ADVANCE CASTING TECHNIQUES
Semester I (Production Engineering) SUB CODE: MEPR103
Teaching Scheme (Credits and Hours)

Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
					Hrs	Marks	Marks	Marks	Marks	
Hrs	Hrs	Hrs	Hrs							
4	0	2	6	5	3	70	30	20	30	150

LEARNING OBJECTIVES:
The objective of this course is

- To learn various concepts related to casting
- To have practical purview of various special casting techniques.

LESSON PLANNING

SR.NO	CHAPTER NO	DATE/WEEK	%WEITAGE
1	1,2	1^{st} 2^{nd} 3^{rd}	20
2	3	4^{th} 5^{th} 6^{th}	20
3	4	7^{th} 8^{th} 9^{th} 10^{th}	20
4	5,6	11^{th} 12^{th} 13^{th}	20
5	7,8	14^{th} 15^{th}	20

Total hours (Theory): 60, Total hours (Practical): 30, Total hours: 90

DETAILED SYLLABUS

Chap. No.	Topic
1	**Casting Processes:** Classification, characteristics of sand casting processes, metal mould casting processes and casting processes using other mould/core materials, Pattern materials, types of patterns, Mould and core making materials and their characteristics.
2	Technology of Selected Casting Processes, clay bonded, oil bonded, synthetic resin bonded, and inorganic material bonded mould and core making processes. Sand additives and mould coatings. Metal mould casting processes, centrifugal and continuous casting processes.
3	**Solidification, Gating and Riser design & analysis:** Nucleation and grain growth, Solidification of pure metals, short and long freezing range alloys.
4	Rate of solidification, macrostructure and microstructure. Solidification Contraction; Fluidity and its measurement. Mould-metal interface reactions.
5	**Melting and quality control:** Melting and quality control of various steels and non-ferrous alloys casting defects - fettling, inspection and testing of castings.
6	Design for castability-process friendly design, castability analysis and collaborative engineering.
7	**Casting for heterogeneous materials:** FRP, quick casting , full mould casting
8	Evaporative pattern casting

LIST OF PRACTICALS

Sr. No.	Practical Content
1	ASSESSMENT OF SAND CASTING &ITS BINDERS FOR GIVEN APPLICATIONS
2	PERFORMANCE OF SAND TESTING VIZ. PERMABILITY TEST,GREEN STRENGHT,DRY SHEAR STRENGTH, MOULD HARDNESS TEST
3	TO STUDY ABOUT VARIOUS SPECIAL CASTING TECHNIQUES (QUICK CASTING , FULL MOULD CASTING)
4	DESIGN & ANALYSIS OF GATING SYSTEM FOR FERROUS METAL
5	DESIGN & ANALYSIS OF RISER DESIGN FOR FERROUS METAL
6	FLUIDITY MEASUREMENT IN METAL CASTING
7	DESIGN FOR CASTABILITY OF VARIOUS MATERIALS
8	ASSESSMENT OF SOLIDIFICATION OF PURE METALS (SPECIFICALLY NUCLEATION & GRAIN GROWTH)
9	ASSESSMENT OF CASTING DEFECTS IN FERROUS MATERIALS USING NDT
10	CASE STUDY ON CASTING OF FRP MATERIALS

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all units while conducting teaching & examination.
- Attendance is compulsory in lectures and Tutorial which carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 30 Marks.
- One internal exam of 30 marks is conducted as a part of mid semester evaluation.

STUDENTS LEARNING OUTCOMES:

At the end of the course

The students will gain an experience in the implementation of casting techniques concepts which are applied in the field of production.

Reference Books:

1. Scrope Kalpakjian, “Manufacturing processes for Engineering Materials”, Addision, Wesley, 1997.
2. Fundamentals of metal casting technology - P.C. Mukherjee, Oxford and IBH.
3. Mechanical Metallurgy, Dieter, Me Graw Hill, Kogakusha
4. Casting properties of metals and alloys - V. Korolkove.
5. Metal casting-B.Ravi-PHI