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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** | Area Elective |
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| **Course Code**  | CE 465 |
| **Course Name** | Pavement Design |
| **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** | - |
| **Co-requisites** | **-** |
| **Registration Restriction** | -  |
| **Educational Objective** | To have information about pavement types. Understanding of flexible and rigid pavement design principles. |
| **Course Description** | Pavement types, pavement design load calculations, pavement experiments, flexible and rigid pavement design methods. |
| **Learning Outcomes**  | **LO1** |  To have general information about road superstructure coating types.To calculate the loads coming to the road superstructure.Road superstructure design can be done. |
| **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 | Introduction to pavement design and very basic definitions about the subject matter | *A1* | *A1* |  |  |  |  |  |  |
| **S2** | 2 | Determination of vehicle loads and performance of pavements  | *A1* | *A1* |  |  |  |  |  |  |
| **S3** | 3 | Very basic introduction to theory of elasticity and layered elastic systems | *A1* | *A1* |  |  |  |  |  |  |
| **S4** | 4 | Analysis of layered systems (one-layer and two- layer) and plate loading test | *A1* | *A1* |  |  |  |  |  |  |
| **S5** | 5 | Three layer, multi layer systems and general introduction to Kenpave software | *A1* | *A1* |  |  |  |  |  |  |
| **S6** | 6 | Equivalent single wheel load (ESWL) concept | *A1* | *A1* |  |  |  |  |  |  |
| **S7** | 7 | Westergaard analysis | *A1-A2* | *A1-A2* |  |  |  |  |  |  |
| **S8** | 8 | General introduction to rigid pavement design | *A1* | *A1* |  |  |  |  |  |  |
| **S9** | 9 | Stresses in rigid pavements, joint types and construction | *A1* | *A1* |  |  |  |  |  |  |
| **S10** | 10 | Introduction to dowel bars and dowel group action theory | *A1* | *A1* |  |  |  |  |  |  |
| **S11** | 11 | California Design Method, Asphalt Institute Design Method (for flexible pavements) | *A1-A2* | *A1-A2* |  |  |  |  |  |  |
| **S12** | 12 | Shell Flexible Pavement Design Method and Corp's of Engineers Design Method for flexible airport pavements |  |  |  |  |  |  |  |  |
| **S13-14** | 13-14 | Concrete roads and their basic design techniques | *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** | *10%* | *The time and subject announce to the students at least one week in advance.* | There is no compensation for the quizzes. |
| **A3** | **Homework** | *10%* |  |  |
| **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 homework by the students. The teaching staff can make changes in the student's grades. |
| **Method for Determining Letter Grade** |

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| **Activities** | **Midterm Exams** | **Homework and Quizes** | **Final Exam** |
| **Quantity** | 1 | - | 1 |
| **Effects on Grading, %** | 30 | 20 | 50 |
| GRADE | A+ | A | A- | B+ | C | C- | D+ | D | F |
| Equivalent number range | 100-95 | 100-95 | 94-85 | 84-80 | 59-55 | 54-50 | 49-45 | 44-40 | 0 |
| GPA | 4.00 | 4.00 | 3.70 | 3.30 | 2.00 | 1.70 | 1.30 | 1.00 | 0.00 |

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| **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** | SERKAN TAPKIN |
| **E-mail** | serkan.tapkın@antalya.edu.tr |
| **Phone Number** | *2102* |
| **Office Number** | *-* |
| **Office Hours** | It will be determined during the semester. |
| **Course Materials** | **Mandatory** |  |
| **Recommended** | 1. Principles of Pavement Design. 2nd Edition. E.J. Yoder and M.W. Witczak, 1975 **2.** Pavement Analysis and Design. 2nd Edition. Yang H. Huang, 2004 **3.** Pavement design and materials, A.T. Papagiannakis and E.A. Masad, 2008 **4.** Principles of pavement engineering, Nick Thom, 2008 **5.** Pavement engineering: principles and practice, Rajib B. Mallick and Tahar El-Korchi, 2009 7**.** Concrete pavement design, construction, and performance, Norbert Delatte, 2008**6.** American Association of State Highway and Transportation Officials. AASHTO guide for design of pavement structures. Washington, D.C. AASHTO, 1993 **7.** American Association of State Highway and Transportation Officials. Supplement to the AASHTO guide for design of pavement structures. Part II, Rigid pavement design & rigid pavement joint design. Washington, D.C. AASHTO, 1998 **8.** American Association of State Highway and Transportation Officials. Highway subcommittee on construction. Construction manual for highway construction / developed by the Highway Subcommittee on Construction. 4th Ed. Washington, D.C. American Association of State Highway and Transportation Officials, 1990  |
| **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.  |