

## MT 676 Processing of Aluminium alloys

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**Course Objectives:** The objective of this course is to provide students a fundamental understanding of the classification and physical metallurgy of aluminium alloys, various processing techniques of aluminium alloys and to suggest a suitable technique for making an engineering component, the microstructural details of aluminium alloys.

Different Aluminium alloys- Cast and Wrought alloys- Temper designation systems – Physical metallurgy of Aluminium alloys. Direct chill (DC) casting of various aluminium alloys. Control of Hydrogen, Inclusions and grain size during DC casting.

Aluminium alloy castings- Different Forming operations – Forging methods (Open die, closed die and rolled rings) – Cold and Hot Extrusions – Sheet/plate rolling of various aluminium alloys. Welding of Aluminium alloys.

Heat treating of various aluminium alloys (Annealing-Solutionising-Ageing) and the related strengthening mechanisms- Heat treatment furnaces used for Aluminium alloy products. Cleaning finishing and coating

Solidification structures of Aluminium alloy Ingots - Microstructures of aluminium wrought Aluminium alloys - Microstructures of Cast alloys – Microstructures of Aluminium alloy weldments.

Tribological behavior – Microstructure control - Properties of pure, wrought and cast Aluminium alloys.

### Text Books:

1. ASM Specialty hand book – “Aluminium and Aluminium alloys” –ASM International; Materials park- OH 44073 – 0002 – June 2010.
2. T. Sheppard – “Extrusion of Aluminium alloys” – December 2010.
3. ASM – “Aluminium – Volume – I: Properties, Physical Metallurgy and Phase diagrams” - ASM Metals Park, Ohio, USA, 1967.
4. ASM “Aluminium Volume II: Design and Applications” - ASM Metals Park, Ohio, USA, 1967.
5. ASM “Aluminium Volume III: Fabrication and Finishing” - ASM Metals Park, Ohio, USA, 1967.

**Course Outcomes:** At the end of this course, the students would be able to:

1. To learn the classification and physical metallurgy of aluminium alloys
2. To understand various processing techniques of aluminium alloys and to suggest a suitable technique for making an engineering component
3. To analyse the microstructural details of aluminium alloys
4. To evaluate the properties of aluminium alloys

Mrs RB  
ML

Mrs BM / For Senate  
Approve  
M