B. E. Semester: 3 Mechanical Engineering
Subject Name: MACHINING AND CASTING PROCESS (ME-303)

A. **Course Objective:**

- To present a problem oriented in depth knowledge of MACHINING AND CASTING PROCESS
- To address the underlying concepts and methods behind MACHINING AND CASTING PROCESS

B. **Teaching / Examination Scheme**

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
ME303	**MACHINING AND CASTING PROCESS**	4	0	2	6	5	3	70	30	20	30	150

C. **Detailed Syllabus**

1 **Foundry Processes**:
The principle of sand casting. The mould, behavior of cast metal, gates, risers and drills, making mould, moulding machines, cores and core making, core making machines, patterns, type of patterns, pattern materials, pattern layouts, pattern shrinkage allowance, other allowances, draft, fillets, locating pads, sands and other mould ingredients, melting metals in foundry, the cupola, melting non-ferrous metals, pouring and cleaning casting ,cell mould casting .

2 **Hard Mould Casting Process** :
Metal mould casting processes : Permanent mould casting, low pressure casting, slush casting, disc casting, die casting machines, centrifugal casting, comparison of metal mould casting methods, plaster mould casting, precision investment casting, continuous casting.

3 **Basic Machine Tools** :
Machine tool classification, working and auxiliary motions in machine tools, primary cutting motions in machine tools.

4 **Metal Cutting Lathes :**
Engine Lathes, construction arrangement and principal units of engine lathes, type and size range of engine lathes, operations carried on engine lathe, attachment extending the processing capacities of engine lathes, description of other types of lathes, plain turning lathes, facing lathes, multiple tool lathes, simple purpose lathes, turret lathes, horizontal and vertical.

5 **Drilling Machines** :
Purpose and field of application of drilling machines, upright drill processes, radial drills.

6 **Boring Machines** :
Purpose and field of applications. Horizontal boring machines, precision boring machines.

7 **Unit Built Machine Tools** :
Purpose of unit built machines tools and their layout.

8 **Milling Machines** :
Purpose and types of milling machines, general purpose milling machines, different types of milling operations, milling cutters, attachments extending the processing capabilities of general purpose milling machines.

9 **Planers, Shapers and Slotters :**
Classification : Attachments extending the processing capacities of each.
Sawing and Broaching Machines; Metal sawing - classification; reciprocating sawing machines, circular sawing machines, band sawing machines.
Types of broaching machines, advantage and limitations of broaching.

10 **Grinding Machines and Abrasives** :
Classifications of grinding machines, cylindrical grinders, Internal grinders, surface grinders, tool and cutter grinders, surface finishing. Abrasives, manufacture of grinding wheels.

D. **Lesson Planning**

Sr.No.	Date/Week	Unit No.	% Weightage	Topic No:
1	1st ,2ed ,3ed	Unit 1	20 % .	1,2
2	4th ,5th ,6th	Unit 2	20 %	3,4
3	7th ,8th ,9th	Unit 3	20 %	5,6
4	19th ,11th ,12th	Unit 4	20 %	7,8
5	13th ,14th ,15th	Unit 5	20 %	9,10

E. **Instructional Method & Pedagogy**

8. At the start of course, the course delivery pattern , prerequisite of the subject will be discussed

9. Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.

10. Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.

11. One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.

12. Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.

13. Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.

14. The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures. Experiments shall be performed in the laboratory related to course contents. Suggested list of experiment is given below

1. Pattern making including wood turning. ... One job
2. Casting of the above pattern
3. Plain, step and taper turning ... One job
4. Thread cutting, right and left hand threads job without nut ... One job
5. Thread cutting - multistart ... One job
6. Machining plane surface on a shaper and milling machine .. One job
7. Simple gear cutting job on milling machine ... One job
8. Introduction of Lathe machine
9. Different types of Lathe Operations.
10. Introduction of Milling machine.
11. Machining a surface of given job by Milling machine.
12. Introduction of Shaper.
13. Demonstration of Shaper Operation.
14. To determine moisture content of given moulding sand.
15. Introduction of Sand Rammer.
16. Introduction of Permeability meter.
17. Introduction of Universal sand strength machine.
18. Study of Sieve and Shaker.

F. **Students Learning Outcomes**

- The student can identify different areas of MACHINING AND CASTING PROCESS
- Can find the applications of all the areas in day to day life.

G. **Recommended Study Materials**

Reference Books:

1) Production Technology by R.K.Jain, Khanna Publishers
2)
3) Production Technology Vol-I & II by O.P.Khanna, Dhanpatrai & Co.
4) Work Shop Technology Vol.-I & II by Hajara Chaudhary
5) Manufacturing processes by R.P.Arora & Raghunath
6) Workshop technology vol.-I & II by Chapman