GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)
Semester - V

Course Title: Production Planning
(Course Code: 4352902)

Diploma programmes in which this course is offered	Semester in which offered
Textile Manufacturing Technology	5th Semester

1.   RATIONALE

Due to rapid rate of change in technology, needs of industries have also changed so the industries require highly skilled technicians. Accordingly production planning in spinning and weaving has also changed. This course will make the students able to understand production planning technique with respect to latest spinning and weaving technology. The students also will be able to plan production schedule for textile industries especially in the area of spinning and weaving with either conventional or sophisticated machines.

2.   COMPETENCY

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:
- **Plan the production for various types of jobs according to available machines in a textile manufacturing plant.**

3.   COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for   the achievement of the following COs:
   a) Interpret different yarn numbering system.
   b) Production Calculation of Spinning and weaving.
   c) Compute various parameters of fabric.
   d) Compute speed and draft in Textile machinery

4.   TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
3	-	-	3	30*	70	0	0	100

 (*): Out of 30 marks under the theory CA, 10 marks are for assessment of the micro-project to facilitate integration of COs and the remaining 20 marks is the average of 2 tests to be taken during the semester for assessing the attainment of the cognitive domain UOs required for the attainment of the COs.
***Legends: L**-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **CA** - Continuous Assessment; **ESE** -End Semester Examination.*

5.   SUGGESTED PRACTICAL EXERCISES

The following practical outcomes (PrOs) are the sub-components of the COs.*Some of the PrOs* marked *'*'* *(in approx. Hrs column) are compulsory, as they are crucial for that particular CO at the 'Precision Level' of Dave's Taxonomy related to 'Psychomotor Domain'.*

S. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
1			

Note

i. More **Practical Exercises** can be designed and offered by the respective course teacher to develop the industry relevant skills/outcomes to match the COs. The above table is only a suggestive list.

ii. The following are some **sample** 'Process' and 'Product' related skills (more may be added/deleted depending on the course) that occur in the above listed **Practical Exercises** of this course which are embedded in the COs and ultimately the competency.

S. No.	Sample Performance Indicators for the PrOs	Weightage in %
1	Identify components	10
2	Prepare of experimental setup	20
3	Operate the equipment setup	20
4	Follow safe practices measures	10
5	Record observations correctly	20
6	Interpret the result and conclude	20
Total		**100**

6.   MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

This major equipment with broad specifications for the PrOs is a guide to procure them by the administrators to usher in uniformity of practical in all institutions across the state.

S. No.	Equipment Name with Broad Specifications	PrO. No.
1		

7.   AFFECTIVE DOMAIN OUTCOMES

The following **sample** Affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs and PrOs. More could be added to fulfil the development of this course t competency.

a) Work as a leader/ team member.
b) Follow safety practices while using textile equipment.
c) Realize importance of green energy.

The ADOs are best developed through the laboratory/field based exercises. Moreover, the level of achievement of the ADOs according to Krathwohl's 'Affective Domain Taxonomy' should gradually increase as planned below:

i.   'Valuing Level' in 1st year

ii.   'Organization Level' in 2nd year.
iii. 'Characterization Level' in 3rd year.

8.   UNDERPINNING THEORY

The major underpinning theory is given below based on the higher level UOs of *Revised Bloom's taxonomy* that are formulated for development of the COs and competency. If required, more such higher level UOs could be included by the course teacher
to focus on attainment of COs and competency.

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different levels)	Topics and Sub-topics

UNIT-I Yarn Numbering System	1a. Distinguish the relation of each of the numbering systems in Textile production sector.
	 1b. Calculate average and resultant count in both direct and indirect system.
	 1c. Establish the relation between different numbering system.
		1.1 Computation of count, length and weight of yarn in both direct and indirect system.
		 1.2 Average count and resultant count in both direct and indirect system.
		 1.3 Different count system and their Relation.
		  a) Tax Count.
		  b) Denier Count.
		  c) English Cotton Count Ne.
		  d) Matric Count Nm.

UNIT-II Spinning and Weaving Calculation	2a. Calculate Production of spinning machine. 2b. Calculate cleaning efficiency of blow room and carding 2c. Calculate time for Production of material on given spinning machine. 2d. Calculate time to produce/exhaust different package. 2e. Calculate Production of weaving machine. 2f. Calculate time for Production of material on given weaving machine. 2g. Calculate time to produce/exhaust different package and beams 2h. Calculate no machine required for required production.	2.1 Production efficiency, hank of lap, weight of lap, length of lap, time required to prepare lap, draft between C R and L R for Blow room. 2.2 Production efficiency, hank of sliver, draft, cleaning efficiency, time required to exhaust and fill up can from given data for carding machine, draw frame machine. comber machine, speed frame, ring frame, O.E machine, two for one twister 2.3 Production efficiency, time required to prepare one cone, time required to exhaust one ring bobbin for winding machine, warping machine, sizing Machine 2.4 production of loom, efficiency, waste of warp, waste of weft
UNIT-III Fabric Calculations	3a. Describe the procedure to set the GSM of fabric. 3b. Describe the steps and precautions to set the fabric cover, EPI and PPI on loom. 3c. Compute weight of warp, weight of weft, GSM, Heald count, reed count for give data. 3d. For given data, compute contraction of warp, weft, cover factor for warp,	3.1 Weight of warp, weight of weft, GSM, heald count, reed count for give data. a) Contraction of warp, weft, cover factor for warp, weft, max. epi and ppi for given data

	weft, max. epi and ppi.	
UNIT-IV Speed and draft Calculation	4a. Explain the need of gearing techniques in textile manufacturing machines such as spinning, weaving, winding, twisting, warping, sizing, Draw frame and Carding, combing, gilling – auto-levelling, control Mixing machines. 4b. Distinguish draft, hank fed and hank delivered from gearing. 4c. Compute gearing ratio, draft from gearing, hank fed and hank delivered.	4.1 Gearing calculation. 4.2 Calculation of draft from gearing, from hank fed and hank delivered.

9.   SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Yarn Numbering System	6	3	4	7	14
II	Spinning and Weaving Calculation	22	0	7	28	35
III	Fabric Calculations	10	3	0	11	14
IV	Speed and draft Calculation	4	0	3	4	7
	Total	**42**	**6**	**14**	**50**	**70**

Legends: R=Remember, U=Understand, A=Apply and above (Revised Bloom's taxonomy)

Note: *This specification table provides general guidelines to assist student for their learning and to teachers to teach and question paper designers/setters to formulate test items/questions to assess the attainment of the UOs. The actual distribution of marks at different taxonomy levels (of R, U and A) in the question paper may vary slightly from above table.*

10.   SUGGESTED STUDENT ACTIVITIES

Other than the classroom and laboratory learning, following are the suggested student-related *co-curricular* activities which can be undertaken to accelerate the attainment of the various outcomes in this course. Students should conduct following activities in group and prepare reports of about 5 pages for each activity. They also collect/record physical evidences for their (student's) portfolio which will be useful for their placement interviews:

   a)   Prepare report on weight of different package based on industrial visit.
   b)   Prepare report speed of different machine based on industrial visit.
   c)   Prepare report on different yarn count their % and average mill count
   d)   Collect data of warping and sizing particular from different mills.

11.   SUGGESTED SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course:

a) Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.

b) Guide student(s) in undertaking micro-projects.

c) **'L' in section No. 4**means different types of teaching methods that are to be employed by teachers to develop the outcomes.

d) About **20% of the topics/sub-topics** which are relatively simpler or descriptive in nature is to be given to the students for **self-learning**, but to be assessed using different assessment methods.

e) With respect to **section No.10**, teachers need to ensure to create opportunities and provisions for **co-curricular activities**.

f) Guide students on how to address issues on environment and sustainability.

g) Guide students for using data manuals.

12.   SUGGESTED MICRO-PROJECTS

 Only one micro-project is planned to be undertaken by a student that needs to be assigned to him/her in the beginning of the semester. In the first four semesters, the micro-project are group-based (group of 3 to 5). However, **in the fifth and sixth semesters**, the number of students in the group should **not exceed three.**

The micro-project could be industry application based, internet-based, workshop-based, laboratory-based or field-based. Each micro-project should encompass two or more COs which are in fact, an integration of PrOs, UOs and ADOs. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. The duration of the microproject should be about **14-15 (fourteen to sixteen) student engagement hours** during the course. The students ought to submit micro-project by the end of the semester to develop the industry-oriented COs.

A suggestive list of micro-projects is given here. This has to match the competency and the COs. Similar micro-projects could be added by the concerned course teacher:

a) **Yarn Numbering System:** Collect different yarn sample and calculate their yarn countin different numbering system.

b) **Spinning Calculation:** Collect data of spinning machinery available globally. Prepare a spinning plant using that machinery

c) **Weaving Calculations:**Collect data of Weaving machinery available globally. Prepare a Weaving PLant plant using that machinery

d) **Spinning and weaving calculation:** Prepare spinning and weaving plant using latest particulars of machinery.

e) **Fabric Calculation**: Collect sample of different fabric compare calculated and actual GSM of the fabric

13. SUGGESTED LEARNING RESOURCES

Sr. No	Title of Book	Author	Publication with place, year and ISBN
1	Weaving calculation	R. Sengupta	Imprint 1979, ISBN-13: 978-0906216613,ISBN-10: 0906216613
2	Textile mechanics and spinning calculation	R.Jagannathan	Mahajan Publication Ahmedabad ISBN: 8185401195.
3	Weaving Calculations: A Guide to Calculations Relating to Cotton Yarn and Cloth and All Processes of Cotton Weaving	Cristopher Parkinson Brooks	Forgotten Books (21 December 2018)ISBN-10 : 1333850689 ISBN-13 : 978-1333850685
4	The Young Man's Assistant To Cotton Spinning	A.Prestwich	Kessinger Publishing (10 December 2008) SBN-10 : 1437349331 ISBN-13 : 978-1437349337
5	Cotton Mill Machinery Calculations - A Complete, Comprehensive And Practical Treatment Of All Necessary Calculations On Cotton Carding And Spinning Machines	B.M. Parker	Read Books (9 October 2007)SBN-10 : 1406783137 ISBN-13 : 978-1406783131

14. SOFTWARE/LEARNING WEBSITES

1. https://archive.org/details/advancedtextiled00watsrich/page/72/mode/2up
2. http:// www.textileschool.com/.../spinning-form
3. http:// www.textilelearner.blogspot.com/.../calculation
4. http:// www.cs.arizona.edu/patterns/
5. http://www.textile.netal.net/spinning/spinning
6. http:// www.cs.arizona.edu/.../pea_calc.pdf
7. http://www.acedemia.edu/.../spinning_calculation
8. http://www.textileschool.com/.../weaving
9. http://www.weavetex.blogspot.com
10. http://www.acedemia.edu/.../textile_calculation
11. http://www.scribd.com/.../weaving_calculation
12. http://www.docstoc.com/.../spinning_calculation.

15.   PO-COMPETENCY-CO MAPPING

Semester V	Production Planning (Course Code: 4352902)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ development of solutions	PO 4 Engineering Tools, Experimentation &Testing	PO 5 Engineering practices for society, sustainability & environment	PO 5 Project Management	PO 7 Life-long learning
Competency .	Plan the production for various types of jobs according to available machines in a textile manufacturing plant.						
CO a) Interpret different yarn numbering system.	3	3	3	2	-	2	3
CO b) Production Calculation of Spinning and weaving	3	3	3	2	-	2	3
CO c) Compute various parameters of fabric	3	3	3	2	-	2	3
CO d) Compute speed and draft in Textile machinery	3	3	3	2	-	2	3

Legend: '3' for high, '2' for medium, '1' for low and '-' for no correlationof each CO with PO.

15. COURSE CURRICULUM DEVELOPMENT COMMITTEE

GTU Resource Persons

Sr. No.	Name and Designation	Institute	Contact No.	Email
1	Patel SandipKumar P Lecturer in Textile	Sir Bhavsinhji Polytechnic, Bhavnagar	0278-2524372	sandip_rcti@gmail.com
2	Zala Samrat Madansinh Lecturer in Textile	R C Technical institute, Ahmedabad	079-27664785	samrat.zala@gmail.com