WELDING OF ADVANCED HIGH STRENGTH STEELS FOR AUTOMOTIVE APPLICATIONS

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INTENDED AUDIENCE
M.E/M.Tech,M.S,B.Sc,M.Sc,PhD, Final year B.E/B.Tech students or Graduates

PRE-REQUISITES
Production Engineering,Basic knowledge of steel physical metallurgy and welding processes.

INDUSTRIES APPLICABLE TO
All automotive manufacturers and their OEMs and Steel plants.

COURSE OUTLINE:
The use of advanced high strength steels (AHSS) is increasingly preferred in automotive applications due to improved crash energy management and enhanced strength-ductility combinations, resulting in greener and safer vehicles. The weldability of AHSS is generally poorer than conventional steels due to the high alloying contents required to obtain multi-phase microstructure. This course is aimed to discuss the (i) role of alloying elements in stabilizing multi-phase microstructures of AHSS, (ii) effect of weld thermal cycles on the evolution of microstructures and (iii) weldability of AHSS.

ABOUT INSTRUCTOR:
Dr. Murugaiyan Amirthalingam is currently working as an Assistant Professor in IIT-Madras. His research interests include welding metallurgy, welding processes development, steel product development and additive manufacturing.

COURSE PLAN:

Week 01: Introduction to physical metallurgy of advanced high strength steels
Week 02: Introduction to welding processes in automotive industries (Advanced Gas Metal Arc, Resistance Spot and Laser Welding Processes).
Week 03: Welding metallurgy of advanced high strength steels – Effect of weld thermal cycles on the stability of phases, solidification behaviour, segregation and hot cracking susceptibility.
Week 04: Mechanical properties of advanced high strength steel weldments – Tensile shear testing, HAZ softening characteristics, role of modified weld thermal cycles (post pulsing and post weld heat treatments) to improve the mechanical properties.