

MICRO-413

**Advanced additive manufacturing technologies**

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Cursus	Sem.	Type
Mechanical engineering minor	E	Opt.
Mechanical engineering	MA2, MA4	Opt.
Microtechnics	MA2, MA4	Opt.
Mineur STAS Chine	E	Opt.

Language of teaching	English
Credits	3
Withdrawal	Unauthorized
Session	Summer
Semester	Spring
Exam	Oral
Workload	90h
Weeks	14
<b>Hours</b>	<b>3 weekly</b>
Courses	2 weekly
TP	1 weekly
<b>Number of positions</b>	<b>40</b>

**Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.**

**Summary**

Advanced 3D forming techniques for high throughput and high resolution (nanometric) for large scale production. Digital manufacturing of functional layers, microsystems and smart systems.

**Content**

High speed 3D printing with polymers (DMD based)  
 Fabrication methods for 3D nanometric resolution  
 Drop on demand digital printing  
 Industry speakers on selected topics of advanced additive manufacturing

**Keywords**

Micro-nano 3D manufacturing  
 Drop on demand printing  
 Ink formulation  
 High speed light management  
 Hybrid printing

**Learning Prerequisites****Required courses**

- 40 students maximum (first come first serve if more than 40).
- required course: ME-413

**Learning Outcomes**

By the end of the course, the student must be able to:

- Select appropriately advanced printing methods for a given printing requirement
- Realize 3D printing concepts and their limitations
- Match different printing methods to realize multi-functional 3D structures
- Manipulate advanced 3D printing equipment

**Assessment methods**

1 report to be handed in on week 14 counting for 1/3 of the final mark.  
Final oral exam counting for 2/3 of the final mark

## Resources

### Notes/Handbook

Selected sections (PDF format) in books:

Microdrop generator, Eric Lee, CRC press

Surface tension in microsystems, Springer

Additive Manufacturing Technologies, Ian Gibson, David Rosen, Brent Stucker, Springer

Selected papers and course slides.