PROCESS TO EDEY COURSE REGISTRATION

1) How do I recognize if it is an internal or external course?

- If the course is in EDEY it is usually from our course book or comes from one of my course announcements = internal

- If the course is from any other EPFL doctoral program course book = internal also
  Look for hints as in the example below (scroll down)

- If it is a Master course (= internal)
  Look for hints as in the example below (scroll down)

- If you can’t find it in any EPFL course book = external (Equivalence: you cannot register on ISA for this kind of courses, it must be done through me). They usually take the form of:
  o Summer and winter schools
  o Workshops

  !!!FYI: conferences do not give credits!!!

2) How to register to a course

  o For internal courses:
    ▪ fill form “Form for EPFL PhD/Master courses” and then either go to IS-Academia to register or ask me to do it
    ▪ Attend the course – you will automatically receive the credits on IS-A after you have been examined (it may take a few days though)

    !!!FYI: you can attend the course as an auditor (no exam-no credits), thanks to mention it on the form!!!

  o For external courses:
    ▪ fill the form “Form for courses outside EPFL” and send it to me BEFORE registering to the course through your lab secretary in order to be sure that you will receive credits for it
    ▪ I will confirm to you that it has been signed by EDEY direction
    ▪ When you come back, I will send the form for your supervisor to evaluate you and fill the bottom of the form
    ▪ Then I will send it to the SAC for processing the credits

Thank you for your attention and help.
Kind regards,
Cecile
INTERDISCIPLINARY CENTRE FOR ELECTRON MICROSCOPY CIME

MSE-636 Scanning Electron Microscopy Techniques

Spring 2015
13/14/15 April
1 credit

Monday 13 November: 10h15-12h30, 13h15-17h00
Tuesday 14 November: 09h15-12h00, 13h15-17h00 demos in CIME
Wednesday 15 November: 08h15-12h00

To register for the course please contact Onystrille Demiere from the Doctoral Program in Materials Science and Engineering.

EXAM: date TBA; room: TBA
Exam format: written. Lecture notes allowed (no internet connection !)

Objectives:
1) To understand the basics of a scanning electron microscope and its capabilities.
2) To understand the image contrast formation in scanning electron microscopy (SE, BSE, low kV, resolution).
3) To understand analytical techniques such as X-Ray spectroscopy and Electron backscatter diffraction.
4) To understand image formation in environmental SEM.
5) To understand ion beam techniques (FIB and He-ion microscopy).
6) To assess the different possibilities and applications (Materials sciences, biology, crystalline or amorphous materials...).

Content:
This intensive course is intended for researchers who are potential new users of scanning electron microscopes. It will provide them with a basic understanding of the instruments, optics of SEM, the imaging modes, the associated analytical techniques EDS and EBD0, related theories of image formation. Demonstrations will be given on the microscopes.

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**Two-phase flows and heat transfer**

**ME-446**

**Lecturer(s):**
- de Entremont Brian Paul
- Saenae Tom
- Thome John Richard

**Language:**
- English

**SUMMARY**

This course covers the theoretical and practical analysis of two-phase flow and applications. Fundamental two-phase heat transfer in the form of condensation and boiling are studied in detail. Advanced topics such as microchannel two-phase flow, microfinned tubes and oil effects are also handled.

**CONTENT**

1. Introduction to two-phase flow patterns (annular, mist, bubbly, stratified, etc).
2. Two-phase flow pattern maps and transition theory.
3. Homogeneous and heterogeneous flow models.
4. Film condensation (Nusselt equation, multtube models,

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**IN THE PROGRAMS**

- **Mechanical Engineering, 2014-2015, Master semester 3**
- **Mechanical Engineering, 2014-2015, Master semester 1**
- **Energy Management and Sustainability, 2014-2015, Master semester 1**
- **Energy minor, 2014-2015, Autumn semester**