

FR. Conceicao Rodrigues College Of Engineering
 Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50
Department of Mechanical Engineering

S.E. (Mechanical) (semester III) (2020-2021)

Lecture Plan

Subject: Production Processes (MEC303)

Credits-04

1. Syllabus.

Module	Details	Hours
1	Introduction to Production Processes and Metal Casting 1.1. Classification of Production Processes and applications areas 1.2. Pattern making materials, Types of pattern and allowances. 1.3. Sand moulding and Machine moulding 1.4. Gating system :Types of riser, types of gates, solidification 1.5.Special casting processes : CO2 and shell moulding, Investment casting, Die casting, Vacuum casting, Inspection & casting defects and remedies	8
2	Joining Processes 2.1.Classification of various joining processes; Applicability, advantages and limitations of Adhesive bonding, Mechanical Fastening; Welding and allied processes, Hybrid joining processes. 2.2.Classification and Working of various welding methods: Gas, Arc, Chemical, Radiant, Solid State etc. 2.3.Welding Joints, Welding Positions, Welding defects and their remedies.	8
3	3.1. Forming processes • Introduction and classification of metalworking processes, hot and cold working processes • Introduction, classification and analysis of forging and rolling operations, Defects in rolled and forged components, • Extrusion process, Classification and analysis of wire and tube drawing processes. 3.2. Sheet metal working processes • Classification of Sheet metal operations, types of Presses used in sheet metal operations, types of dies.	8
4	4.1. Machine Tools, Machining Processes. • Machine Tools and Machining Processes: Lathe Machines, Milling Machines, Drilling Machines, and Grinding Machines and selection of grinding wheel (Dressing and Truing), Broaching machines, Lapping/Honing machines (Super Finishing Operations) and shaping/slotting/planning	12

	Machines. • Gear Manufacturing Gear milling, standard cutters and limitations, Gear Hobbing, Gear Shaping, Gear Shaving and Gear Grinding processes 4.2. Tool Engineering • Geometry and nomenclature of single point cutting tool, Speed, feed, depth of cut, Taylor’s tool life equation, Concept of chip formation and types of chips. Introduction to Jigs and Fixtures and types.	
5	5.1 Non Traditional Machining Processes: • Electro-chemical machining (ECM) • Electric-discharge machining (EDM) • Ultrasonic machining (USM) • Laser Beam Machining (LBM)	4
6	6.1 Polymer Processing: • Polymer Molding Techniques for thermoplastic and thermosetting plastics. Applications of Plastics in engineering field. 6.2 Powder Metallurgy: • Introduction to PM, Powder making processes, Steps in PM. Compaction and Sintering processes. Secondary and finishing operations in PM. 6.3 Intelligent manufacturing in the context of Industry 4.0, • Cyber-physical systems (CPS) • Internet of Things (IoT) enabled manufacturing • Cloud Manufacturing	8

2. CO Statements.

Learner will be able to

1. Demonstrate an understanding of casting process
2. Illustrate principles of forming processes.
3. Demonstrate applications of various types of welding processes.
4. Differentiate chip forming processes such as turning, milling, drilling, etc.
5. Illustrate the concept of producing polymer components and ceramic components.
6. Illustrate principles and working of non-traditional manufacturing and Understand the manufacturing technologies enabling Industry 4.0

3. CO-PO Mapping.

CO# / PO#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	3	-	-	-	-	-	-	-	-	-	-
2	3	3	-	-	-	-	-	-	-	-	-	-
3	3	3	-	-	-	-	-	-	-	-	-	-
4	3	3	-	-	-	-	-	-	-	-	-	-

5	3	3	-	-	3	-	2	-	-	-	-	2
6	3	3	-	-	3	-	2	-	-	-	-	2

4. CO Assessment tools with target.

	Target for Assessment Tools		
	Unit Test	End Semester Exam	Course Exit Survey
1	50%	50%	60%
2	50%	50%	60%
3	50%	50%	60%
4	50%	50%	60%
5	50%	50%	60%
6	50%	50%	60%

5. Curriculum Gap/Content beyond syllabus (if any).

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6. Lecture/Lab/Mini Project/Assignment Plan.

Week	Durati on (Hrs.)	Topic	Modul e
Week 1 (10/07/20)	1	Introduction to Production Processes and Metal Casting	1
Week 2 (13/07/20 – 17/07/20)	4	1.1. Classification of Production Processes and applications areas 1.2. Pattern making materials, Types of pattern and allowances.	1
Week 3 (20/07/20 – 24/07/20)	4	1.3. Sand moulding and Machine moulding 1.4. Gating system :Types of riser, types of gates, solidification Numericals on Riser design	1

Week 4 (27/07/20 – 31/07/20)	4	1.5.Special casting processes : CO2 and shell moulding, Investment casting, Die casting, Vacuum casting, Inspection & casting defects and remedies Joining Processes 2.1.Classification of various joining processes; Applicability, advantages and limitations of Adhesive bonding, Mechanical Fastening; Welding and allied processes, Hybrid joining processes.	1 & 2
Week 5 (03/08/20 – 07/08/20)	4	2.2.Classification and Working of various welding methods: Gas, Arc, Chemical, Radiant, Solid State etc. 2.3.Welding Joints, Welding Positions, Welding defects and their remedies.	2
Week 6 (10/08/20 – 14/08/20)	4	3.1. Forming processes • Introduction and classification of metalworking processes, hot and cold working processes • Introduction, classification and analysis of rolling operations, Defects in rolled components,	3
Week 7 (17/08/20 – 21/08/20)	4	Introduction, classification and analysis of forging operations, Defects in forged components,	3
Mid Term Break			
Week 8 (31/08/20 – 04/09/20)	4	• Extrusion process, Classification and analysis of wire and tube drawing processes. 3.2. Sheet metal working processes •	3
Week 9 (07/09/20 – 11/09/20)	4	Classification of Sheet metal operations, types of Presses used in sheet metal operations, types of dies.	3
Week 10 (14/09/20 – 18/09/20)		4.2. Tool Engineering • Geometry and nomenclature of single point cutting tool, Speed, feed, depth of cut, Taylor’s tool life equation, Concept of chip formation and types of chips.Introduction to Jigs and Fixtures and types. Revision for UT	4
Unit Test - 1			
Week 12 (28/09/20 – 02/10/20)	4	4.1. Machine Tools, Machining Processes. • Machine Tools and Machining Processes: Lathe Machines, Milling Machines, Drilling Machines,	4

Week 13 (05/10/20 – 09/10/20)	4	Grinding Machines and selection of grinding wheel (Dressing and Truing), Broaching machines, Lapping/Honing machines (Super Finishing Operations) and shaping/slotting/planning Machines.	4
Week 14 (12/10/20 – 16/10/20)	4	• Gear Manufacturing Gear milling, standard cutters and limitations, Gear Hobbing, Gear Shaping, Gear Shaving and Gear Grinding processes	4
Week 15 (19/10/20 – 23/10/20)	4	5.1 Non Traditional Machining Processes: • Electro-chemical machining (ECM) • Electric-discharge machining (EDM) • Ultrasonic machining (USM) • Laser Beam Machining (LBM)	5
Week 16 (26/10/20 – 30/10/20)	4	6.1 Polymer Processing: • Polymer Molding Techniques for thermoplastic and thermosetting plastics. Applications of Plastics in engineering field. 6.2 Powder Metallurgy: • Introduction to PM, Powder making processes, Steps in PM. Compaction and Sintering processes. Secondary and finishing operations in PM.	6
Week 17 (02/11/20 – 06/11/20)	4	6.3 Intelligent manufacturing in the context of Industry 4.0, • Cyber-physical systems (CPS) • Internet of Things (IoT) enabled manufacturing • Cloud Manufacturing 08	6
Week 18 (09/11/20 – 10/11/20)	2	Revision for UT2	
Week 19 (26/11/20)		Unit Test – II	