

**GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)**

**Competency-focused Outcome-based Green Curriculum-2021 (COGC-2021)**

Semester-VI

Course Title: **Production, Planning, Management & Control**

(Course Code: 4365102)

<b>Diploma programme in which this course is offered</b>	<b>Semester in which offered</b>
Computer Aided Costume Design and Dress Making	Sixth

**1. RATIONALE**

This course will familiarize the students about the concept of the management, need and importance of planning, implementation of various production systems and its implications on other dependent processes and measurement parameters in different manufacturing processes. Besides, it will also help them to prepare time and action plan for a given order ensuring maximum utilization of the available resources to achieve efficient productivity with minimal resources.

**2. COMPETENCY**

The purpose of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- **Improve productivity of apparel manufacturing through systematic production planning, management and control.**

**3. COURSE OUTCOMES (COs)**

The practical exercises, the underpinning knowledge and the relevant soft skills associated with this competency are to be developed in the student to display the following COs:

- Adapt effective management and planning strategies for an industry.
- Interpret various terminologies for production planning and control.
- Manage different critical resources optimally and economically.
- Distinguish various types of manufacturing systems used in industries.
- Derive appropriate time plan and action plan for given order execution.

**4. TEACHING AND EXAMINATION SCHEME**

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				Total Marks
L	T	P		Theory Marks		Practical Marks		
			C	CA	ESE	CA	ESE	
4	-	0	4	30*	70	-	-	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 “\*” are compulsory, as they are crucial for that particular CO at the ‘Precision Level’ of Dave’s Taxonomy related to ‘Psychomotor Domain’.*

Sr. No.	Practical Outcomes (PrOs)	Unit No.	Approx. Hrs. required
	NA		

### 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.

Sr. No.	Sample Performance Indicators for the PrOs	Weightage in %
	NA	

## 6. MAJOR EQUIPMENT/ INSTRUMENTS REQUIRED

These 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.

Sr. No.	Equipment Name with Broad Specifications	PrO.No.
	NA	

## 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 fulfill the development of the competency.

- a) Work as a leader/a team member.
- b) Follow ethical practices.
- c) Practice environmental friendly methods and processes. (Environment related)**

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 1<sup>st</sup> year
- ii. ‘Organization Level’ in 2<sup>nd</sup> year.
- iii. ‘Characterization Level’ in 3<sup>rd</sup> year.

## 8. UNDERPINNING THEORY

Only the major Underpinning Theory is formulated as higher level UOs of *Revised Bloom's taxonomy* 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 level)	Topics and Sub-topics
<b>Unit – I</b>  <b>Management</b>	1a. Define management 1b. Explain functions of management 1c. Interpret Warehouse Management 1d. Classify methods used for product movement in warehouse	1.1. Definition and Importance of Management 1.2. Functions of Management 1.3. Warehouse Management 1.3.1. Concept of Warehouse 1.3.2. Purpose of warehouse management 1.3.3. Processes involved in Warehouse management 1.3.4. Methods of moving products in warehouse 1.3.4.1. LIFO 1.3.4.2. FIFO
<b>Unit – II</b>  <b>Planning</b>	2a. Distinguish various types of planning 2b. Describe the steps involved in planning 2c. Explain the process of managing by objectives, strategies and policies 2d. Apply line planning and line balancing for optimum productivity	2.1 Types of Planning 2.1.1 Strategic 2.1.2 Operational 2.1.3 Tactical 2.1.4 Contingency 2.2 Steps involved in Planning 2.3 Formulating Objectives 2.4 Process of Managing by Objectives 2.5 Process of Managing by Strategies and Policies 2.6 Line Planning 2.7 Line balancing 2.8 Line Supervision
<b>Unit– III</b>  <b>Managing Critical Resources</b>	3a. Describe 7M resources 3b. Explain finance management 3c. Select various techniques of Material management 3d. Justify the role of time management	3.1. Interpret 7M Resources 3.2. Finance Management 3.2.1. Sources of finance 3.2.2. Advantages of managing finance 3.2.3. Disadvantages of managing finance 3.2.4. Methods of cost control & its importance 3.3. Material Management 3.3.1 MRP (Material Requirement Planning) 3.3.2 JIT (Just In Time)

Unit	Unit Outcomes (UOs) (4 to 6 UOs at different level)	Topics and Sub-topics
		3.4. Time Management 3.4.1. Meaning and importance of Time management 3.4.2. Principles of Time management
<b>Unit- IV</b>  <b>Terminologies for production and planning</b>	4a. Interpret the terminologies associated with production planning and control 4b. Calculate line efficiency 4c. Figure out critical operations 4d. Analyze throughput time, lead time and pitch time 4e. Solve bottle neck operation	4.1. Machine Layout 4.2. WIP (Work In Progress) 4.3. Bottle Neck 4.4. Critical Operation 4.5. Line Efficiency 4.6. Throughput Time 4.7. Lead Time 4.8. Pitch Time 4.9. Floater
<b>Unit- V</b>  <b>Types of manufacturing system</b>	5a. Differentiate various manufacturing systems 5b. Apply suitable manufacturing system 5c. Use production related reports 5d. Modify the format of production related report	5.1. Make through system 5.2. Assembly system 5.2.1. Progressive bundle system (PBS) 5.2.2. Unit Production system (UPS) 5.3. Modular production system (MPS) 5.4. Quick response manufacturing system (QRM) 5.5. Flexible production system (FPS) 5.6. Production Related reports and Record maintenance 5.6.1. Operator attendance report 5.6.2. Daily production report 5.6.3. Hourly production report 5.6.4. Man and machine utilization report 5.6.5. Garment inspection report 5.6.6. Repair and rejection report 5.6.7. Cutting production report 5.6.8. Inventory report 5.6.9. Finishing room production report
<b>Unit-VI</b>  <b>Time and Action Plan</b>	6a. Explain importance of time and action plan 6b. Prepare time and action plan 6c. Explore various factors while preparing TNA	6.1. Importance of time and action plan in apparel merchandizing 6.2. Factors to be considered while preparing TNA

**Note:** The UOs need to be formulated at different level of Revised Bloom's Taxonomy' to accelerate the attainment of the COs and the competency.

## 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	Management	10	03	04	03	10
II	Planning	10	02	04	04	10
III	Managing Critical Resources	10	03	07	04	14
IV	Terminology for production and planning	06	02	04	02	08
V	Types of manufacturing system	14	00	06	15	21
VI	Time and Action Plan	06	00	04	03	07
<b>Total</b>		<b>56</b>	<b>10</b>	<b>29</b>	<b>31</b>	<b>70</b>

**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 may be useful for their placement interviews:

- Assign internet-based assignments.
- Give seminar on any relevant topic.
- Assign teacher guided self learning activities.
- Industrial visit.

## 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:

- Massive open online courses (**MOOCs**) may be used to teach various topics/sub topics.
- Guide student(s) in undertaking micro-projects.
- 'L' in section No. 4** means different types of teaching methods that are to be employed by teachers to develop the outcomes.
- 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.
- With respect to **section No.11**, 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) Make students understand the relevant topic using animation, video and presentations.

## 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 is group-based. However, in the fifth and sixth semesters, it should preferably be **individually** undertaken to build up the skill and confidence in every student to become problem solver so that s/he contributes to the projects of the industry. In special situations where groups have to be formed for micro-projects, 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 total duration of the micro-project should not be less than **16 (sixteen) student engagement hours** during the course. The student 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) **Management:** Prepare a report on different warehouse management systems.
- b) **Planning:** Prepare a line plan of formal shirt/ formal trouser for assembly system.
- c) **Critical Resources:** Prepare a report on material requirement for a given order.
- d) **Types of manufacturing system:** Prepare chart showing machine layout of various manufacturing systems.
- e) **Time and Action Plan:** Prepare Time and action calendar for a given order.

## 13. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
1	Garment Manufacturing	Prasanta Sarkar	Online Clothing Study Gurgaon, India.
2	Entrepreneurship Development	A. M. Talsania	
3	Warehouse Management	Gwynne Richards	Replika Press Pvt. Ltd. 4737/23, Ansari Road, Daryaganj, New Delhi 110002, India ISBN 978 0 7494 6934 4 E-ISBN 978 0 7494 6935 1
4	Industrial Engineering & management	O. P. Khanna	Dhanpat rai publications (p) ltd ISBN-10 : 818992835X ISBN-13 : 978-8189928353

Sr. No.	Title of Book	Author	Publication with place, year and ISBN
5	Management I and II	Prof. Anand K. Bewoor and S. Kulkarni	Tech-max Publication, Pune ISBN : 978-81-8492-495-4

#### 14. SOFTWARE/LEARNING WEBSITES

- <https://www.youtube.com/watch?v=WvOYjtHFE5A>
- <https://www.slideshare.net/jobitonio/7-ms-of-management>
- <https://www.economicdiscussion.net/management/management/33781>
- <https://www.cottonmonk.com/blog/what-are-the-types-of-garment-production>

#### 15. PO-COMPETENCY-CO MAPPING

Semester VI	Production Planning, Management & Control (Course Code: 4365102)						
	POs and PSOs						
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 6 Project Management	PO 7 Life-long learning
<b>Competency</b>	<b>Improve productivity of apparel manufacturing unit through systematic production planning, management and control</b>						
CO a) Adapt effective management and planning strategies for an industry	3	2	2	-	2	2	3
CO b) Interpret various terminologies for production planning and control	3	-	-	-	-	2	3
CO c) Manage different critical resources optimally and economically	3	3	2	2	2	2	3
CO d) Distinguish various types of manufacturing systems used in industries	3	2	2	2	2	2	3
CO e) Derive appropriate time plan and action plan for given order execution	3	2	2	2	2	2	3

Legend: '3' for high, '2' for medium, '1' for low or '-' for no correlation of each CO with PO

**16. COURSE CURRICULUM DEVELOPMENT COMMITTEE****GTU Resource Persons**

<b>Sr. No.</b>	<b>Name and Designation</b>	<b>Institute</b>	<b>Contact No.</b>	<b>Email</b>
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