


GRADUATE SCHOOL



PRODUKTION2030

Courses www.produktion2030.se

Course name	P24 Welding Technology 
Examiner	Lars-Erik Svensson, University West, lars-erik.svensson@hv.se
More info, contact person	As above
Course site and dates	University West, Innovatum. Tuesday from W3 19/1 2016
Teachers /Tutors	<p>The teachers are experienced researchers in various areas of welding, such as welding processes, metallurgy, physical modelling etc: Prof Lars-Erik Svensson and Prof Leif Karlsson – material science</p> <p>Professor Svensson was welding expert at Volvo AB's materials technology laboratory and has worked for ESAB. He supported the product development of engines, cabs and chassis for lorries, buses and other heavy vehicles. Between 2004 and 2010 he was also Adjunct Professor in Physics, specialising in welding, at Chalmers University of Technology.</p> <p>Professor Leif Karlsson is an Adjunct Professor in Welding Technology at University West. The main focus of his research is welding metallurgy. The aim is to understand, predict and control the relations between on the one hand weld metal compositions, the welding process and procedure and on the other hand weld metal</p>

	microstructure and properties Since he received his PhD in Materials Science in 1986, Leif Karlsson has been employed at ESAB, a world leading manufacturer of equipment and consumables for welding.
Target group	Doctoral students in production and/or product development who want to gain knowledge in current scientific methods and tools for welding applications and how welding affects the joined components.
Overall Course Goal	The course aims to give a thorough understanding of different welding processes and their physical properties.
Higher Education Credits/ "Points"	7,5 HE credits
Ingress Short Summary and aims	The course covers arc physics, welding machines, welding metallurgy of several alloys (steels, stainless steels, Ni-base alloys, aluminium) and welding production
Learning outcomes	<p>After the course, the student shall demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> • Different welding processes including the involved physics. • How different construction material is affected by welding. • The impact from welding on the properties of the component. • Which demands are laid on the welding in production. • Available modelling tools for welding simulation. <p>The student shall demonstrate skill and ability in:</p> <ul style="list-style-type: none"> • Describing control functions in welding machines for obtaining desired performance. • Basic phenomena in heat generation. • Dynamic processes in drop transfer and melt pool.
Course content	<p>The course covers theoretical and practical issues regarding the following topics:</p> <ul style="list-style-type: none"> • Arc physics. • Control functions in welding machines and influences due to material and shield gas on the welded joint. • Influence on the welded component due to the welding. • Production of welded components • Modelling of the welding processes
Expected pre-knowledge	Doctoral students in Product Design or Production Technology or equivalent research area.
Registration info and FEES	-
Examination	There is a written examination of the course The grades are passed/not passed.
Literature	<p>Weman, Klas (2012). <i>Welding processes handbook</i>. 2nd ed. Cambridge: Woodhead.</p> <p><u>Reference literature:</u> Grong, Øystein (1997). <i>Metallurgical modelling of welding</i>. 2. ed. London: Institute of Materials. Lancaster, J. F. (1999). <i>Metallurgy of welding</i>. 6. ed. Cambridge: Abington. Svensson, Lars-Erik (1994). <i>Control of microstructures and properties in steel arc welds</i>. Boca Raton, Fla: CRC Press. Relevant scientific papers.</p>
Limiting number of participants	15

Detailed Course Structure/ Class sessions	Tuesdays from 9-15 or 9-12. Detailed schedule will be given at course start.
Travelling directions incl. google map and coordinates (<i>to be added before first lecture</i>)	http://www.hv.se/en/production-technology-west/about/find-us