yarn dyeing
Learning Outcome (Practical)	**After completion of this course, students will be able to:** 1. Identify different dyes, chemicals and auxiliaries used in dyeing operation 2. Identify the process sequence for particular dyeing operation 3. Plan a dyeing process with required dyes and chemicals and appropriate dyeing machinery 4. Calculate the amount of relevant dyes, chemicals and auxiliaries to carry out efficient dyeing operation 5. Follow the precautions should be taken in dyeing process 6. Prepare the plan for a production

Detailed Syllabus (Theory)

Unit	Topics with Contents	Period (1 Period)	Final Marks
1	**Acid Dyes** 1.1 Define Acid dye 1.2 Classify Acid dye 1.3 State the properties of Acid dyes 1.4 List out the commercial names of Acid dye 1.5 State dyeing procedure of Nylon with Acid dye 1.6 Describe the dyeing procedure of Wool with Acid dye 1.7 Describe the after-treatment procedure of Acid dye	**3**	**6**
2	**Basic Dyes** 2.1 Define Basic dye 2.2 Classify Basic dye 2.3 State the properties of Basic dye 2.4 List out the commercial names of Basic dye 2.5 Describe the scope of cotton dyeing with Basic dye 2.6 State the dyeing procedure of Jute with Basic dye 2.7 Describe the dyeing procedure of Acrylic with Basic dye	**3**	**6**
3	**Azoic Dyes** 3.1 Define Azoic dye 3.2 State the properties of Azoic dye 3.3 Describe the steps of dyeing with Azoic dye 3.4 List out the commercial names of Azoic dye 3.5 Describe the dyeing procedure of cotton with Azoic dye 3.6 Explain the after-treatment procedure of Azoic dye	**2**	**6**
4	**Pigments** 4.1 Define Pigment 4.2 State the properties of Pigment 4.3 List out the commercial names of Pigment 4.4 Classify Pigment 4.5 State merits & demerits of pigment 4.6 Mention the function of binder and fixer 4.7 Describe the dyeing procedure of cotton with Pigment	**4**	**6**

5	**Indigo Dyes** 5.1 Define Indigo dye 5.2 Classify Indigo dye 5.3 State the properties of Indigo dye 5.4 List out the commercial names of Indigo dye 5.5 Mention the dyeing methods with Indigo dye 5.6 State the steps of Indigo dyeing process 5.7 Describe the Rope form Dyeing method for denim with Indigo dye	**3**	**6**
6	**Solvent Dyes** 6.1 Define Solvent dye 6.2 State the necessity of Solvent Dyeing 6.3 Classify Solvent dye 6.4 State the properties of Solvent dye 6.5 List out the commercial names of Solvent dye 6.6 Describe the Dyeing procedure of polyester with Solvent dye 6.7 Explain the After-treatment procedure of Solvent dye	**2**	**6**
7	**Natural Dyes** 7.1 Define Natural dye 7.2 State the properties of Natural dyes 7.3 Classify natural dye on the basis of sources 7.4 List out the advantages and limitations of Natural Dyes 7.5 Explain the extraction processes of Natural dyes 7.6 Describe the dyeing procedure of cotton with Natural dye	**3**	**5**

8	**Yarn Dyeing** 8.1 Define yarn dyeing 8.2 State the purpose of yarn dyeing 8.3 State the merits and demerits of yarn dyeing 8.4 Classify yarn dyeing 8.5 Explain the preparatory process of yarn dyeing 8.6 Describe yarn dyeing sequence of cotton 8.7 Describe yarn dyeing sequence of polyester	**4**	**6**
9	**Garments Dyeing** 9.1 Define garments dyeing 9.2 State the purposes of garments dyeing 9.3 Describe the procedure of garments dyeing 9.4 State merits and demerits of garments dyeing 9.5 Describe the precautions of garments dyeing 9.6 Mention garments dyeing machineries 9.7 Describe the process of garments dyeing with Reactive dye	**4**	**6**
10	**Procedure of Garments Dyeing** 10.1 Describe the process of garments dyeing with pigment (Dirty wash/ Oil wash/CPD) 10.2 State the process of garments pigment dyeing with enzyme wash (General pigment dyeing procedure) 10.3 Describe over dyeing process of garments with direct dye 10.4 Describe the Dip dyeing process of garments 10.5 Discuss Tie dyeing process of garments	**4**	**7**
	Total	**32**	**60**

Detailed Syllabus (Practical)

Sl.	Experiment Name with procedure	Class (3 Period)	Continuous Marks
1	**Perform the Application Procedure of Acid Dyes on Nylon Fabric** 1.1 Identify the fabric, relevant dyes, chemicals, auxiliaries & machineries 1.2 Calculate the dyes & chemicals to obtain a required shade 1.3 Perform the dyeing operation 1.4 Maintain the record of performed experiment	1	2
2	**Perform the Application Procedure of Basic dyes on Jute** 2.1 Identify the fabric, relevant dyes, chemicals, auxiliaries & machineries 2.2 Calculate the dyes & chemicals to obtain a required shade 2.3 Perform the dyeing operation 2.4 Maintain the record of performed experiment	1	2
3	**Perform the Application Procedure of Azoic dyes on Cotton fabric** 3.1 Identify the fabric, relevant dyes, chemicals, auxiliaries & machineries 3.2 Calculate the dyes & chemicals to obtain a required shade 3.3 Perform the dyeing operation 3.4 Maintain the record of performed experiment	1	2
4	**Perform the Application Procedure of Indigo dyes on Cotton (Rope Form)** 4.1 Identify the rope, relevant dyes, chemicals, auxiliaries & machineries 4.2 Calculate the dyes & chemicals to obtain a required shade 4.3 Perform the dyeing operation 4.4 Maintain the record of performed experiment	1	2
5	**Perform the Application Procedure of Pigment on Cotton fabric** 5.1 Identify the fabric, relevant pigment, chemicals, auxiliaries & machineries 5.2 Calculate the pigment & chemicals to obtain a required shade 5.3 Perform the dyeing operation 5.4 Maintain the record of performed experiment	2	3

6	**Perform the Application Procedure of Solvent dyes on Polyester fabric** 4.1 Identify the fabric, relevant dyes, chemicals, auxiliaries & machineries 4.2 Calculate the dyes & chemicals to obtain a required shade 4.3 Perform the dyeing operation 4.4 Maintain the record of performed experiment	1	2
7	**Perform the Application Procedure of Natural dyes on Cotton fabric** 7.1 Identify the fabric, relevant dyes, chemicals, auxiliaries & machineries 7.2 Calculate the dyes & chemicals to obtain a required shade 7.3 Perform the preparatory operation 7.4 Perform the dyeing operation 7.5 Maintain the record of performed experiment process	3	3
8	**Perform the yarn dyeing sequence of Cotton** 8.1 Identify the yarn, relevant dyes, chemicals, auxiliaries & machineries 8.2 Calculate the dyes & chemicals to obtain a required shade 8.3 Perform the preparatory operation 8.4 Perform the dyeing operation 8.5 Maintain the record of performed experiment process	1	2
9	**Perform the yarn dyeing sequence of Polyester** 9.1 Identify the yarn, relevant dyes, chemicals, auxiliaries & machineries 9.2 Calculate the dyes & chemicals to obtain a required shade 9.3 Perform the preparatory operation 9.4 Perform the dyeing operation 9.5 Maintain the record of performed experiment process	2	3
10	**Perform the Garments dyeing procedure with Pigment (General Process)** 10.1 Identify the apparel, relevant dyes, chemicals, auxiliaries & machineries 10.2 Calculate the dyes & chemicals to obtain a required shade 10.3 Perform the preparatory operation 10.4 Perform the dyeing operation 10.5 Perform the post-treatment process 10.6 Maintain the record of performed experiment	2	2

11	**Perform the Garments dyeing procedure with Reactive dye** 11.1 Identify the apparel, relevant dyes, chemicals, auxiliaries & machineries 11.2 Calculate the dyes & chemicals to obtain a required shade 11.3 Perform the preparatory operation 11.4 Perform the dyeing operation 11.5 Perform the post-treatment process 11.6 Maintain the record of performed experiment	1	2
	Total	**16**	**25**

Necessary Resources (Tools, Equipment and Machineries):

Sl	Item Name	Quantity (piece/s)
1	Fabric (Cotton, Jute, Nylon, Polyester)	As required
2	Yarn (Cotton, Polyester)	As required
3	Garment (Cotton made)	As required
4	Dye Stuff (Reactive, Acid, Basic, Azoic, Pigments, Solvent, Indigo and Natural dyes)	1 kg each type
5	Pigments	1 kg
6	Deionized Water	As required
7	Mordanting Agent	1 kg
8	Alkali (Soda Ash, Caustic soda)	10 kg each type
9	Acid (Acetic acid, Formic Acid, Green Acid)	10 kg each type
10	Salt (Sodium Chloride, Glauber Salt)	20 kg each type
11	Oxidizing Agent	1 kg
12	Reducing Agent(Hydrose, Sodium Sulphide)	5 kg
13	Wetting Agent	5 kg
14	Sequestering Agent	5 kg
15	Anti-migrating Agent	5 kg
16	Softener	5 kg
17	Detergent	5 kg
18	Bleaching Agent	5 kg
19	Sample Dyeing Machine	2 set
20	Garments Dyeing Machine	2 set
21	Tumble Dryer	1 set
22	Infrared Dryer	1 set
23	Sample Curing Machine	2 set
24	Pipet, Conical Flask , Beaker, Funnel	5 set
25	Digital Balance (Up to three digit)	2 set
26	pH paper/meter	2 set
27	Thermometer	5 set
28	Stopwatch	2 set
29	Burner	5 set

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Technology of Textile Processing	DR. V. A. Shenai	Sevak publications
02	Textile Chemistry-I	MD. MoziburRahaman	----------
03	Basic Principle of Textile Coloration	A D Broadbent	BMN-3 Foundation
04	Fundamentals and Practices in Coloration of Textiles	J N Chakraborty	----------
05	Dyeing and Chemical Technology of Textile Fiber	E R Trotman	----------
06	Dyeing Technology	Engr.MD. Abdul Kader Bepari	----------
07	Technology of Bleaching and Dyeing of Textile Fibers	Chakrawarthy	Coxtown Publication
08	Textile Dyes	N. N. Mahapatra	----------

Website References:

Sl	Web Link	Remarks
01	https://nptel.ac.in/	
02	https://textilelearner.net/	
03	https://fiber2fashion.com/	
04	https://textilestudycenter.com/	
05	https://onlinegarmentsacademy.blogspot.com/	
06	https://textilefashionstudy.com/	
07	https://textiletuts.com/	

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