Form No: ÜY-FR-0269

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|  | | | | | **ECTS Course Description Form** | | | | | | | | | | | | | | | | | | | |
| **PART I ( Senate Approval)** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Offering School** | **Engineering** | | | | | | | | | | | | | | | | | | | | | | | |
| **Offering Department** | **Civil Engineering** | | | | | | | | | | | | | | | | | | | | | | | |
| **Program(s) Offered to** | **Civil Engineering** | | | | | | | | | | | | | | Must | | | | | | | | | |
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| **Course Code** | CE 321 | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Name** | Fluid Mechanics | | | | | | | | | | | | | | | | | | | | | | | |
| **Language of Instruction** | English | | | | | | | | | | | | | | | | | | | | | | | |
| **Type of Course** | *Lecture* | | | | | | | | | | | | | | | | | | | | | | | |
| **Level of Course** | **Undergraduate** | | | | | | | | | | | | | | | | | | | | | | | |
| **Hours per Week** | **Lecture: 3** | | | | | **Laboratory:** | | | | **Recitation:** | | | **Practical: 0** | | | | **Studio:** | | | **Other:** | | | | |
| **ECTS Credit** | **5** | | | | | | | | | | | | | | | | | | | | | | | |
| **Grading Mode** | **Letter grade** | | | | | | | | | | | | | | | | | | | | | | | |
| **Pre-requisites** | MATH 202 | | | | | | | | | | | | | | | | | | | | | | | |
| **Co-requisites** | **-** | | | | | | | | | | | | | | | | | | | | | | | |
| **Registration Restriction** | - | | | | | | | | | | | | | | | | | | | | | | | |
| **Educational Objective** | 1. To give the definition of fluids and unit systems,  2. To give the principles of hydrostatic and calculation of pressure forces,  3. To evaluate the basic equations for ideal and real fluids in the case of one dimensional flows (continuity, energy and impulse-momentum equations.) and their applications.  4. To examine the pipeline flows.  5. To do dimensional analyses and being able to make hydraulic models using similarity concepts. | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Description** | Introduction to unit systems. Hydrostatic Pressure at a point. Calculation of pressure forces. Kinematics  of fluids. Basic equations of one dimensional flow (continuity, energy and impulse-momentum equations). One dimensional flow of ideal fluids. One dimensional flow of real fluids. Pipeline flows and energy losses within pipelines. Dimensional Analyses and Similarities. Conservation of mass and work and energy in moving fluids in addition to the fluid momentum. | | | | | | | | | | | | | | | | | | | | | | | |
| **Learning Outcomes** | **LO1** | | | 1. Gain necessary knowledge on mechanics of fluids. 2. Diagnose and solve the problems on mechanics of fluid | | | | | | | | | | | | | | | | | | | | |
| **LO2** | | |
| **LO3** | | |
| **PART II ( Faculty Board Approval)** | | | | | | | | | | | | | | | | | | | | | | | | |
| **Basic Outcomes (University-wide)** | | **No.** | **Program Outcomes** | | | | | | | | | **LO1** | | **LO2** | | | | | | | | | | |
| **PO1** | Ability to communicate effectively and write and present a report in Turkish and English. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO2** | Ability to work individually, and in intra-disciplinary and multi-disciplinary teams. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO3** | Recognition of the need for life-long learning and ability to access information , follow developments in science and technology, and continually reinvent oneself. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO4** | Knowledge of project management, risk management, innovation and change management, entrepreneurship, and sustainable development. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO5** | Awareness of sectors and ability to prepare a business plan. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO6** | Understanding of professional and ethical responsibility and demonstrating ethical behavior. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **Faculty Specific Outcomes** | | **PO7** | Ability to develop, select and use modern techniques and tools necessary for engineering applications and ability to use information technologies effectively. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO8** | Recognition of the effects of engineering applications on health, environment and safety in the universal and societal dimensions and the problems of the time and awareness of the legal consequences of engineering solutions. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO9** | Ability to identify, define, formulate and solve complex engineering problems; and electing and applying appropriate analysis and modeling methods for this purpose. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **Discipline Specific Outcomes (program)** | | **PO10** | Sufficient knowledge in mathematics, science and civil engineering; and the ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO11** | Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions of economic, environmental, sustainability, manufacturability, ethics, health, safety, social and political issues; and the ability to apply modern design methods for this purpose. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **PO12** | Ability to design experiments, conduct experiments, collect data, analyze and interpret results for the examination of civil engineering problems. | | | | | | | | | LO1, LO2 | | | | | | | | | | | | |
| **Specialization Specific Outcomes** | | **PO N….** |  | | | | | | | | |  | | | | | | | | | | | | |
| **PART III ( Department Board Approval)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Subjects, Contribution of Course Subjects to Learning Outcomes, and Methods for Assessing Learning of Course Subjects** | | | **Subjects** | **Week** | | | |  | | | | | **LO1** | | **LO2** | | | | | | | | | | | |
| **S1** | 1 | | | | Unit Systems - Dimensional Homogeneity - Physical Properties of Fluids | | | | | *A1* | | *A1* | |  | |  |  | |  | |  |  | |
| **S2** | 2 | | | | Shearing stress – Newton second law | | | | | *A1* | | *A1* | |  | |  |  | |  | |  |  | |
| **S3** | 3 | | | | Basic Equations of Fluid Statics - Relative Equilibrium | | | | | *A1* | | *A1* | |  | |  |  | |  | |  |  | |
| **S4** | 4 | | | | Hydrostatic - Pressure Concept - Computation of Pressure Forces | | | | | *A1* | | *A1* | |  | |  |  | |  | |  |  | |
| **S5** | 5 | | | | Hydrostatic force | | | | | *A1* | | *A1* | |  | |  |  | |  | |  |  | |
| **S6** | 6 | | | | Hydrostatic force One-Dimensional | | | | | *A1* | | *A1* | |  | |  |  | |  | |  |  | |
| **S7** | 7 | | | | One-Dimensional Flow of Real Fluids and Velocity field | | | | | *A1-A2* | | *A1-A2* | |  | |  |  | |  |  | |  | |
| **S8** | 8 | | | | Laminar and Turbulent Flows | | | | | *A1* | | *A1* | |  | |  |  | |  |  | |  | |
| **S9** | 9 | | | | Continuity equation | | | | | *A1* | | *A1* | |  | |  |  | |  |  | |  | |
| **S10** | 10 | | | | Euler/Bernoulli equation  Darcy-Weisbach Law - Applications | | | | | *A1* | | *A1* | |  | |  |  | |  |  | |  | |
| **S11-12** | 11-12 | | | | Momentum equation | | | | | *A1-A2* | | *A1-A2* | |  | |  |  | |  |  | |  | |
| **S13-14** | 13-14 | | | | Dimensional Analyses and Similarity | | | | | *A1* | | *A1* | |  | |  |  | |  |  | |  | |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules** | | | **No.** | **Type** | | | | | | **Weight** | | **Implementation Rule** | | | **Make-Up Rule** | | | | | | | | | | | |
| **A1** | **Exam** | | | | | | *80%* | | *No electronic devices are allowed in the examinations except for calculators.* | | | If the reason for not taking the exam is justified by the school, the student is informed about the time of the make-up exam. | | | | | | | | | | | |
| **A2** | **Quiz** | | | | | | *20%* | | *The time and subject announce to the students at least one week in advance.* | | | There is no compensation for the quizzes. | | | | | | | | | | | |
| **A3** | **Homework** | | | | | |  | |  | | |  | | | | | | | | | | | |
| **A4** | **Project** | | | | | |  | |  | | |  | | | | | | | | | | | |
| **A5** | **Report** | | | | | |  | | - | | | - | | | | | | | | | | | |
| **A6** | **Presentation** | | | | | |  | | - | | | - | | | | | | | | | | | |
| **A7** | **Attendance/ Interaction** | | | | | |  | | - | | | - | | | | | | | | | | | |
| **A8** | **Class/Lab./**  **Field Work** | | | | | |  | | - | | | - | | | | | | | | | | | |
| **A9** | **Other** | | | | | |  | |  | | |  | | | | | | | | | | | |
| **TOTAL** | | | | | | | **100%** | | | | | | | | | | | | | | | | |
| **Evidence of Achievement of Learning Outcomes** | | | Letter grades determined by weighting on the specified percentages on the grades that are taken from exams, quizzes and homeworks by the students. The teaching staff can make changes in the student's grades. | | | | | | | | | | | | | | | | | | | | | | | |
| **Method for Determining Letter Grade** | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Activities** | | | **Midterm Exams** | | | | **Quizzes** | | | **Homework** | | | | **Final Exam** | | | | | **Quantity** | | | 1 | | | | 2 | | | 5 | | | | 1 | | | | | **Effects on Grading, %** | | | 30 | | | | 20 | | | 0 | | | | 50 | | | | | GRADE | A+ | A | | A- | B+ | B | | B- | C+ | | C | C- | D+ | | D | F | | Equivalent number range | 100-95 | 100-95 | | 94-85 | 84-80 | 79-75 | | 74-65 | 64-60 | | 59-55 | 54-50 | 49-45 | | 44-40 | 0 | | GPA | 4.00 | 4.00 | | 3.70 | 3.30 | 3.00 | | 2.70 | 2.30 | | 2.00 | 1.70 | 1.30 | | 1.00 | 0.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| **Teaching Methods, Student Work Load** | | | **No** | **Method** | | | | | **Explanation** | | | | | | | | | | | | | **Hours** | | | | |
| ***Time applied by instructor*** | | | | | | | | | | | | | | | | | | | | | | | |
| **1** | **Lecture** | | | | |  | | | | | | | | | | | | | 3x14=42 | | | | |
| **2** | **Interactive Lecture** | | | | |  | | | | | | | | | | | | | - | | | | |
| **3** | **Recitation** | | | | |  | | | | | | | | | | | | | - | | | | |
| **4** | **Laboratory** | | | | |  | | | | | | | | | | | | | - | | | | |
| **5** | **Practical** | | | | |  | | | | | | | | | | | | | 0 | | | | |
| **6** | **Field Work** | | | | |  | | | | | | | | | | | | | - | | | | |
| ***Time expected to be allocated by student*** | | | | | | | | | | | | | | | | | | | | | | | |
| **7** | **Project** | | | | |  | | | | | | | | | | | | | *-* | | | | |
| **8** | **Homework** | | | | |  | | | | | | | | | | | | | 20 | | | | |
| **9** | **Pre-class Learning of Course Material** | | | | |  | | | | | | | | | | | | | 42 | | | | |
| **10** | **Review of Course Material** | | | | |  | | | | | | | | | | | | | 56 | | | | |
| **11** | **Studio** | | | | |  | | | | | | | | | | | | | - | | | | |
| **12** | **Office Hour** | | | | |  | | | | | | | | | | | | | - | | | | |
| **TOTAL** | | | | | | *160* | | | | | | | | | | | | | | | | | |
| **IV. PART** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Instructor** | | | **Name** | | | | | | Ali DAMNANDEH MEHR | | | | | | | | | | | | | | | | | |
| **E-mail** | | | | | | Ali.danandeh@antalya.edu.tr | | | | | | | | | | | | | | | | | |
| **Phone Number** | | | | | | *02422452361* | | | | | | | | | | | | | | | | | |
| **Office Number** | | | | | | *A1-15* | | | | | | | | | | | | | | | | | |
| **Office Hours** | | | | | | It will be determined during the semester. | | | | | | | | | | | | | | | | | |
| **Course Materials** | | | **Mandatory** | | | | | |  | | | | | | | | | | | | | | | | | |
| **Recommended** | | | | | | Munson, B. R., Young, D. F., Okiishi, T. H. (2006) Fundamentals of Fluid mechanics. John Wiley & Sons Ins.  R.C. Hibbeler., 2015, Fluid mechanics, Pearson, ISBN:0-13-277762-9  Streeter,V.,L.,Wylie E.,B., 1998, Fluid Mechanics, Mc Graw Hill, ISBN:0-07-548015-.  Frank M.White, 1987, Fluid Mechanics, Mc Graw Hill, ISBN:0-07-Y66525-.  W.L.McCabe,J.c.Smith,P.Hariott, 2005, Unit Operations of Chemical Engineering,7th edition,McGraw Hill, ISBN:007-124710-6. | | | | | | | | | | | | | | | | | |
| **Other** | | | **Scholastic Honesty** | | | | | | Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Any form of scholastic dishonesty is a serious academic violation and will result in a disciplinary action. | | | | | | | | | | | | | | | | | |
| **Students with Disabilities** | | | | | | Reasonable accommodations will be made for students with verifiable disabilities. | | | | | | | | | | | | | | | | | |
| **Safety Issues** | | | | | | The course does not require any special safety precautions. | | | | | | | | | | | | | | | | | |
| **Flexibility** | | | | | | Circumstances may arise during the course that prevents the instructor from fulfilling each and every component of this syllabus; therefore, the syllabus is subject to change.  Students will be notified prior to any changes. | | | | | | | | | | | | | | | | | |