

PhD Course “Additive Manufacturing of Metals and Alloys”

5 days (5 hours) of lectures (10:15-12:00, 13:15-16:00) + 1 day 3 hours presentations
(28 h - 2 ECTS)

Course contents:

Days 1 to 5

1. Introduction into AM of metals and AM methods
2. Powder fabrication and characterization
3. Beam / material interaction
 1. Laser or electron beam interactions
 2. Heat flow and processing maps
4. Fundamentals of rapid solidification
5. Residual stress, pores, cracks, and surface roughness
6. Specific alloys
 1. Titanium, steels, Cu and precious alloys
 2. Ni alloys
 3. Al alloys
7. Microstructure control through processing
8. Post-treatments for microstructure and properties control
9. Mechanical properties of AM parts
10. Properties of AM lattice structures
11. AM of special metals, multimaterial AM

Day 6:

- a. Each student finds a paper of interest and transfers it to a dedicated server
- b. Groups of 2 people choose a paper among the list on the server (not the ones they have found in a)
- c. Teams have to present the topic on the last day, ~ 15-20 min, followed by questions
- d. Grading based on
 - the relevance of the provided paper (a)
 - the presentation quality and answers to questions (c).