

## 8. SRH INTERNATIONAL WEEK 2017: Course description

<b>Title of Course:</b>	Computational Fluid Dynamics Using Finite Volume Method
<b>Language:</b>	English
<b>Course Type:</b>	Seminar
<b>Work Load:</b>	20 hours (including exams on Friday)
<b>Lecturer/Title/ Home University:</b>	Dr. Mehmet Halûk AKSEL / Professor of Mechanical Engineering Middle East Technical University, Turkey
<b>Course description/ Contents:</b>	<p>This course is an introductory course on Computational Fluid Dynamics (CFD) using finite volume method.</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Conservation laws and boundary conditions</li> <li>• Finite volume method for diffusion problems</li> <li>• Finite volume method for convection-diffusion problems</li> <li>• Pressure-velocity coupling in steady flows</li> <li>• Solution of discretization equations</li> </ul>
<b>Learning outcome:</b>	<p>Upon successful completion of the course, the student is able to</p> <ul style="list-style-type: none"> <li>• identify the governing equations that are used in CFD problems.</li> <li>• identify the characteristic of a problem and solve it with appropriate solution method.</li> <li>• analyze merits and/or pitfalls of various solution algorithms.</li> <li>• analyze computation errors for solution accuracy.</li> <li>• identify the finite volume algorithms used by commercial CFD codes.</li> </ul>
<b>Examination:</b>	2 hour exam at the end of the course covering the course contents
<b>4 questions to be prepared by the students prior to arrival:</b>	<ul style="list-style-type: none"> <li>• What is Computational Fluid Dynamics (CFD)?</li> <li>• How does a CFD code work?</li> <li>• What is turbulence and how can it be modelled?</li> <li>• Why CFD is both a powerful and a dangerous tool?</li> </ul>
<b>Essential reading:</b>	<p>J. D. A. Anderson, Computational Fluid Dynamics, McGraw Hill Book Company, New York, 1995.</p> <p>A. Bakker, CFD Lecture Notes, <a href="http://www.bakker.org/dartmouth06/engs150/">http://www.bakker.org/dartmouth06/engs150/</a></p> <p>S. V. Patankar, Numerical Heat Transfer and Fluid Flow, McGraw Hill Book Company, New York, 1980.</p> <p>H. K. Versteeg and W. Malalasekera, An Introduction to Computational Fluid Dynamics: The Finite Volume Method, Pearson Education Ltd., Harlow, Essex, Great Britain, 2007.</p>