

| COURSE DESCRIPTION FORM | |
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| Course Code and Title | CE441 PRESTRESSED CONCRETE |
| Semester | 7 |
| Catalog description | Learning the definition of prestressed structures, working principles of rod, anchor, cable elements, production of pre-cast elements |
| Required reading | 1. Demirel, Y., “Önyapımlı Elemanlar Ders Notları” |
| Recommended reading | 1. Özcebe, G., Ersoy, U., “Betonarme”, Evrim Yayınevi, 2007. 2. Şener, S., “Öngermeli Elemanlar”, Alp Yayınevi, 2006. 3. Karaesmen, E., “Ardgermeli Beton ve Yeni Çözümler”, Freysaş Freyssinet Yapı Sis , 2002. |
| ECTS | 4 |
| Prerequisites and co-requisites | No prerequisite. Required attendance to lectures is at least 70% of total term hours. |
| Compulsory/Elective | Technical elective course |
| Language of instruction | English |
| Aim of course | The aim of this course to teach the working principles of prestressed buildings to students. |
| Learning outcomes of the course unit | Upon completion of the course student should be able to; 1.Students will gain the ability to acquire the knowledge necessary for the definition and design of prestressed structures used in civil engineering 2.Students will gain the analytical and numerical methods in detail. |
| Mode of delivery | Traditional Form |
| Course content | 1. Definition and history 2. The economy of prestressed reinforcement technology 3. Materials, concrete, aggregate, cable and rope, construction of of precast elements 4. Production of precast elements, small elements, frame elements, plates, large plates and assemblies 5. Prestressed analysis, prestressing losses, creep in steel, elastic shortening of concrete, plastic shrinkage, fluage 6. Transport and assembly of prestressed elements, cantilever and pin connections 7. Prefabricated fabrication factory and post-tensioning bridge study trips 8. 1. Midterm 9. Post-tensioning elements, losses (elastic shortening, creep and shrinkage of concrete, friction losses, post-tensioning and head losses) 10. Post-tensioning elements, ropes and cables, cable jackets, male and female anchor cones 11.Losses (elastic shortening, creep and shrinkage of concrete, friction losses, post-tensioning and head losses) 12. Frames and continuous discontinuous connections 13. Panels, construction and connections 14. 2.Midterm, Post-tensioning usage in buildings, bridges and silos 15. The developments in the Post-tensioning method, Post-tensioning in the constructions and the review |
| Planned learning activities and teaching methods | 3 lecture hours per week (3+0) Reading Report preparation Preparation for midterm and final exam |

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| (The time spent for the activities mentioned here will determine the credit. Careful filling is required) | Final exam and preparation for exams | | | | |
| Assessment methods and criteria | | Quantity | Percentage (%) | | |
| | Mid-terms | 2 | 40 | | |
| | Assignment | 5 | 20 | | |
| | Exercises | - | - | | |
| | Projects | - | - | | |
| | Practice | - | - | | |
| | Quiz | - | - | | |
| | Contribution of In-term Studies to Overall Grade % | | 60 | | |
| | Contribution of Final Examination to Overall Grade (%) | 1 | 40 | | |
| Workload | Attendance | | | | |
| | Work activity | | Total Week Count | Weekly Duration (in hour) | Total Workload in Semester |
| | Theoretical Study Hours of Course Per Week | | 14 | 3 | 42 |
| | Practicing Hours of Course Per Week | | 0 | 0 | 0 |
| | Reading | | 10 | 1 | 10 |
| | Searching in Internet and Library | | 0 | 0 | 0 |
| | Designing and Applying Materials | | 0 | 0 | 0 |
| | Preparing Reports | | 5 | 2 | 10 |
| | Preparing Presentation | | 0 | 0 | 0 |
| | Presentation | | 0 | 0 | 0 |
| | Mid-Term and Studying for Mid-Term | | 2 | 10 | 10 |
| | Final and Studying for Final | | 1 | 14 | 14 |
| | Other | | 1 | 14 | 14 |
| | Total Workload: | | | | 106 |
| | Total Workload / 25: | | | | 4.24 |
| Course's contribution to program | No | Program Learning Outcomes | | | |
| | 1 | Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems. | | | 1 2 3 4 5 |
| | | | X | | |
| | 2 | Ability to identify, formulate, and solve complex civil engineering problems; ability to select and apply proper analysis and modeling methods for this purpose. | | | |
| | | | X | | |
| | 3 | Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose. | | | |
| | | | X | | |
| | 4 | Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in civil engineering practice; ability to employ information technologies and to use at least one computer programming language effectively. | | | |
| | | | X | | |
| | 5 | Ability to design and conduct experiments, gather data, analyze and interpret results for | | | |
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| | | investigating complex civil engineering problems or discipline specific research questions. | | | | | |
| | 6 | Ability to work efficiently in intra-disciplinary and multi-disciplinary teams. | | | | X | |
| | 7 | Ability to work individually. | | | X | | |
| | 8 | Ability to communicate effectively in Turkish, both orally and in writing; ability to write effective reports and comprehend written reports. | | | | X | |
| | 9 | Knowledge of English of B1 level according to <u>Common European Framework of Reference</u> . | | | | X | |
| | 10 | Prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions. | | | | X | |
| | 11 | Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself. | | | X | | |
| | 12 | Consciousness to behave according to ethical principles and professional and ethical responsibility. | | X | | | |
| | 13 | Knowledge on standards used in civil engineering practice. | | X | | | |
| | 14 | Knowledge about business life practices such as project management, risk management, and change management. | | | | X | |
| | 15 | Awareness in entrepreneurship, innovation; knowledge about sustainable development. | | | X | | |
| | 16 | Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering. | | | | X | |
| | 17 | Awareness of the legal consequences of engineering solutions. | | | | X | |
| Name of lecturer(s) and contact information | | Yrd.Doc.Dr. Yusuf Demirel, ydemirel@gazi.edu.tr | | | | | |