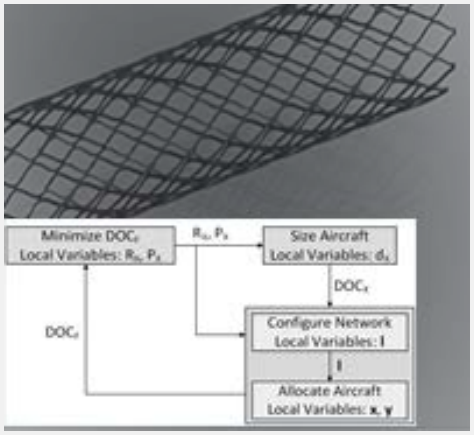
Updated: 10/31/2016

Syllabus for



P66 – Multidisciplinary Design Optimization in Product Development

Credits	3 credits
Examiner	Michael Kokkolaras, McGill University, michael.kokkolaras@mcgill.ca
Contact	Magnus Bengtsson magnus.bengtsson@chalmers.se +46 (0) 733 – 16 41 24
Target group	Professionals and students who wants to develop their skills and knowledge within Design Optimization in Product Development
Fee for industrial members	Contact Magnus Bengtsson for current fees.
Prerequisites	No prerequisites
Aim	The objective of this course is to introduce the basic principles of multidisciplinary design optimization (MDO).

Examples will be will be used along with assignments to demonstrate the implementation of theoretical topics so that practitioners can learn how to apply them on their own problems.

More at http://sol.research.mcgill.ca/research.html

Teachers / tutors

Dr. **Michael Kokkolaras** is Associate Professor of Mechanical Engineering at McGill University and a faculty member of the McGill Institute for Aerospace Engineering (MIAE) and the FRQNT-funded multi-university Group for Research in Decision Analysis (GERAD). He joined McGill in 2012 after spending 12 years at the University of

Michigan (UM) in Ann Arbor, where he held research faculty appointments in the Department of Mechanical Engineering and the UM Transportation Research Institute. He has a Diploma in Aerospace Engineering from the Technical University of Munich and a Ph.D. in

Mechanical Engineering from Rice University. His research interests include multidisciplinary optimization, simulation-based engineering design, uncertainty quantification, decomposition and coordination methods, modeling and validation, systems of systems, product families and optimization applications in engineering. He has co-authored 45 articles in archival journals, 59 papers in conference proceedings and 5 book chapters and has given more than 40 invited

talks at academic, industry and government seminars and workshops.

He served as Associate Editor of the ASME Journal of Mechanical Design from 2008 to 2014, and is currently Associate Editor of the CSME Transactions and the Optimization and Engineering journal. He is a member of the ASME Design Automation Executive Committee (Design Engineering Division) and Associate Fellow of the AIAA, serving on its Multidisciplinary Design Optimization Technical Committee.

Learning outcomes

Upon successful completion of this course, attendees will be familiar with:

- relevant engineering optimization concepts,
- gradient-based and derivative free algorithms,
- appropriate surrogate optimization frameworks,
- MDO problem formulations, and Architectures,
- non-hierarchical and hierarchical coordination methods.

Contents

Topics include:

- Engineering optimization: review of relevant theory and algorithms

- Rigorous approaches for surrogate-assisted simulation-based design optimization
- Multidisciplinary design optimization formulations and architectures
- Analytical target cascading: hierarchical and non-hierarchical coordination
- Design under uncertainty: non-deterministic design approaches (time permitting)

Organisation To be decided

Literature Information will be sent out to participants.

Examination To be decided.

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