

1	Module Name	Project Work on Advanced Materials, Processes and Applications – “Energy Materials” Interdisciplinary tutorial at the joint EMRS- EUROMAT materials weekend 19./20.09.2015 in Warsaw, Poland	5 ECTS
2	Courses	A The old matter of new energy materials (Dr. Mikael Syväjärvi, University of Linköping, SE), 60 min B Battery materials (Dr. Claus Daniel, Oak Ridge National Laboratory, USA), 60 min C Photovoltaic materials - crystal growth of silicon for photovoltaics (Dr. Jochen Friedrich; Fraunhofer IISB, D), 60 min D Poster Session on “Energy Materials”, 60 min	3 ECTS
		E EMRS Fall meeting 2015 or EUROMAT 2015 conference	2 ECTS
3	Teaching Staff	A Dr. Mikael Syväjärvi, University of Linköping, SE, misyv@ifm.liu.se B Dr. Claus Daniel, Oak Ridge National Laboratory, US, danielc@ornl.gov C Dr. Jochen Friedrich; Fraunhofer IISB, D, jochen.friedrich@iisb.fraunhofer.de D Dr. Mikael Syväjärvi, University of Linköping, SE, misyv@ifm.liu.se E Module Coordinators	
4	Module Coordinators	Dr. Mikael Syväjärvi, University of Linköping, SE, misyv@ifm.liu.se Prof. Dr. A. Lindsay Greer, Department of Materials Science & Metallurgy, University of Cambridge, UK Prof. Dr. Peter J. Wellmann, Materials Department, University of Erlangen-Nürnberg, D, peter.wellmann@fau.de	
4	Syllabus Outline	The old matter of new energy materials <ul style="list-style-type: none"> • Understanding the role of materials for new applications • Understanding the time scale and efforts to bring a new material forward to an application Battery Materials <ul style="list-style-type: none"> • Overview on battery materials • Challenges in battery electrode materials Photovoltaic materials - crystal growth of silicon for photovoltaics <ul style="list-style-type: none"> • Czochralski crystal growth process • Directional solidification • Silicon solar cells devices 	
6	Educational goals and Learning outcome	<ul style="list-style-type: none"> • Specific skills: Gain of broad and interdisciplinary knowledge in a modern topic of advanced materials, processes and applications • Soft skills: Ability to present own literature survey and to carry out a scientific discussion. 	

		<ul style="list-style-type: none"> For all skills: Can explain, apply and reflect upon the theories, technologies, specialties, terminology, boundaries and different schools of their discipline (field of gained knowledge) critically and in depth.
7	Prerequisites	Bachelor degree in Chemistry, Molecular Science, Physics, Nanotechnology, Materials Science or a related course
8	Intended stage in the degree course	Elective module during Master or Graduate Studies (interdisciplinary studies, soft skill training)
9	Courses of study for which the module is acceptable	M.Sc. and PhD-studies in Chemistry, Molecular Science, Physics, Nanotechnology, Materials Science or a related course
10	Assessment and examinations	<ul style="list-style-type: none"> Oral examination during poster session (15 min) notes from attended conference (8 pages)
11	Calculation of the grade for the module	100% from oral examination (passed or failed)
12	Frequency of offer	Single event, September 19 th + 20 th , 2015 + associated conference week
13	Workload	<ul style="list-style-type: none"> Home studies (preparation of poster presentation): 90 h Tutorial day (lectures + poster session): 4 h Conference attendance (EMRS fall meeting or EUROMAT 2015 conference, September 2015 in Warsaw, Poland): 56 h
14	Duration	1 semester / term
15	Language	English
16	Preparatory reading / reading list	Selected publication list of the tutorial speakers

Module Catalogue (to be completed by home University / College):

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