

1	Course Number	Study Program KEEP/INTAP	Semester 2-4	Offered in <input checked="" type="checkbox"/> WS, <input checked="" type="checkbox"/> SS	Duration 1 Semester	Course Type optional	Workload (h)	ECTS Points 4
2	Course Fluid Mechanics		Teaching and Learning Forms Lectures, practices and exam preparation		Contact Time (SWS) (h) 4 40 (1h=45 min.)		Self-Study Time (h) 20	Language English
3	Learning Outcomes and Competences After successfully completing the module, students will be able to ... Know and understand - ... the fundamental concepts of fluid dynamics. - ... basic tools necessary to apply the conservation principles of mass, momentum and energy to non-viscous and viscous fluids in the analysis of engineering systems. Use, application and generation of knowledge <i>Use and transfer</i> - ... use basic analytical tools necessary to apply conservation principles of mass, momentum and energy to non-viscous and viscous fluids in the analysis of engineering systems. -estimate typical magnitudes of fluid mechanical parameters and material properties. <i>Scientific innovation</i> - ... independently carry out optimizations and further developments of fluid mechanical systems. Overarching competencies <i>Communication and Cooperation</i> - ... argue their point of view in technical discussions using basic relations from the field of fluid dynamics. <i>Methodological competence</i> - ... have learned to solve fluid mechanical problems systematically. - ... name and apply the equations from the field of fluid dynamics relevant to the problem at hand and apply them. Scientific self-image/professionalism - ... the students can work independently on scientific projects related to fluid mechanical issues.							
4	Participation Requirements Experimental Physics							
5	Course Contents Part 1. Properties of Fluids Part 2. Hydro- and Aerostatics Part 3. Hydro and Aerodynamics <ul style="list-style-type: none"> - Stream Filament Theory - Introduction to Gas Dynamics - Flows with Friction - Dimensional Analysis 							

6	<p>Course Calendar</p> <table border="0" style="width: 100%;"> <thead> <tr> <th></th> <th style="text-align: center;">Section 1</th> <th style="text-align: center;">Section 2</th> </tr> </thead> <tbody> <tr> <td>Week 1</td> <td>Introduction</td> <td>Exercises</td> </tr> <tr> <td>Week 2</td> <td>Properties of Fluids</td> <td>Exercises</td> </tr> <tr> <td>Week 3</td> <td>Hydro and Aerostatics</td> <td>Exercises</td> </tr> <tr> <td>Week 4</td> <td>Stream Filament</td> <td>Exercises</td> </tr> <tr> <td>Week 5</td> <td>Theory</td> <td>Exercises</td> </tr> <tr> <td>Week 6</td> <td>mid-term exam</td> <td>Exercises</td> </tr> <tr> <td>Week 7</td> <td>Discussion and Solution mid-term</td> <td>Exercises</td> </tr> <tr> <td>Week 8</td> <td>Introduction to Gas</td> <td>Exercises</td> </tr> <tr> <td>Week 9</td> <td>Dynamics</td> <td>Exercises</td> </tr> <tr> <td>Week 10</td> <td>Flows with Friction</td> <td>Exercises</td> </tr> <tr> <td>Week 11</td> <td>Dimensional Analysis</td> <td>Exercises</td> </tr> <tr> <td></td> <td>Exercises and Discussion</td> <td>Exercises</td> </tr> <tr> <td></td> <td>final exam</td> <td></td> </tr> </tbody> </table>		Section 1	Section 2	Week 1	Introduction	Exercises	Week 2	Properties of Fluids	Exercises	Week 3	Hydro and Aerostatics	Exercises	Week 4	Stream Filament	Exercises	Week 5	Theory	Exercises	Week 6	mid-term exam	Exercises	Week 7	Discussion and Solution mid-term	Exercises	Week 8	Introduction to Gas	Exercises	Week 9	Dynamics	Exercises	Week 10	Flows with Friction	Exercises	Week 11	Dimensional Analysis	Exercises		Exercises and Discussion	Exercises		final exam	
	Section 1	Section 2																																									
Week 1	Introduction	Exercises																																									
Week 2	Properties of Fluids	Exercises																																									
Week 3	Hydro and Aerostatics	Exercises																																									
Week 4	Stream Filament	Exercises																																									
Week 5	Theory	Exercises																																									
Week 6	mid-term exam	Exercises																																									
Week 7	Discussion and Solution mid-term	Exercises																																									
Week 8	Introduction to Gas	Exercises																																									
Week 9	Dynamics	Exercises																																									
Week 10	Flows with Friction	Exercises																																									
Week 11	Dimensional Analysis	Exercises																																									
	Exercises and Discussion	Exercises																																									
	final exam																																										
7	<p>Course Schedule Two sessions per week with 2 hours per session (1h=45 min.).</p>																																										
8	<p>Examination Forms and Prerequisites for Awarding ECTS Points Midterm and final exam written examination 90 min., graded The exam is an open book exam and the students can bring all documents in paper form (scripts and notes) and calculators.</p>																																										
9	<p>Estimated Student Workload 40 hours</p>																																										
10	<p>Further Use of Course Electrical Engineering, Mechatronics, Mechanical Engineering</p>																																										
11	<p>Grading Scheme Total grade: 25% midterm exam and 75% final exam</p> <p><i>Local grading scale Esslingen University:</i></p> <p>1,0/1,3 very good 1,7/ 2,0/ 2,3 good 2,7/3,0/3,3 satisfactory 3,7/4,0 adequate 4,3/4,7/5,0 insufficient/failed</p>																																										
12	<p>Course Manager and Full-Time Lecturer Prof. Dr. Christian Saumweber</p>																																										
13	<p>Literature Lecture scripts with notes, exam samples with solution, instructor provides exercises with solutions. Further reading: Graebel, W.P.: Engineering Fluid Mechanics, Taylor & Francis, 2001. Anderson, J.: Fundamentals of Aerodynamics, 6th edition, McGraw-Hill, 2016</p>																																										
14	<p>Course Registration Since the course places are limited, please register in advance by email at: kremena.daneva@hs-esslingen.de</p>																																										
15	<p>Last Updated 31.07.2023</p>																																										