**Form No: ÜY-FR-0277**

|  |  |
| --- | --- |
|  | **ECTS Course Description Form** |
| **PART I ( Senate Approval)** |
| **Offering School**  | **Engineering**  |
| **Offering Department** | **Civil Engineering** |
| **Program(s) Offered to** | **Civil Engineering** | Must |
|  |  |
|  |  |
| **Course Code**  | CE 323 |
| **Course Name** | Hydrology |
| **Language of Instruction** | **English** |
| **Type of Course** | *Lecture* |
| **Level of Course** | [Undergraduate](http://tureng.com/tr/turkce-ingilizce/undergraduate%20education) |
| **Hours per Week** | **Lecture: 3** | **Laboratory: 0** | **Recitation:** 0 | **Practical:**  | **Studio:** | **Other:** |
| **ECTS Credit** | **5** |
| **Grading Mode** | [*letter grade*](http://tureng.com/tr/turkce-ingilizce/letter%20grade) |
| **Pre-requisites** | **-** |
| **Co-requisites** | **-** |
| **Registration Restriction** | *-* |
| **Educational Objective** | 1. The introduction for students about the hydrology science which gains significance increasingly.
2. Establishing the foundation for the water resources course in the next term.
3. Enabling the application on water resources subject employing mathematics, physics, and statistics sciences.
 |
| **Course Description** | The definition of hydrology. Rainfall. Evaporation. Infiltration. Groundwater flow. Flow records and analysis. River basins. Snow melting. Hydrograph and analysis. Unit hydrograph theory and its applications. Synthetic unit hydrograph. The routing of the hydrograph along the river. Probability theory and the application of statistics in the hydrology. |
| **Learning Outcomes**  | **LO1** | 1. Learns the elements of the hydrological cycle and comprehends its significance in civil engineering.
2. Learns the significance of the groundwater in civil engineering.
3. Learns about the measurement of the hydrologic data and gains ability to analyze the recorded data.
4. Learns about flow which is an element of hydrological cycle directly affecting civil engineering and gains the ability to employ the unit hydrograph theory which is frequently used in our country in the evaluation of the flows.
5. Gains the ability to apply statistics which is an indispensable subject for the civil engineering program in water resources subject.
 |
| **LO2** |
| **LO3** |
| **LO4** |
| **LO5** |
| **PART II ( Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** |
| **PO1** | Ability to communicate effectively and write and present a report in Turkish and English.  | LO1, LO2, LO3, LO4, LO5 |
| **PO2** | Ability to work individually, and in intra-disciplinary and multi-disciplinary teams. | LO1, LO2, LO3, LO4, LO5 |
| **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, LO3, LO4, LO5 |
| **PO4** | Knowledge of project management, risk management, innovation and change management, entrepreneurship, and sustainable development. | LO1, LO2, LO3, LO4, LO5 |
| **PO5** | Awareness of sectors and ability to prepare a business plan. | LO1, LO2, LO3, LO4, LO5 |
| **PO6** | Understanding of professional and ethical responsibility and demonstrating ethical behavior. | LO1, LO2, LO3, LO4, LO5 |
| **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, LO3, LO4, LO5 |
| **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, LO3, LO4, LO5 |
| **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, LO3, LO4, LO5 |
| **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, LO3, LO4, LO5 |
| **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, LO3, LO4, LO5 |
| **PO12** | Ability to design experiments, conduct experiments, collect data, analyze and interpret results for the examination of civil engineering problems. | LO1, LO2, LO3, LO4, LO5 |
| **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** | **LO3** | **LO4** | **LO5** |
| **S1** | 1 | Definition of hydrology, place and significance of hydrology in civil engineering, hydrologic cycle, basic equations of hydrology | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S2** | 2 | Generation of Precipitation , Measurement of Precipitation, Analysis of Precipitation Records | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S3** | 3 | Mechanism of Evaporation, Evaporation from Water Surface, Evaporation from Soil and Snow Surface, Transpiration and Interception, Evapotranspiration Losses | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S4** | 4 | Infiltration Capacity, Infiltration Velocity, Infiltration Indices | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S5** | 5 | Ground Water Zones, Unsaturated Zone, Saturated Zone, Feeding and Losses of Ground Water | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S6** | 6 | Ground Water Flow, Flow in the Unsaturated Zone, Abstraction of Ground Water by Wells, Measurement of Hydraulic Conductivity | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S7** | 7 | Level and Water Surface Slope Measurements, Cross-Section measurements, Discharge Measurements, Flow Rating Curve, Analysis of Flow Records | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S8** | 8 | River Basin Characteristics, Separation of Flow into Components, Flow induced by Snow Melting | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S9** | 9 | Elements of the Hydrograph, Separation of the Indirect Flow and the Base Flow, System Analysis of River Basins, Parametric Basin Models | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S10** | 10 | Definition of the Unit Hydrograph, Unit Hydrograph as a Rainfall Runoff Model | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S11** | 11 | Synthetic Unit Hydrographs, Instantaneous Unit Hydrographs | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S12** | 12 | Laboratory, Hydrograph Routing along the Channel | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S13** | 13 | Probability, Frequency Distribution, Probability Distribution Functions, Flood Frequency Analysis | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **S14** | 14 | Correlation and Regression Analysis | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* | *A1-A2-A3* |  |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | *85%* | *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** | *10%* | *The time and subject announce to the students at least one week in advance.* | There is no compensation for the quizzes. |
| **A3** | **Homework** | *5%* | *Homeworks are given by announcing deadline. Homeworks that are submitted after the deadline are not accepted.* | There is no compensation for the Homeworks. |
| **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 | Homeworks | Laboratory Work | Final Exam |
| **Quantity** | 1 | 1 | 1 | 1 | 1 |
| **Effects on Grading, %)** | 35 | 10 | 5 | - | 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 |
| **2** | **Interactive Lecture** |  | - |
| **3** | **Recitation** |  | - |
| **4** | **Laboratory** |  | - |
| **5** | **Practical** |  | - |
| **6** | **Field Work** |  | - |
| ***Time expected to be allocated by student*** |
| **7** | **Project** |  | *-* |
| **8** | **Homework** |  | 17 |
| **9** | **Pre-class Learning of Course Material**  |  | 32 |
| **10** | **Review of Course Material** |  | 60 |
| **11** | **Studio** |  | - |
| **12** | **Office Hour** |  | - |
| **TOTAL** |  *151* |
| **IV. PART** |
| **Instructor** | **Name** | Ali DANANDEH 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** | * Hidroloji, Mehmetçik Bayazit, İ.T.Ü. İnşaat Fakültesi Matbaasi, 7
* Hidroloji Uygulamalari, M. Bayazit, İ. Avci, Z. Şen, İ.T.Ü. Yayinlari, 1982.
* “Değişken Akımların Hidroliği”, Ünsal İ., İtü, 1978.
* Applied Hydrology, Ven Te Chow, David R. Maidment, Larry W. Mays, Mcgraw- Hill, International Editions, Civil Engineering Series.
* Hydrology For Engineers, Third Edition, Ray K. Linsley,Max A. Kohler, Joseph
* L. H. Paulhus, Mcgraw-Hill, Civil Engineering Series.
* Introduction to Hydrology by Warren Viessman, Jr. and Gary L. Lewis. Prentice Hall, Fifth Edition, 2003.
* Hydrology, an Introduction to Hydrologic Science by Rafael L. Bras. Addison Wesley
* Physical Hydrology by L. Dingman, Prentice Hall
 |
| **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 for 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.  |