| Course code | Course Name | L-T-P-Credits | Year of Introduction |
|---|---|---|---|
| MP206 | Foundry Technology | 3-0-0-3 | 2016 |

**Prerequisite : Nil**

**Course Objective**

1. To introduce different techniques and applications of casting process.
2. To impart basic casting design principles.
3. To introduce different metal melting techniques.

**Syllabus**

Introduction to foundry, Pattern design and making, core making, sand moulding, casting design principles, casting techniques, Melting and pouring of metal.

**Expected Outcome**

At the end of the course, the students will have exposure to the different casting techniques, design principles, and application.

**References**


- Jain, P. L., "Principles of foundry technology", Tata McGraw-Hill Education.
- Beeley, Peter., "Foundry technology", Butterworth-Heinemann.
- Heine, Richard W., Carl R. Loper, and Philip C. Rosenthal, "Principles of metal casting", Tata McGraw-Hill Education.
- Agarwal, R. L., T. R. Banga, and Tahil Manghnani, "Foundry Engineering", Khanna Pub.
- Srinivasan, N.K., "Foundry Technology", 3rd Edition, Khanna Pub.
- Howard, E. D., ed. "Modern foundry practice", Philosophical Library.
- Taylor, Howard F., Merton C. Flemings, and John Wulff, "Foundry engineering", New York: Wiley.
- Ekey, David C., and Wesley P. Winter, "Introduction to foundry technology", McGraw-Hill.
- Kalpakjian, Serope, Steven R. Schmid, and Chi-Wah Kok, "Manufacturing processes for engineering materials", Pearson-Prentice Hall.


**Course Plan**

| Module | Contents | Hours | Sem. exam marks |
|---|---|---|---|
| I | Introduction to foundry, Steps involved in casting, Advantages and limitations of casting process, Design and metallurgical advantages, applications of casting process. | 5 | 15% |
| II | Pattern design and making, Pattern types and materials– factor effecting the choice of pattern materials, use of different types of patterns, pattern allowances, pattern materials, color coding of pattern. | 7 | 15% |
| | **First Internal Exam** | | |
| III | Molding: Sand moulding procedure, types of sand moulding, | 7 | 15% |

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|---|---|---|---|
| | ingredients and the properties of moulding sand, sand conditioning, sand preparation equipment. Specification and testing of moulding sands- grain size sieve analysis, green and dry strength, hardness test, permeability and moisture content. Core: types, core materials, core boxes, core sand | | |
| IV | Casting Design: Metallurgical consideration, design consideration, economical consideration. Solidification and microstructure development of castings, mechanism of dentritic growth, solidification rate and time, Chvorinov's rule. Gating and risering: functions of gating and risering system, design of sprue, gating ratio, riser design. | 8 | 15% |
| **Second Internal Exam** | | | |
| V | Casting techniques: types of casting processes and applications; permanent mould casting, pressure die casting, squeeze casting, centrifugal casting, continuous casting, electro-slag casting, shell moulding, $CO_2$ moulding, fettling, heat treatments for casting, casting defects and inspection of castings. | 8 | 20% |
| VI | Modernisation and mechnisation of foundries: Need, area for mechanisation, material handling, pollution control in foundries, pollutants in a foundry, pPlant layout for foundries, steps in planning a foundry layout.<br>Application of CAD/CAM in foundry. Casting of complicated shapes - automotive components. | 7 | 20% |
| **End Semester Exam** | | | |

**Question Paper Pattern**

Total marks: 100, Time: 3 hrs

The question paper should consist of three parts

**Part A**

4 questions uniformly covering modules I and II. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

**Part B**

4 questions uniformly covering modules III and IV. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

**Part C**

6 questions uniformly covering modules V and VI. Each question carries 10 marks

Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

**Note**: In all parts, each question can have a maximum of four sub questions, if needed.