Grasmech course 1st semester 2024

NCTAM organization - Belgium

Between process and material models, macroscopic or lower scales, some examples of your possibilities

Inscription: fill inscription file and send it to anne.habraken@uliege.be

Abstract: This course is focused on solid material models at macroscopic and microscopic scales and the link with material process that explains materials defect and microstructure genesis. The presented mechanical behaviour laws or microstructure kinetic evolution models are stand alone modules or part of an FE^2 homogenisation scheme or any other coupled frame linked for instance with machine learning approaches. At the lower scale, Phase Field modules are described while "classical' macroscale models are presented too in deep drawing and fatigue life prediction for instance. Many materials (Steel, TA6V, Al alloys) and processes such as deep drawing, Directed Energy Deposition will be covered within the course. The last part will be devoted on material service life models (creep ,fatigue).

This course gives you an introduction to material models and points the teams you find in Belgium around those topics as 12 professors share with you their expertise. It provides a broad background in material modelling, letting you dig more if you are interested in one topic.

Who: PhD students of an institution in Belgian are public target, but any scientist with an engineer background can attend **(free attendance)**

When ? 7 slots of half a day from October to December 2024 on Tuesday (mornings except one afternoon)

Where? You travel Uliege, KU Leuven, UGhent, UC Louvain

(each professor stays within his/her institution)

Exact schedule and location next page

How many ECTS?

An attendance sheet will allow to deliver you an attestation for the amount of course followed. Based on this information, your institution decides, how much credit it is worth.

If you plan attend at least 10 slots (2 lectures per slot) **and would be interested by an exam signal it**. We will see how to organise it.

PS: at your inscription AM Habraken will confirm the room location within the campus, some are not yet known, inscription list will be shared to encourage co-traveling by trains or cars.

	Module(s), teacher(s) and affiliation(s)	Location	Date
1	**Overview of process models** at different scales Anne Marie Habraken	ULiege (campus Sart Tilman) Institut de Génie Civil et mécanique (9 Allée de la découverte 4000 Liege) https://www.campus.uliege.be/cms/c1841746/fr/b52/3-mecanique-genie-civil-bureaux Room +2/433	Tuesday 1st October 9:00 -12:30
2	Which model for **deep drawing simulations** Macro, Micro scales? Anne Marie Habraken		
3	The **phase-field** method: models and applications Nele Moelans (KULeuven)	KU Leuven Department of Materials Engineering, KU Leuven Kasteelpark Arenberg 44, box 24.50 (Room and directions will be indicated at the entrance of the building) KU Leuven	Tuesday 8th October 9:00 -12:30
4	**Physical processes underlying plastic deformation**, how the mechanisms drive the models Marc Seefeldt (KULeuven)		
5	**Crystal plasticity** models - Introduction and DAMASK presentation Martin Diehl (KULeuven)		Tuesday 15th October 9:00 -12:30
6	**Crystal plasticity** models – practice Martin Diehl (KULeuven)		
7	Implementation of a **self consistent** crystal plasticity model Patricia Verleysen, Jesus Galan-Lopez (UGent)	UGent Campus Ardoyen (Zwijnaarde), Building 60 "Lab Magnel", Teaching room UGain 0.1 (ground level)	Tuesday 5th November 9:00 -12:30
8	**Texture** modeling Leo Kestens (UGent)		
9	PFEM (**Particle Finite Element Method**) another way to mix fluid and solid models, including fluid-structure interactions Jean Philippe Ponthot ULiege	ULiege Same location as 1/10 https://www.campus.uliege.be/cms/c1841746/fr/b52/3-mecanique-genie-civil-bureaux Room +2/433	Tuesday 19th November 9:00 -12:30
10	Simulations of **Directed Energy Deposition** process, FE model and Machine Learning Laurent Duchêne ULiege		
11	About **rupture** models Thomas Pardoen (UC Louvain)	UC Louvain BARB 02 (Auditoires Sainte Barbe, Place Sainte Barbe – 1348 Louvain-la-Neuve)	Tuesday 26th November Afternoon 14:00-17:30
12	About **interface** models Nicolas Moes (UC Louvain)		
13	A **creep** survey from mechanisms to multiscale modelling Anne Marie Habraken ULiege	UGent attention same campus but different room than on 5/11 Campus Ardoyen (Zwijnaarde), iGent tower (building 126), meeting room 1.1 "Hermann von Helmholtz" (first floor)	Tuesday 3rd December 9:00 -12:30
14	**Fatigue** modelling Phenomenological Approach Maximum Variance Method (MVM) Wim Van Paepegem UGent		