|  |  |
| --- | --- |
|  | **ECTS Course Description Form** |
| **PART I ( Senate Approval)** |
| **Offering School**  | College of Engineering |
| **Offering Department** | Civil Engineering |
| **Program(s) Offered to** | Civil Engineering | Must |
|  |  |
|  |  |
| **Course Code**  | CIVE 343 |
| **Course Name** | Matrix Structural Analysis |
| **Language of Instruction** | English |
| **Type of Course** | Lecture/Project |
| **Level of Course** | Undergraduate |
| **Hours per Week** | **Lecture:** 2 | **Laboratory:0** | **Recitation:** 0 | **Practical: 1** | **Studio:** *0* | **Other:** *0* |
| **ECTS Credit** | 4 |
| **Grading Mode** | Letter Grade |
| **Pre-requisites** | - |
| **Co-requisites** | - |
| **Registration Restriction** | - |
| **Educational Objective** | To gain the ability of analysis of building systems under different loading by using matrix methods. |
| **Course Description** | Stiffness and loading matrices in bar elements. Matrix displacement method. Application of the method to two- and three-dimensional building systems. Stiffness and loading matrices in continuous media parts. Matrix force method. Nonlinear systems in terms of material and geometry change. Application of the method to dynamic analysis of building systems. |
| **Learning Outcomes**  | **LO1** | LO1: Understands the basic principles of matrix displacement methodLO2: Understand the basic principles of matrix force methodLO3: Analyze lattice systems with matrix displacement methodsLO4: Can analyze rigid-node systems with matrix displacement and force methodsLO5: Understands the effect of normal force on structure behavior |
| **LO2** |
| **LO3** |
| **LO4** |
| **LO5** |
| **PART II (Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **PO1** | **Ability** to communicate effectively in Turkish and English with oral, written and visual methods, writing reports and making presentations. | LO1, LO2, LO3, LO4, LO5 |
| **PO2** | **Ability** to work effectively both individually and in disciplinary and multidisciplinary teams. | LO2, LO3, LO5 |
| **PO3** | **Awareness** of the necessity of lifelong learning and access to information, following the developments in science and technology and the ability to constantly renew itself. | LO2, LO3, LO4, LO5 |
| **PO4** | **Awareness** of the sectors and the **ability** to prepare a business plan. | LO2, LO3, LO4, LO5 |
| **PO5** | **Behave** according to professional and ethical responsibility and ethical principles. | LO4, LO5 |
| **Faculty Specific Outcomes** | **PO6** | Ability to develop, select and use modern techniques and tools required for engineering applications; ability to use information technologies effectively. | LO4, LO5 |
| **PO7** | 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. | LO4, LO5 |
| **PO8** | Ability to identify, define, formulate and solve complex engineering problems; and electing and applying appropriate analysis and modeling methods for this purpose. | LO4, LO5 |
| **Discipline Specific Outcomes (program)** | **PO9** | 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. | LO2, LO3, LO4, LO5 |
| **PO10** | 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. |  LO2, LO3, LO4, LO5 |
| **PO11** | Ability to design experiments, conduct experiments, collect data, analyze and interpret results for the examination of civil engineering problems. | LO3, LO4, LO5 |
| **Specific Outcomes** | **PO12** | **-** | - |
| **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** | **LO5,6** | **LO7** |
| **S1** | 1 | Subject-Scope-Course Layout, Matrices and Some Selected Matrix Operations | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S2** | 2 | Measuring Knowledge Level | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S3** | 3 | Simple Uses of Some Computer Programs in Solution of Building Systems | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S4** | 4 | Structural Modeling-Discretization of Continuous Systems | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S5** | 6-7 | Matrix Displacement Method | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S6** | 8 | Matrix Displacement Method | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S7** | 9 | Matrix Displacement Method | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S8** | 10-11 | Application of the Method to Two- and Three-Dimensional Structural Systems. | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S9** | 12 | Midterm | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **S10** | 13,14 | Application of the Method to Two- and Three-Dimensional Structural Systems. | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 | A1-A2 |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | 60% | In the exams, it is not allowed to have any electronic devices with the student except for calculators. | The student's special situation is justified or, if the report is accepted by the school, she/he is informed about the time of the make-up exam. |
| **A2** | **Quiz** | - | - | - |
| **A3** | **Homework** | 20% | The time and scope of the subject are notified to the students at least 1 week in advance. | There is no compensation. |
| **A4** | **Project** | - |  |  |
| **A5** | **Report** |  |  |  |
| **A6** | **Presentation** | - |  |  |
| **A7** | **Attendance/ Interaction** | 10% | Lesson is determined according to attendance record | There is no compensation. |
| **A8** | **Class/Lab./****Field Work** | - |  |  |
| **A9** | **Other** | - |  |  |
| **TOTAL** | **100%** |
| **Evidence of Achievement of Learning Outcomes** | Each subject of the lesson is tested with at least one exam question or related question. Weighted grade point average of each student will be calculated with the weight given to each learning assessment method. To pass the course, a student must collect a certain target percentage out of 100 points, and the grade average will be taken into account when finding this target percentage. |
| **Method for Determining Letter Grade** | A total of 1 midterm exam, quizzes, reports and 1 final exam are used in grading. The most points that can be obtained are:.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Assessment** | Midterms | HomeWorks | Attendance | Final exam | TOTAL |
| **Points** | 30 | 20 | 10 | 40 | 100 |

Letter grade is determined using the table below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Total points** | 100-95 | 94-85 | 84-80 | 79-75 | 74-65 | 64-60 | 59-55 | 54-50 | 49-45 | 44-40 |
| **Letter Grade** | A | A- | B+ | B | B- | C+ | C | C- | D+ | D |

 |
| **Teaching Methods, Student Work Load** | **No** | **Method** | **Explanation** | **Hours** |
| ***Time applied by instructor*** |
| **1** | **Lecture** |  | 28 |
| **2** | **Interactive Lecture** |  | - |
| **3** | **Recitation** |  | - |
| **4** | **Laboratory** |  | - |
| **5** | **Practical** |  | - |
| **6** | **Field Work** |  | - |
| ***Time expected to be allocated by student*** |
| **7** | **Project** |  | - |
| **8** | **Homework** | Homework/coursework and their preparations | 58 |
| **9** | **Pre-class Learning of Course Material**  | Pre-class/ after class individual study | 20 |
| **10** | **Review of Course Material** | Quizzes, midterms and their preparations |  |
| **11** | **Studio** | End of semester exams, final exam and preparation | - |
| **12** | **Office Hour** |  | 14 |
| **TOTAL** | *120* |
| **IV. PART** |
| **Instructor** | **Name** | Ibrahim Aydogdu |
| **E-mail** | Ibrahim.aydogdu@antalya.edu.tr; aydogdu@akdeniz.edu.tr; iaydogdu80@gmail.com  |
| **Phone Number** | +905303272360 |
| **Office Number** | A1-16 |
| **Office Hours** | It will be determined during the semester. |
| **Course Materials** | **Mandatory** |  |
| **Recommended** | Fundemental fo Structural Analysis Hery H. West |
| **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 handling of the course does not require any special safety requirements. |
| **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.  |