

## Courses in English

### Course Description

<b>Department</b>	05 Building Services Engineering, Paper and Packaging Technology and Print and Media Technology
<b>Course title</b>	<b>Fluid Mechanics</b>
<b>Hours per week (SWS)</b>	4
<b>Number of ECTS credits</b>	5
<b>Course objective</b>	
<b>Prerequisites</b>	no
<b>Recommended reading</b>	Textbook and handouts
<b>Teaching methods</b>	lectures and exercises
<b>Assessment methods</b>	examination
<b>Language of instruction</b>	English
<b>Name of lecturer</b>	Prof. Dr.-Ing. habil. Dieter Liepsch
<b>Email</b>	<a href="mailto:Liepsch@hm.edu">Liepsch@hm.edu</a>
<b>Link</b>	
<b>Course content</b>	siehe Anlage
<b>Remarks</b>	

**Prof. Dr.-Ing. habil. Dieter Liepsch**

## **Fluid Mechanics**

**Goal:** To extend the physical knowledge in the field of fluid mechanics

### **Contents:**

#### **Introduction to Fluid Mechanics**

Definition of a fluid-fluid as a continuum.

Velocity field, stress field, viscosity.

Description and classification of fluid motions.

#### **Fluid Static's**

Pressure

Hydrostatic force on submerged surfaces

Buoyancy and stability

Dimensionless number: Reynolds number,

Froude-, Mach-, Strouhal-number

#### **Basic equations**

Conservation of mass

Newton's Second Law

The angular momentum principle

The first and second law of thermodynamics

#### **Motion of a fluid element**

##### **Incompressible inviscid flow**

Momentum equation for frictionless flow

Euler equation

Bernoulli equation

##### **Internal incompressible viscous flow**

Fully developed laminar flow

Flow in pipes and ducts

Turbulent flow

##### **Boundary layer theory**

##### **Turbo machinery**

##### **Compressible flow in pipes**

Isotherm and adiabatic

Laval jet

##### **Flow measurement (short introduction)**

External incompressible viscous flow

Flow in open channels

Introduction to compressible flow