

1: Course Number and Name

- a. **CENG 3322:** Construction Materials and Pavement Design, Fall 2021
- b. Lecture: Section 010 2:00 pm – 3:50 pm, Tuesday
Lab: Section 01Z 2:00 pm – 4:50 pm, Thursday

2: Credits and Contact Hours

- a. **Credits:** 4
- b. **Contact Hours:** 2 hours/week (classroom), 3 hours/week (lab)

3: Instructor Information

- a. **Course Coordinator:** Dr. Dick Apronti
- b. **Instructor:** Dick Apronti, 325-486-5512, dick.apronti@angelo.edu. Office: VIN 275.
- c. **Office hours:** MW 2:00 pm – 4:30 pm (Mondays in my office, Wednesdays in Student Hub).

4: Required Course Materials

a. **Textbooks:**

- Mamlouk, M. S., and Zaniewski, J. P. (2017) Materials for Civil and Construction Engineers, 4th Ed. Pearson Prentice Hall, San Francisco.
- Yoder, E. J., and Witzczak, M. W. (1975) Principles of Pavement Design, 2nd Ed. John Wiley & Sons, Inc. – you may not have to purchase this book because the online version is available through the library's online resources.

b. **Additional Resources** (not required but extremely useful):

- Personal Protection Equipment (PPE): shatter-proof eyewear with side shields, steel-toed shoes.

5: Technology Requirements

To successfully complete this course, you need to have internet access and the ability to use the following online tools: Blackboard, Gradescope, Blackboard Collaborate, Adobe Acrobat (or another pdf maker), YouTube. No specific hardware is required, but access to a computer with webcam is highly encouraged.

6: Specific Course Information

- a. **Catalog Description:** This course covers two main topics: 1) evaluation of civil construction materials for engineering applications, and 2) principles of pavement design. The laboratory component shall explore physical properties of aggregates, asphalt, and concrete using related ASTM test specifications and materials characterization for different construction materials. Students shall also learn about various pavement types, stresses in flexible and rigid pavements, and traffic considerations in pavement design.
- **Prerequisites:** MATH 2314 – College Algebra or equivalent academic preparation
- c. **Required or elective:** Required.

7: Specific Goals for the Course

- a. Course Learning Outcomes:
 1. Describe aggregate properties and durability issues

2. Compute moisture absorptivity and particle size distributions of aggregates, and select appropriate aggregates for (asphaltic and Portland cement) concrete mixture design
3. Design a Portland cement concrete mixture using volumetric calculations
4. Describe curing and durability issues and evaluate early-age volume changes and mechanical properties of hardened Portland cement concrete
5. Identify different pavement deteriorations and their causes.
6. Design rigid and flexible pavements to meet traffic and environmental considerations
7. Communicate laboratory results in technical reports

b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

ABET Student Outcomes	1	2	3	4	5	6	7
1. Solve Problems	X	X	X	X	X	X	
2. Design		X	X			X	
3. Communication							X
4. Ethics & Professionalism							
5. Teamwork					X		
6. Experimentation							
7. Acquire New Knowledge							

8: Topics Covered

1. Pavement management
2. Pavement Design
3. Bituminous materials
4. Criteria for engineering material selection
5. Aggregates
6. Portland cement
7. Portland Cement Concrete

9: Course Delivery and Communications

9.1: Delivery Method(s)

This is a face-to-face course with learning resources and supplemental materials posted in [Blackboard](#)¹. Accommodations will be made for students who are in quarantine or isolation and are unable to attend.

9.2: Communications

The primary means of communication during this course are Blackboard and Piazza. Lesson materials will be delivered via Blackboard. Piazza will be used for announcements and discussion of course materials. Please do not email your instructor with questions about class—instead, post your questions on Piazza. One reason for using Piazza is for you to benefit from the collective knowledge of your classmates and instructors. You are encouraged to ask questions when you are struggling to understand a concept—you can even do so anonymously or send private messages to the instructor.

The instructor will respond to Piazza messages within six to twelve hours during working hours Monday through Friday. Weekend messages may be responded to within 24 hours or until Monday. Messages posted on Piazza will be sent to your ASU email address. Check frequently for announcements and policy changes.

When face-to-face office hours are not possible, office hours or advising may be arranged with the assistance of Collaborate, Zoom, or another web meeting platform.

10: Professionalism

Professional engineering standards apply in this class. You are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. You are expected to: (1) come prepared for class; (2) respect faculty and peers; (3) demonstrate responsibility and accountability for your own actions; (4) demonstrate sensitivity and appreciation for diverse cultures, backgrounds, and life experiences; (5) offer and accept constructive criticism in a productive manner; (6) demonstrate an attitude that fosters professional behavior among peers and faculty; (7) be punctual to class meetings; (8) maintain a good work ethic and integrity; and (9) recognize the classroom as a professional workplace.

11: Graded Material

11.1: Class Attendance, Participation, Timeliness and Teamwork

You are expected to meet every class meeting on time and prepared. Attendance will be taken. Should you find it necessary to miss a class for any reason, you are expected to notify your instructor as early as the absence is known—preferably before the absence.

Your online assignments will be due at the time specified on Blackboard. Assignments submitted in hard copy are due at the beginning of class on the due date. Your instructor may assess penalties for late work.

Nearly all worthwhile accomplishments from raising a family to launching the space shuttle are the work of teams. Civil engineering is no exception. All significant civil engineering projects are completed by teams. You will be assigned to a team for most labs. The purpose of the teams are to give you practice working together and to provide a support group for you within the class. Outside of class, please collaborate and work with anyone you wish.

11.2: Quizzes

There may be in-class quizzes. The quizzes will be unannounced and unscheduled. The quizzes are intended to assess your comprehension of the basic concepts of topics covered, and to determine whether you have completed the pre-class work and are prepared for class.

11.3: Homework

There will be homework assignments covering each topic. Each homework is an individual effort that may require reading beyond the discussions presented by the instructor in class. Homework assignments will be due on the dates indicated on Blackboard. Your lowest submission will be dropped.

11.4: Semester Project and Laboratory Submissions

You shall be assigned a semester project related to pavement deterioration analysis and design at the beginning of the semester. This project will require some research work that may involve identifying the needed data and gathering them for your analysis and design. The project will culminate in a final report and a project presentation.

After every laboratory session, you will be responsible for preparing a technical report. These lab reports must be completed clearly and legibly for full credit. Reports will be prepared using a word processor. Tables and graphs must also be completed using a software program (such as MS Excel). Lab reports must be formatted as shown in the guidance below. Any sloppy lab report that is not formatted correctly may receive no credit.

A technical report must include the following sections:

- A cover page that states the title of the lab, the author(s) of the report, the course and your lab section, the semester, and any other organizational information.
- An abstract that presents a short summary of the entire report (between 100 to 200 words).
- An introduction that provides technical background of materials that were tested, technical background of testing methods that were used, a description of theoretical considerations and an explanation why those theories and equations are being included in the lab report, explain the motivation of performing the experiment, and explaining the objectives of what the experiment sought to accomplish.
- A detailed procedure that explains how materials were handled during the experiment, the size and shape of specimens, how the data was collected and what type of data was collected, what equipment was used to collect the data, and a general description of the steps taken such that another person reading the report may decipher how to replicate your experiment. This procedure should not be a list of tasks to be done – instead, this procedure must explain what you did using full and complete sentences.
- A results section that factually states results (e.g., a description of sensory observations, i.e., sight, smell, sound, touch, etc.) and refers to necessary sample calculations, graphs, and tables in the appendix.
- A logically organized discussion that well answers the assigned questions given by your instructor where the discussion is supported by theory described in your introduction and supported by data presented in your results section.
- A list of conclusions that is drawn from your results and discussion. Your conclusions must clearly reiterate thoughtful statements and not simply re-state facts.
- An appendix that includes tables listed in numerical order, followed by figures listed in numerical order, followed by sample calculations listed in numerical order. Numerical order is dictated by the order in which the table, figure, or sample calculation is mentioned in the main body of the technical report.

In general, your lab reports must be organized according to this format, sections must be clearly labeled and contain the correct content, grammar and sentence structure must be correct, the overall appearance must be neat and professionally assembled, and the technical content must be correct.

To improve your technical writing skills, one hard copy of your Pre-Lab Report is due one week after the lab is performed. In your Pre-Lab Report, it is required that you have completed your detailed procedure, your results, and your appendix. It is also required that you have started and made some progress on your introduction and discussion. You will exchange Pre-Lab Reports with another student, and you will both Peer Edit each other's submissions under the guidance of the instructor. You must incorporate this peer-graded feedback into a Full-Lab Report, which is due one week after Peer Edit.

Your Full-Lab Report is due two weeks after the lab is performed. In your Full-Lab Report, it is required that you have all sections completed and incorporate all peer-graded feedback. At the time of your final submission, original hard copies of your Pre-Lab Report, Peer Edits with peer graded feedback, and Full-Lab Report are all due. If you miss a Pre-Lab Report submission deadline, then you have no more than 24

hours to turn in your late Pre-Lab Report directly to the instructor with a 50% penalty. No late Pre-Lab Report is accepted after 24 hours. If you miss a Full-Lab Report submission deadline, then you have no more than 24 hours to turn in your late Full-Lab Report with a 10% penalty. No late Full-Lab Report is accepted after 24 hours.

11.5: Civil Engineering Design Project

You shall be placed in groups to work on a geometric design project. The project shall be submitted on the due dates as indicated on Blackboard or by your instructor.

11.6: Exam

There will be two in-class exams and one final exam. The first exam will be 120 minutes and scheduled for a lab meeting time. The final exam will be 120 minutes and scheduled per the university final exam calendar. All exams will be closed book. You will be allowed to bring in a limited amount of handwritten notes.

11.7: Grades: Weighting and Letter Grades

The weighting system shown in Table 2 will be used in determining final grade for this course.

Table 2: Grade Weighting

Item	Weight
Quizzes & Participation	5%
Homework	25%
Lab submissions	15%
Semester Project	10%
Exam 1	20%
Final Exam	25%
Total	100%

The instructor will determine letter grades for the course using his professional judgment, and the following standards as described in the University Catalog:

A = excellent work B = good work C = average work D = poor work F = failing work

11.8: Incomplete Grade Policy

It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course work. Documentation may be required. See ASU Operating Policy 10.11 [Grading Procedures](#)² for more information.

12: Classroom and University Policies and Student Support

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)³ and [Angelo State University Catalog](#)⁴.

12.1: Accommodations for Students with Disabilities

ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA) and subsequent legislation.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#).⁵ The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dr. Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

12.2: Title IX at Angelo State University

Angelo State University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from sex discrimination of any kind. In accordance with Title VII, Title IX, the Violence Against Women Act (VAWA), the Campus Sexual Violence Elimination Act (SaVE), and other federal and state laws, the University prohibits discrimination based on sex, which includes pregnancy, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination and unwelcome behavior of a sexual nature. The term includes sexual harassment, nonconsensual sexual contact, nonconsensual sexual intercourse, sexual assault, sexual exploitation, stalking, public indecency, interpersonal violence (domestic violence or dating violence), sexual violence, and any other misconduct based on sex.

You are encouraged to report any incidents involving sexual misconduct to the Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator, Michelle Miller, J.D. You may submit reports in the following manner:

Online: [Incident Reporting Form](#)⁶
Face to Face: Mayer Administration Building, Room 210
Phone: 325-942-2022
Email: michelle.miller@angelo.edu

Note, as a faculty member at Angelo State, I am a mandatory reporter and must report incidents involving sexual misconduct to the Title IX Coordinator. Should you wish to speak to someone in confidence about an issue, you may contact the University Counseling Center (325-942-2371), the 24-Hour Crisis Helpline (325-486-6345), or the University Health Clinic (325-942-2171).

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit the [Title IX website](#).⁷

12.3: Student Absence for Observance of Religious Holy Days

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for [Observance of Religious Holy Day](#)⁸ for more information.

12.4: Information About COVID-19

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)⁹ web page for current information about campus guidelines and safety standards as they relate to the COVID-19 pandemic.

12.5: Student Conduct Policies

12.5.1: Academic Integrity

Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

12.5.2: Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)¹⁰ in the Student Handbook. Plagiarism is the action or practice of taking someone else's work, idea, etc., and passing it off as one's own. Plagiarism is literary theft.

In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

Papers are subject to be evaluated for originality via Turnitin or SafeAssign. Resources to help you understand this policy better are available at the [ASU Writing Center](#)¹¹.

12.5.3: Copyright Policy

Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

13: Course Outline

The tentative course outline is presented in the Table 3. Specific submission details for homework assignments, projects, and quizzes along with updates to this schedule will be provided via Bb. The following schedule may be modified as the semester progresses.

Table 3: Course Lesson Outline

Week	Date	Topic	Reading	Tasks
1	Aug 24	Course Introduction; Pavement Types, Pavement Management	Syllabus; PHE 4.1 – 4.2; THE 21.1	HW01
	Aug 26	Pavement Condition	THE 21.2 – 21.3	
2	Aug 31	Pavement Rehabilitation	THE 21.4 – 21.6	Project
	Sept 2	Bituminous materials introduction	THE 18.1 – 18.4	HW02
3	Sept 7	Holiday		
	Sept 9	Asphalt Mixtures; Superpave Systems	THE 18.5 – 18.6	HW03
4	Sept 14	Flexible Pavement Design Intro; Soil Stabilization	THE 19.1 -19.2	
	Sept 16	Visit to TXDOT Asphalt Lab (tentative)		

Week	Date	Topic	Reading	Tasks
5	Sept 21	Flexible Pavement Design	THE 19.3	HW04
	Sept 23	Rigid Pavement Design	THE 20.1 – 20.6	
6	Sept 28	Practice Problems		
	Sept 30	Exam 1		
7	Oct 5	Materials Engineering Concepts	MCCE 1.1 – 1.7	HW05
	Oct 7	Aggregate Testing (Part 1)	Lab 1	
8	Oct 12	Aggregates I	MCCE 5.1 – 5.4	HW06
	Oct 14	Aggregate Testing (Part 2)	Lab 1 (continued)	
9	Oct 19	Aggregates II	MCCE 5.5 – 5.7	
	Oct 21	Aggregate Testing (Part 3)	Lab 1 (continued)	
10	Oct 26	Portland Cement I	MCCE 6.1 – 6.8	HW07
	Oct 28	PCC Mix Design (Part I)	Lab 2	
11	Nov 2	Portland Cement II	MCCE 6.9 – 6.13	
	Nov 4	PCC Mix Design (Part II)	Lab 2 (continued)	
12	Nov 9	Portland Cement Concrete I	MCCE 7.1 – 7.3	HW08
	Nov 11	PCC Mix Design (Part III)	Lab 2 (continued)	
13	Nov 16	Portland Cement Concrete II	MCCE 7.4 – 7.7	
	Nov 18	Mechanical Properties of Concrete	Lab 3	
14	Nov 23	Project Review		
	Nov 25	Thanksgiving Holiday Break		
15	Nov 30	Project Presentation		
	Dec 2	Practice Problems		
16	Dec 7	Final Exam @ 1:00 pm – 3:00 pm		

14: End Notes

¹ angelo.blackboard.com

² <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>

³ <http://www.angelo.edu/student-handbook/>

⁴ <https://www.angelo.edu/academics/catalog/>

⁵ <https://www.angelo.edu/current-students/disability-services/>

⁶ <https://www.angelo.edu/incident-form>

⁷ <https://www.angelo.edu/title-ix>

⁸ <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>

⁹ <https://www.angelo.edu/covid-19/>

¹⁰ <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>

¹¹ http://www.angelo.edu/dept/writing_center/academic_honesty.php