

**1: Course Number and Name**

- a. **CENG 4311:** Transportation Design, Spring 2022
- b. Lecture: Section 010 11:00 am – 11:50 am in VIN 238 - Monday, Wednesday, and Wednesday

**2: Credits and Contact Hours**

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

**3: Instructor Information**

- a. **Course Coordinator:** Dr. Dick Apronti
- b. **Instructor:** Dick Apronti, 325-486-5512, [dick.apronti@angelo.edu](mailto:dick.apronti@angelo.edu). Office: VIN 275.
- c. **Office hours:** MTWRF 5:00 pm – 6:00 pm (Online on Blackboard Collaborate); office meetings by appointment only.

**4: Required Course Materials**

- a. **Textbooks:**
  - Traffic & Highway Engineering, 5th Edition by Garber and Hoel.
  - American Association of State Highway and Transportation Officials (AASHTO). (2018). Policy on Geometric Design of Highways and Streets (7th Edition). American Association of State Highway and Transportation Officials (AASHTO). Available for free online through ASU Library online resource.
  - Chappell, Eric. AutoCAD Civil 3D Essentials: Autodesk Official Press. Available from: VitalSource Bookshelf, Wiley Professional Development (P&T), 2042.
- b. **Additional Resources** (not required but extremely useful):
  - Fred L. Mannering, and Scott Washburn (2016). Principles of Highway Engineering and Traffic Analysis, 6th Edition. John Wiley & Sons. Inc., U.S.A.

**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. The Engineering Student Hub has computers that you can use if you need to.

**6: Specific Course Information**

- a. **Catalog Description:** This course provides students with an understanding of the basic principles and techniques of highway design – criteria controlling geometric design of highways including design speed, design volume, and vehicle requirements. The course will explore design of alignments, evaluation of earthwork requirements, pavement management and design, and application of computer software in highway design. There will be a class project involving the horizontal and vertical design of a given highway using a geometric design software.
  - **Prerequisites:** CENG 3311 – Transportation Engineering
  - **Required or elective:** Elective design course for BSCE Majors

**7: Specific Goals for the Course**

- a. Course Learning Outcomes:
  - 1. Identify and characterize the key attributes of vehicles, operators, and highway systems that affect the geometric design of highways.
  - 2. Design horizontal and vertical alignment of a road utilizing a geometric design software.
  - 3. Design an intersection.
  - 4. Design a flexible and a rigid pavement using the AASHTO method.
- b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

**Table 1: Course Learning Outcomes mapped to ABET Student Outcomes**

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

**8: Topics Covered**

- 1. Geometric design of highways
- 2. Intersection design
- 3. Design of highway pavements

**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. Lectures shall be recorded and made available online when students are unable to attend class due to Covid related quarantines.

**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. Message posted on Piazza will be sent to your ASU email address. Check frequently for announcements and policy changes.

Virtual communication: Office hours and/or advising may be done with the assistance of the Microsoft Team.

### **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**

The number one complaint of engineering clients is the timeliness of deliverables (reports, drawings, specifications, etc.). As a professional engineer you will be expected to arrive at scheduled meetings on time and prepared. Late proposals are not generally accepted. Late specifications or drawings may cost the engineer a monetary penalty. Professional engineering standards apply in this course.

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. It is important that you communicate clearly to your instructors.

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

#### **11.2: Quizzes & Participation**

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: 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.

#### **11.5: Exam**

There will be two in-class exams and one final exam. The first in class exam will be 50 minutes and scheduled during class time. The second in-class exam will be 120 minutes and scheduled at a special 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.

### 11.6: 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**

<b>Item</b>	<b>Weight</b>
Participation	20%
Homework	15%
Project	15%
Exam 1	20%
Final Exam	30%
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

### 11.7: 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](#)<sup>1</sup> 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](#)<sup>2</sup> and [Angelo State University Catalog](#)<sup>3</sup>.

#### 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](mailto:ADA@angelo.edu). For more information about the application process and requirements, visit the [Student Disability Services website](#).<sup>4</sup> 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](mailto: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](#)<sup>5</sup>

Face to Face: Mayer Administration Building, Room 210

Phone: 325-942-2022

Email: [michelle.miller@angelo.edu](mailto: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](#).<sup>6</sup>

## **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](#)<sup>7</sup> for more information.

## **12.4: Information About COVID-19**

Please refer to ASU's [COVID-19 \(Coronavirus\) Updates](#)<sup>8</sup> 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](#)<sup>9</sup> 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](#)<sup>10</sup>.

### 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
1	Jan 17	MLK Day	
	Jan 19	Course Introduction	Syllabus
	Jan 21	Responsibilities of Road Design Engineer	
2	Jan 24	Introduction to the Green Book	GB Preface
	Jan 26	Contextual Design	GB 1.1 – 1.3
	Jan 28	Functional Classifications	GB 1.4
3	Jan 31	Context Classification	GB 1.5 – 1.6
	Feb 2	Design Process for Specific Project Types	GB 1.7
	Feb 4	The Transportation Planning Process	THE Ch 11.1 – 11.2
4	Feb 7	The Transportation Planning Process (continued)	THE Ch 11.3 – 11.4
	Feb 9	Forecasting Traffic Demand	THE Ch 12.1 – 12.2
	Feb 11	Forecasting Traffic Demand (continued)	THE Ch 12.3 – 12.4
5	Feb 14	Forecasting Traffic Demand (continued)	THE Ch 12.5
	Feb 16	Forecasting Traffic Demand (continued)	THE Ch 12.6 – 12.7
	Feb 18	Other Methods for Forecasting Demand	THE Ch 12.8
6	Feb 21	<b>Exam 1</b>	
	Feb 23	Circular Curve	Handout
	Feb 25	Circular Curve	Handout
7	Feb 28	Curve Coordinates	

Week	Date	Topic	Reading
	Mar 2	Spiral Curve	Handout
	Mar 4	Spiral Coordinates	Handout
8	Mar 7	Stopping Sight Distance	GB 3.2.2
	Mar 9	Decision Sight Distance	GB 3.2.3
	Mar 11	Passing Sight Distance	GB 3.2.4
9	Mar 14	Spring Break	
	Mar 16	Spring Break	
	Mar 18	Spring Break	
10	Mar 21	Superelevation Fundamentals	GB 3.3.2
	Mar 23	Distributions of Superelevation & Friction	GB 3.3.3
	Mar 25	Distributions of Superelevation & Friction	GB 3.3.5
11	Mar 28	Superelevation for Rural Highways, Urban Freeways, & High-Speed Urban Roadways	GB 3.3.4
	Mar 30	Superelevation for Low-Speed Urban Roadways	GB 3.3.6
	Apr 1	Transition Design Controls	GB 3.3.8
12	Apr 4	Transition Design Controls (continued)	GB 3.3.8
	Apr 6	Project discussion	
	Apr 8	Earthworks	THE 14.3
13	Apr 11	Earthworks (continued)	
	Apr 13	Mass Diagram	
	Apr 15	Cross-Sectional Elements – The Traveled Way, Lane Widths, Shoulders	GB 4.1 – 4.4
14	Apr 18	Cross-Sectional Elements – Rumble Strips, Roadside Design	GB 4.5 – 4.6
	Apr 20	Cross-Sectional Elements – Curbs, Drainage Channels	GB 4.7 – 4.8
	Apr 22	Roadway Traffic Noise Abatement	GB 4.14
15	Apr 25	Pedestrian and Bicycle Facilities	GB 4.17 – 4.18
	Apr 27	Transit Facilities	GB 4.19
	Apr 29	Intersection Design	Handouts
	May 2	Intersection Design (continued)	
	May 4	Intersection Design (continued)	
	May 6	Exam Prep	
	May 11	<b>Final Exam @ 10:30 am – 12:30 pm</b>	

## 14: End Notes

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- <sup>1</sup> <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
- <sup>2</sup> <http://www.angelo.edu/student-handbook/>
- <sup>3</sup> <https://www.angelo.edu/academics/catalog/>
- <sup>4</sup> <https://www.angelo.edu/current-students/disability-services/>
- <sup>5</sup> <https://www.angelo.edu/incident-form>
- <sup>6</sup> <https://www.angelo.edu/title-ix>
- <sup>7</sup> <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
- <sup>8</sup> <https://www.angelo.edu/covid-19/>
- <sup>9</sup> <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>
- <sup>10</sup> <http://www.angelo.edu/dept/writing-center/academic-honesty.php>