

## *COMPUTATIONAL FLUID DYNAMICS 2021/22*

**Coordinator of the course: dr Slawomir Kubacki, WUT professor**

**Number of ETCS points – 3**

### **Effects of education**

#### **Knowledge:**

- EW1. Student knows basic models and equations of fluid mechanics.
- EW2. Student knows basic techniques of discretization of differential equations.
- EW3. Student knows stability limitations of various discretization methods.

#### **Skills:**

- EU1. Student can discretize and solve numerically a simple boundary value problem.
- EU2. Using an appropriate engineering computer package, a student is able to make the computational grid for a simple engineering flow problem.
- EU3. Using an appropriate engineering computer package, a student is able to solve simple engineering flow problem and critically assess obtained solution.

### **VERIFICATION OF KNOWLEDGE EFFECTS. ASSESSMENT METHOD.**

The maximum number of points, which can collect, at the end of the course is 100. In order to pass the course one has to obtain 50(/100) points at least, including the laboratory classes (PC-classes) and theory (exam). At least 20 (/100) points has to be obtained from the theory. If the number of points is less than 20, the score is reduced to zero. The maximum number of points from the PC-classes is 40. The maximum number of points from the theory (exam) is 60.

The final grade for the entire course is given in the following table

Sum of points (PC-classes + exam)	Final mark (best mark is 5)
0-49	2
50-59	3
60-69	3.5
70-79	4.0
80-89	4.5
90-100	5.0

#### **Lectures**

Lectures are delivered every week on Tuesday (9:15-12:00h, 3hrs per week, room no 6).

#### **Laboratory classes**

There is 7 PC labs per semester, 2-hours per week (meeting is every week). Laboratory PC-classes are obligatory. The practical test is conducted at meeting no 7. The practical test is

performed employing the flow simulation tool. The aim is to verify the student's achievement in terms of effects EU2 and EU3.

One excused absence is allowed during laboratory classes. In the case of unjustified absence, it is necessary to conduct the classes at another time.

Attention: For students who failed the CFD course in previous semesters 2019/20 and 2020/21 there is no possibility to transfer the lab points. The labs have to be done again.

### **Exam**

The course ends with an exam – 2 terms in the summer exam session, 2 terms in the winter exam session + 1 or 2 correction term(s).

A necessary condition for obtaining a positive grade is to provide a correct answers/solutions to obligatory part of the exam (verification of achievement of effects EW1-EW3 and EU1-EU3). The advanced part aims to check to what extent the knowledge and skills acquired by the student go beyond the required minimum.

The exam is evaluated as follows:

- A prerequisite for obtaining a positive mark is to provide the correct answers to all questions / mini-tasks of the obligatory part of the exam. If one archives this, it means that the obligatory part of exam is satisfied (minimum 20 points is achieved).

Attention:

- Solving any problem of the advanced part will not be treated as the equivalent of the missing solution to the problem from the obligatory part (unless the examiner decides otherwise).

### **Materials**

The lecture is delivered using a PowerPoint presentation and blackboard. Lecture materials (in the form of a prescript) are available at:

<https://meil.pw.edu.pl/za/ZA/Courses/CFD>