

**B. Tech (Metallurgical & Materials) Syllabus from Admission Batch 2018-19**  
**5<sup>th</sup> Semester**

<b>5<sup>th</sup> Semester</b>	<b>RMM5D005</b>	<b>Joining of Materials</b>	<b>L-T-P 3-0-0</b>	<b>3 Credits</b>
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**Module I:** **(10 Hours)**  
Theory and classification of welding processes Gas, arc, resistance, pressure, submerged arc, TIG, MIG, plasma arc and electron beam welding including spot welding laser welding and diffusion welding.

**Module II:** **(8 Hours)**  
Mass and heat flow in fusion welding. Metallurgical effects of the weld thermal cycles.

Metallurgy of welding of structural steels, HAZ. Metallurgy of fusion welding of ferritic and austenitic steels, cast iron etc. welding pool solidification.

**Module III:** **(8 Hours)**  
Metallurgical principles of welding nonferrous alloys, Cu alloys, Al alloys etc., welding pool solidification, structure of welds, heat treatment and transformation.

Welding stresses and stress relieving treatments.

**Module IV:** **(8 Hours)**  
Design of welded joints, welding defects and their remedies. Inspection and testing of weldments.

**Module V:** **(6 Hours)**

Brazing and soldering. Joining of ceramics and plastics.

**Books:**

- [1] Metallurgy of Welding, by J.F.Lancaster, Allen and Unwin.
- [2] Welding and Welding Technology by R.L.Little, TMH
- [3] Metallurgy of Welding by Sefarin, John Wiley.
- [4] Welding Processes Hadbook, K. Weman, Woodhead.

**Digital Learning Resources:**

CourseName: Joining Technologies for metals  
Course Link: <https://nptel.ac.in/courses/112/107/112107213/>  
Course Instructor: Prof. D.K.Dwibedi, IIT Roorkee

CourseName: Fundamentals of welding and joining  
Course Link: <https://nptel.ac.in/courses/112/103/112103244/>  
Course Instructor: Dr Swarup Bag, IIT Guwahati