

**PROGRESSIVE DEGREE PROGRAM  
COURSE PLAN TEMPLATE**

<b>USC SCHOOL</b>	Viterbi School of Engineering
<b>ACADEMIC DEPARTMENT</b>	Sonny Astani Department of Civil and Environmental Engineering
<b>GRADUATE PROGRAM</b>	Master of Science in Civil Engineering (Transportation Engineering)
<b>POST CODE</b>	894
<b>TERM EFFECTIVE DATE</b>	Spring 2021

**PROGRAM DESCRIPTION**

A brief description of the graduate program.

The program prepares students for professional employment in transportation engineering and transportation planning agencies, firms and nonprofit organizations, or for doctoral study at the University of Southern California or elsewhere.

**COMMON BACHELOR DEGREE PROGRAM PATHWAYS**

A list of common bachelor's degrees that undergraduate students pursue in advance of pursuing a progressive degree option with this graduate program. Some programs are restricted to certain majors while others are open to all students.

Any BS degree offered by the Viterbi School.	
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**PREPARATORY UNDERGRADUATE COURSES**

A list of courses at the undergraduate level that prepare students for the graduate program. Required coursework is listed first, followed by recommended courses. If not applicable, this section will be blank.

<b>Dept. Prefix - Course #</b>	<b>Course Title</b>	<b>Required or Recommended</b>	<b>Units</b>
<b>CE 408</b> <u>or EE 364</u>  <u>or ISE 225</u> <u>or equivalent</u>	One calculus-based course in probability and/or statistics equivalent to: Risk Analysis in Civil Engineering <u>or</u> Introduction to Probability and Statistics for Electrical Engineering and Computer Science <u>or</u> Engineering Statistics I.	Required	At least 3 units
<b>CE 473</b> <u>or ISE 460</u> <u>or equivalent</u>	One course in engineering economy equivalent to: Engineering Law, Finance and Ethics; <u>or</u> Engineering Economy.	Recommended	At least 3 units
<b>CE 471</b> or equivalent	An introduction to transportation or traffic engineering at or planning equivalent to: Principles of Transportation Engineering	Recommended	At least 3 units
<b>ECON 203g</b> or equivalent	One course in micro-economic theory equivalent to: Principles of Microeconomics.	Recommended	At least 3 units

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**UNDERGRADUATE COURSES USED TO REDUCE GRADUATE LEVEL UNITS**

A list of undergraduate level courses that may be used to reduce the number of graduate level units required for the graduate program. If there are none, that is specified instead.

<b>Dept. Prefix - Course #</b>	<b>Course Title</b>	<b>Units</b>
	NONE	

**CORE GRADUATE PROGRAM REQUIREMENTS (# units required)**

A list of all required graduate courses for the graduate program. None of these courses may be used toward satisfying undergraduate degree requirements.

*If special exceptions for any of these courses are made by the academic department, the course # is marked with an asterisk (\*) and the exception is explained in the "Department Notes" section at the end of this course plan template.*

<b>Dept. Prefix - Course #</b>	<b>Course Title</b>	<b>Units</b>
	NONE	

**PRE-APPROVED ELECTIVE COURSEWORK**

Elective coursework is approved at the discretion of the academic department. Note the following details about the total number and units required of elective coursework.

28
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**TOTAL ELECTIVE UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE**

19
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**TOTAL ELECTIVE UNITS REQUIRED FOR THE PROGRESSIVE GRADUATE DEGREE**

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**TOTAL UNIT COUNTS AND REQUIRED GRADUATE UNITS**

28
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**TOTAL UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE**

9
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**TOTAL GRADUATE UNITS THAT MAY BE WAIVED (IF ANY)**

19
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**MINIMUM NUMBER OF GRADUATE UNITS THAT MUST BE AT THE 500 LEVEL OR ABOVE**

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**NOTES FROM THE DEPARTMENT**

This section highlights any unique considerations, exceptions, or requirements for the graduate program. If a program has specific restrictions (courses, majors, etc.), they are detailed below.

The Curriculum Coordination Office reports that this POST code and degree program were created in 1974 with the original expectation that additional courses would be proposed and mounted in the CEE and ISE departments to serve the program and students. No action was taken and no students were admitted until 1989, at which point the School of Engineering and the CEE department allowed a regular faculty member to take responsibility 1) for advising students completing individualized programs of study combining coursework in CEE, ISE, Urban Planning, Public Policy, Business, Computer Science, Economics and Geography; and 2) for recruiting adjunct faculty to create and deliver CEE courses specific to the program.

Students in the 28-unit program must complete at least 16 approved units with an engineering prefix, including courses mounted by other schools and cross-listed in the school of engineering. Students in the 19-unit PDP program must complete at least 11 approved units with an engineering prefix, including courses mounted by other schools and cross-listed in the school of engineering. PDP students may not apply 400-level, directed research, or internship units toward their MSCE (Transportation Engineering) degree. Applications to graduate from both the 28-unit and 19-unit programs are reviewed and approved by the faculty advisor serving as program director.

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A list of courses students most frequently take toward completion of the degree follows below. This list is not exhaustive. None of these courses may be used toward satisfying undergraduate degree requirements.

**Transportation Engineering**

**CE 582:** Transportation System Security and Emergency Management  
**CE 583:** Design of Transportation Facilities  
**CE 584:** Intelligent Transportation Systems  
**CE 585:** Traffic Engineering and Control  
**CE 586:** Modeling Transportation Network Supply and Demand  
**CE 588:** Railroad Engineering  
**CE/ISE/PPD 589:** Port Engineering: Planning and Operational Analysis

**Transportation Planning**

**CE/PPD 579:** Introduction to Transportation Planning Law  
**PPD/CE 633:** Methods and Modeling Tools for Transportation Planning  
**PPD/CE 634:** Institutional and Policy Issues in Transportation  
**PPDE/CE 637:** Urban Mass Transit  
**PPDE 644:** Land Use and Transportation Planning  
**PPD 531L:** Planning Studio (Transportation section)

**Computer Methods**

**CE 505:** Data Management for Civil and Environmental Engineers  
**CSCI 570:** Analysis of Algorithms  
**DSCI 510:** Principles of Programming for Informatics  
**SSCI 581:** Concepts for Spatial Thinking **or** **PPD 631:** Geographic Information Systems for Policy, Planning, & Development

**Quantitative Methods**

**CE 561:** Uncertainty Quantification and Data Analytics in Civil and Mechanical Engineering  
**CSCI 570:** Analysis of Algorithms  
**ISE 520:** Optimization Theory and Algorithms: Numerical Optimization  
**ISE 525:** Design of Experiments  
**ISE 530:** Optimization Models for Analytics  
**PPD 557:** Modeling and Operations Research  
**ISE 532:** Network Flows  
**ISE 536:** Linear Programming and Extensions  
**ISE 538:** Performance Analysis: Using Markov Methods  
**MATH/CSCI 501:** Numerical Analysis and Computation  
**PM/MATH 544L:** Multivariate Analysis  
**PM 603:** Structural Equation Modeling **or** **PPD 558:** Multivariate Statistical Analysis  
**PPDE 668:** Applied Econometrics for Program Evaluation

**Other Technical or Institutional Electives**

**CE 501:** Construction Practices  
**CE 502:** Accounting, Finance and Strategy  
**CE 506:** Heavy Construction Estimating  
**CE 526:** Engineering Mathematical Methods  
**CE 558:** International Construction and Engineering  
**CE 561:** Uncertainty Quantification and Data Analytics in Civil and Mechanical Engineering  
**CE 569:** Project Controls

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**Other Technical or Institutional Electives Continued**

**CSCI 570:** Analysis of Algorithms  
**DSO 581:** Supply Chain Management  
**ECON 502:** Mathematical Methods in Dynamic Economics  
**ENE 502:** Environmental and Regulatory Compliance  
**ENE 505:** Energy and the Environment  
**ENE 535:** Air Pollution Management: Exposure, Health Effects and Risk  
**ISE 515:** Engineering Project Management  
**ISE 520:** Optimization Theory and Algorithms: Numerical Optimization  
**ISE 525:** Design of Experiments  
**ISE 527:** Quality Management for Engineers  
**ISE 529:** Predictive Analytics  
**ISE 532:** Network Flows  
**ISE 535:** Data Mining  
**ISE 538:** Performance Analysis using Markov Methods  
**ISE 544:** Management of Engineering Teams  
**ISE 561:** Economic Analysis of Engineering Projects  
**ISE 562:** Decision Analysis  
**ISE 570:** Human Factors in Engineering  
**ISE 576:** Industrial Ecology: Technology Environment Interaction  
**ISE 580:** Performance Analysis with Simulation  
**PPD 542:** Policy and Program Evaluation  
**PPD 557:** Modeling and Operations Research  
**PPD 558:** Multivariate Statistical Analysis  
**PPD 560:** Methods for Policy Analysis  
**PPD/ISE 587:** Risk Analysis  
**PPD 617:** Urban Demography and Growth  
**PPD 619:** Smart Growth and Urban Sprawl: Policy Debates & Planning Solutions  
**PPD 636:** Infrastructure and Modern Society  
**PPD 644:** Shaping the Built Environment  
**PPDE 668:** Applied Econometrics for Program Evaluation (Up to 4 Units)  
**PPD 692:** Transportation and the Environment  
**PPD 694:** Coastal Policy and Planning  
**PPD 709:** Applications in the Advanced Quantitative Methods  
**SSCI 583:** Spatial Analysis and Modeling  
**SSCI 587:** Spatial Data Acquisition  
**SSCI 589:** Cartography and Visualization.

Kelly Goulis

**Authorizing Dean's Name**

April 27, 2021

**Date Approved**

Senior Associate Dean, Viterbi School of Engineering

**Authorizing Dean's Title**