GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Design Syllabus (Industrial Design)

Subject Code: 10140302

Subject Name: Materials and Production Processes - II

WEF Academic Year:	2024-25
Semester:	4
Category of the Course:	PCC

Prerequisite:	Materials and Production Processes I
Rationale:	Understanding and knowledge of various materials and production processes for manufacturing are vital for designing products. Ability to make informed decisions for choice of any specific material, production process, finishes, detailing and assembly forms an indispensable competency of a designer in practice. Ability to engage with production and engineering teams in exploring possibilities and engaging with thorough knowledge is vital to design optimisation and decision making.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Enable thorough understanding of different non- metal as materials for design decisions of new products.	U
02	Provide an informed judgment to analyze and select suitability of materials, properties and production processes.	U, R
03	Have a sound understanding of various adhesives, solvents, paints and surface coatings and their processes.	U, A
04	Have ability to use different techniques, methods, skills and judgment about contemporary engineering tools and machinery for production.	U
05	Develop conceptual clarity of various principles of production and their advantages and limitations.	U, R

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (In Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/Practical		
L	T	PR	C	ESE (E)	PA/CA (M)	ESE (V)	PA/CA (I)	

0	2	4	4	0	30	50	20	100

Continuous marking based on classroom assignments pertaining to different aspects of visual Design Elements. Final internal presentation in form of course documentation. End semester evaluation by external jury to evaluate extent and quality of explorations, initiative, originality of visual ideas and overall understanding of various visual elements of form and aesthetics.

Course Content:

Unit No.	Course Content	No. of Hours	% of Weightage
1	**Unit I: Plastics: Properties and Processes** Properties and usage of thermoplastics and thermosetting plastics. Process of selection and applications of plastics for engineering and consumer products. Design limitations and specific advantages of different plastic molding processes. Injection molding, thermo-forming, Roto molding, Friction Welding, Injection blow molding, extrusion, 3D printing	30	35
2	**UNIT II: Other Non-metal Materials- Properties and Processes** Properties, composition, application and use of rubber, ceramics and glass. Properties of natural materials like wood, cane and bamboo, leather, fabrics and paper and their use and application in industry.	30	30
3	**Unit III: Adhesives, Solvents and Surface Coatings** Different adhesives, solvents, resins, foams, paints and surface coatings and their processes.	30	35
	Total	90	100

Visits to different markets and industries to experience different production processes and forms of raw materials available.

Suggested Specification Table with Marks :

Distribution of Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
30	15	15	15	10	15

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

- Thompson R, 'Manufacturing process for design professionals', Thames and Hudson, London, 2007.
- Ashby, Michael, Johnson, Kara, 'Materials and Design: The Art and Science of Material Selection in Product Design', Butterworth-Heinemann, 2002.
- Garratt J, 'Design and Technology', Cambridge University Press, UK, 2004
- Vijay K. Jain, Advanced Machining Processes. Allied Publishers, New Delhi, 2007
- P. C. Pandey and H.S. Shan, Modern Machining Processes, Tata McGraw-Hill, New Delhi, 2007
- G.F. Benedict, Non-traditional Manufacturing Processes, Marcel Dekker Inc., New York, 1987
- McGeough, Advanced Methods of Machining, Chapman and Hall, London, 1998
- Paul De Garmo, J.T. Black, and Ronald A. Kohser, Material and Processes in Manufacturing, Prentice Hall India, 2001.
- Bell, Victoria, Ballard, Rand, Partick, Materials for Design 2, 2014
- Kalpakjian, Serope, Schmid, Steven R., AICTE Recommended| Manufacturing processes for engineering materials | By Pearson 2018
- Thompson, Rob, Thompson, Martin, The Materials Sourcebook for Design Professionals, 2017

* * * * * * *