

# CE 5390: The History of Engineering on Route 66

## Department of Civil Engineering

### General Information

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Meeting Time and Location: There is no assigned meeting time.

Final Exam: None

Course Description: This course is partially funded by The National Park Service through the Route 66 Corridor Preservation Program. This is the inaugural instance of the course.

We will definitely learn lots of interesting factoids, and see some of the attractions, and generally become informed about the Mother Road. It is my sincere hope that when we finish, you will value the history of Route 66 as much as I have learned to since starting to work with National Park Service on this and other projects.

The title of the course is “The History of Engineering on Route 66,” so perhaps not surprisingly, we will certainly be learning a lot of the history of Route 66. A more correct way of describing my intention would be to say that Route 66 will be the lens through which we address some challenging questions regarding engineering, history, preservation, and renewal.

The assignments for the course will require you to do research on your own, to develop new skills, to write, and to create. These are skills that I consider to be pivotal for success in engineering, but rarely are the focus of engineering coursework.

The material will be delivered in several forms of media including lecture videos, readings, movies, books, journal papers, etc. We will have guest lectures from experts in the field. It should be a fun course.

Expectations:

Instructor Expectations: From me, you can expect the following:

- I will treat everyone respectfully and equitably
- I will adhere to this syllabus
- I will assign you the grade that you earn
- I will make myself available to attempt to address issues that may arise via office hours appointments
- I will respond within 24 hours to emails and Teams messages

Student Expectations: From you, I expect the following:

- You will treat each other with respect
- You will act in a professional manner at all times
- You will adhere to this syllabus
- You will apply the knowledge to which you previously should have been exposed.
- You will work to learn new skills as needed in a self-guided manner.
- You will treat my time as valuable, scheduling meetings in advance and coming prepared to ask questions and present proposed solutions
- You will take personal responsibility for your success

Class Approach:

The course will be split into eight modules. The first seven will last two weeks each, while the final will be one week. The modules will be made available to you at the latest Sunday at midnight prior to the start of the two-week time window. The assignments will be due at the end of the two-week window. The assignments will vary greatly. They are described below.

You will interact with the course material on your own time and at your own pace. That being said, these assignments will take significant investments of time to complete so do not delay. I will be available by appointment to chat over Teams or video when you have questions or discussions.

Evaluation of your deliverables will generally include a peer evaluation component. Occasionally there will be discussion boards or small quizzes designed to reinforce engagement. They will be part of the module assignment grade. The purpose of quizzes is to include some form of assessment that could be conducted in an autonomous fashion in the future.

Course Support:

*Teaching Assistant:* The unofficial teaching assistant is Paola Santillano ([pmsantillano@miners.utep.edu](mailto:pmsantillano@miners.utep.edu)). Paola is an M.S. student who graduated from UTEP. She helped me in the collection and development of the course material and will continue to do so throughout the term.

Course Objectives:

By the end of this course, you should:

1. Describe the history of Route 66 including how it was developed, constructed, maintained, decommissioned, and preserved.
2. Describe the importance of Route 66 to the economy and expansion of the west.
3. Demonstrate the ability to use GIS to present geospatial data

4. Use structural analysis software to model an existing bridge
5. Explain the challenges with new infrastructure and its effects on history and the economy
6. Consider the role of engineers in causing and preventing climate change
7. Learn about the process of and challenges to historic preservation of transportation assets on Route 66
8. Reflect on how reflecting on the history of Route 66 has or has not changed your perception of engineering

### Class Policies

**Honor Code:** Civil Engineering students are expected to adhere to the Honor Code of the Department of Civil Engineering, which can be found here (<http://ce.utep.edu/honorcode.htm>). This statement is consistent with the [UTEP Handbook of Operating Procedures](#). Academic dishonesty includes but is not limited to plagiarism, cheating, and collusion. Under no circumstances should any design work be completed by anyone outside of your team. Additionally, under no circumstances should a practicing mentor be compensated for their time or assistance. All suspected violations must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action.

**Attendance Policy:** I do not take attendance or track interactions with the online content.

**Neatness Policy:** By this stage in your educational career, you should be submitting work that is neat and professional. I reserve the right to return work unreviewed if I deem it unprofessional. Resubmitted work will be considered late.

**Accommodations:** The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#).

**Technology Requirements:** The course material will be delivered through and stored on Blackboard. Discussions will occur on Blackboard, and assignments will be assigned, submitted, and graded within Blackboard. Announcements will be made through Blackboard. [Microsoft Teams](#) will be used for one-on-one communication. This software is provided for free by UTEP. Please download and install Teams. I will invite you to join the course using your UTEP email. Be sure to check that

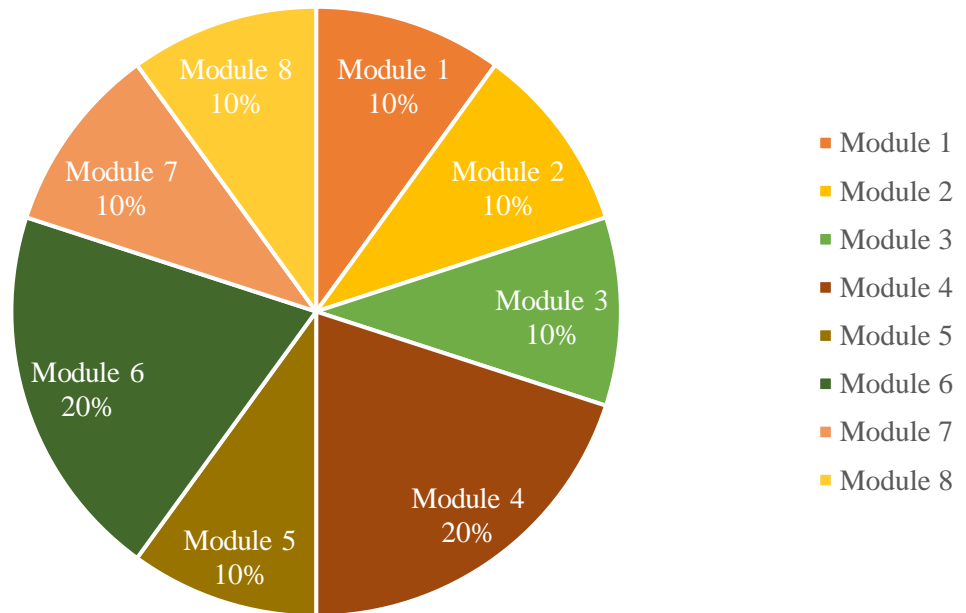
notifications are set up properly in Blackboard and Teams so that you do not miss any important communications. I will not use a personal email address in this course.

You will need access to a computer for this course. To interact in Office Hours, you will need access to video chat capabilities (webcam, microphone). To submit handwritten homework, you will need a scanner, or a scanning app on your phone. To make use of many UTEP software off campus, you will need [VPN access](#) set up on your computer. The [ETC Helpdesk](#) can support you in terms of technology requirements and [VPN access](#).

UTEP can provide support or technology assistance as required. Please see [Technology Services](#) for access to computer, internet connectivity, and other technology-related support issues to facilitate remote learning during the Pandemic.

### Coursework and Grading Expectations

Grading:      Grade Breakdown:



Final Grade     $A \geq 89.5$   
Thresholds:     $89.5 > B \geq 79.5$

79.5 > C ≥ 69.5  
69.5 > D ≥ 59.5  
59.5 > F

Exams: There are no exams in this course.

Homework: There is no homework in this course.

Module #1 Assignment (10%) Digital Scrapbook: Create a digital presentation of an aspect of Route 66 history (does not have to be engineering-related) that interests you. The format and topic of your scrapbook is up to you. It should be visually engaging – not just written word.

Some suggestions for format are provided below, but you may do something else:

- A poster created in PowerPoint
- A flyer in 1930's style online with something like Canva
- An infographic using Canva
- A concept map in Lucidchart
- A storyboard in Powerpoint
- A video

Some suggestions for topics are provided below, but you may select anything you like:

- Cy Avery – The Father of Route 66
- Pavement advancement
- Politics of highway building
- Tourism on Route 66
- History of a Bridge on Route 66
- The Interstate Highway System and Route 66
- Route 66 and Literature, Music, and Movies
- Your personal experience on the Mother Road
- Neon signs

You will be evaluated by your peers, me and the teaching assistant. Each of you will be responsible for evaluating two other projects, to be assigned later.

Module #2 Assignment (10%) Create a Map of a Segment: Select a segment of interest on Route 66. The length of the segment is up to you but be sure there is something there worth seeing. You will create the map in either ArcGIS (if you are familiar and have access) or QGIS if ArcGIS is unavailable. QGIS is an open-source software that works on Macs as well as PCs.

The map should show

- the present-day alignment
- any nearby relevant roads/towns/landmarks, etc.
- any old alignments
- notable bridges
- legend
- scale

- north arrow
- title
- relevant labels

You will be evaluated by your peers, me, and the teaching assistant. You are expected to evaluate two maps per the same rubric provided to you with the assignment.

You will be provided with a shapefile of former alignments of Route 66 for inclusion in your maps. The goal is that your map could be used by someone interested in visiting a part of the Route and seeing the area from a historic/engineering perspective.

Module #3  
Assignment  
(10%)

Trip Generation Analysis: Select a town or region on Route 66 and conduct a trip generation analysis to understand what kind of traffic would be generated by the existing entertainment and service assets in the place. The purpose of this exercise is to consider how and why the Route 66 economy developed the way it did and how it differs with how we look at new places. You should develop a short report (5 pages or less) including the following:

- describe the location you have selected
- describe the assets in that location that would generate traffic
- present the trip generation analysis
- analyze and reflect on the differences between that analysis and the Route 66 economy
- comment on the importance of nuance and flexibility in engineering analysis (you may be for or against nuance and flexibility – just be clear why)

Be sure to include any citations in your report. You will be evaluated by me and the TA.

Module #4  
Assignment  
(20%)

Analysis of a Bridge on Route 66: You will develop an analytical model of a bridge on Route 66 using existing drawings for the structure. The model will be used to conduct a “load test.” You will apply a load to the bridge of 50,000 lbs and determine the maximum moment, shear, and axial force and the maximum displacement in the bridge. You will validate these values using simple hand calculations.

The goal of this exercise is to learn about the differences between models and reality. You will hopefully (assuming I get access) learn to read plans for existing bridges. You will learn about creating structural models in a finite element software, loading these models, and extracting results. Finally, you will gain exposure to the unique bridges that carry Route 66.

Your analysis report should include, at minimum (note that these are not the sections):

- Pictures of the bridge
- Summary of the bridge history
- Summary of materials and properties
- Assumptions
- Description and pictures of your model
- Discussion of how you applied the load

- Results
- Simple hand comparison calculations
- Discussion and conclusions

This exercise will be evaluated by me and the TA.

Module #5  
Assignment  
(10%)      Persuasive Essay - The Interstate killed Route 66: You will construct and defend an argument about whether Route 66 was a victim of the Interstate Highway System (IHS) or something else. Obviously, the IHS did bypass Route 66, but was that the only force that led to the decommissioning of the Mother Road?

Your essay should include:

- A brief summary of the history of the IHS and the National Highway System (of which Route 66 was a part)
- Your opinion on the question at hand, and your arguments
- An assessment of the counterarguments you would expect and why you have determined that they are not adequate to prove you wrong
- Discussion and conclusions

The goal of this exercise is to write persuasively about an engineering topic, and to construct a strong argument either way. I expect you, wherever possible, to back your opinions with data. Be sure to cite your sources. This will be evaluated by me and two of your peers.

Module #6  
Assignment  
(20%)      Essay: Climate Change and Engineers: For this exercise, you will be reflecting on engineering and climate change. We will learn about the Dust Bowl in the 1930's and how Route 66 became inexorably tied to a clearly man-made climate event. We will contrast these ideas with recent data that shows that efforts to combat climate change can end in the same spot.

Your challenge in this short essay is to discuss the role of engineers in responding to climate change. You are welcome to take any position from staunch environmentalist to climate change denier. Just make it clear why you believe what you believe. I am not going to give you detailed guidance on this because I believe that this is the most important assignment in terms of your growth in this course.

This exercise will be evaluated by me and the TA.

Module #7  
Assignment  
(10%)      Save Route 66! Frame a Section 106 Application: You will identify an asset on Route 66 (that is not already in Section 106) and develop a Section 106 application. Obviously, a true application takes more time and resources than you have available in this course, so it will be a truncated effort focused on learning about what is required to preserve the history of Route 66. The deliverable should follow a typical Section 106 layout, with the

focus on your assessment of the requirements of what makes something of historical value.

This exercise will be evaluated by me and the TA, and through peer evaluation.

Module #8  
Assignment  
(10%)      Reflection Discussion: The final assignment is to reflect on the course in the discussion board. Specifically, I want you think about your understanding of what an engineer is that was submitted during the first module and see if you have changed that opinion at all. It is ok if it did not change, but I want to know why.