Texas State University's new Master of Science program in Civil Engineering prepares students for careers in academia or industry. The program integrates traditional civil engineering principles with technology-enhanced infrastructure (TEI) and entrepreneurial skills, equipping students to address critical infrastructure needs and advancing Texas State's commitment to innovative research and development.

Application Requirements

Application requirements consist of institutional and program requirements for applicable semesters of entry during the current academic year. Additional information and changes to admission requirements for semesters other than the current academic year can be found on The Graduate College's website (http://www.gradcollege.txstate.edu/).

Unless otherwise noted on The Graduate College program page, AI tools can only be used to correct spelling and grammar errors in application materials.

Institutional Requirements

Institutional requirements are the minimum standards for admission to any graduate program at Texas State. These include:

- Completed online application
- Nonrefundable application fee
  - Degree Programs (Doctoral and Master's)
    - $55 fee, or
    - $90 for applications with international credentials
  - Post-Baccalaureate Programs (Certificate, Certification, Non-Degree, and Visiting)
    - $20 fee, or
    - $60 for applications with international credentials
- Official transcripts from each institution where course credit was granted. Final transcripts showing degree completion are required before the student may register for their second term of enrollment.
- GPA requirements (a higher GPA may be listed in the Program Requirements)
  - Doctoral programs require a 3.00 overall GPA or a 3.00 GPA in your last 60 hours (https://www.gradcollege.txst.edu/admissions/policy.html#gpa) of undergraduate course work (plus any completed graduate courses).
  - Master's and Specialist programs require a 2.75 overall GPA or a 2.75 GPA in your last 60 hours (https://www.gradcollege.txst.edu/admissions/policy.html#gpa) of undergraduate course work (plus any completed graduate courses).
  - Post-Baccalaureate programs require a 2.50 overall GPA or a 2.50 GPA in your last 60 hours (https://www.gradcollege.txst.edu/admissions/policy.html#gpa) of undergraduate course work (plus any completed graduate courses).
- Baccalaureate degree from a regionally accredited university. (Non-U.S. degrees must be equivalent to a four-year U.S. Bachelor's degree. In most cases, three-year degrees are not considered. Visit our International FAQs (https://www.gradcollege.txst.edu/international/faqs.html) for more information.)

Approved English Proficiency Exam Scores

Applicants are required to submit an approved English proficiency exam score that meets the minimum requirements below unless they have earned a bachelor's degree or higher from a regionally accredited U.S. institution or the equivalent from a country on our exempt countries list (http://www.gradcollege.txstate.edu/international/language.html#waiver). Some programs may restrict acceptable tests or require higher scores than the institutional scores; this will be noted in the Program Requirements.

- official TOEFL iBT scores required with a 78 overall if taken on or before January 21, 2026
- official TOEFL iBT scores required with a 4 overall if taken after January 21, 2026
- official PTE scores required with a 52 overall
- official IELTS (academic) scores required with a 6.5 overall and minimum individual module scores of 6.0
- official Duolingo scores required with a 110 overall
- official TOEFL Essentials scores required with an 8.5 overall
- official Texas State Intensive English Program score of 90% or higher in the highest-level course (level 5)

The institution does **not** offer admission if the scores above are not met.

Program Requirements

- baccalaureate degree in Civil Engineering, Environmental Engineering, or a closely related field from a regionally accredited university (Non-U.S. degrees must be equivalent to a four-year U.S. Bachelor's degree. In most cases, three-year degrees are not considered. Visit our International FAQs (https://www.gradcollege.txst.edu/international/faqs.html) for more information.)
- 3.00 overall GPA or a 3.00 GPA in the last 60 hours of undergraduate course work (plus any completed graduate courses)
- official GRE (general test only) with competitive scores in the verbal reasoning and quantitative reasoning and writing sections is preferred. Texas State University students are exempt from this preference
- resume/CV detailing prior work experience, research experience, awards, scholarships, and other related qualifications
- statement of purpose (two pages) conveying research interests, plans for graduate study, and professional aspirations
- two letters of recommendation from non-related individuals familiar with the student's scholarly work and/or relevant work experience

Additional Information

Non-credit (leveling) course work may be required prior to admission into the program if the student lacks sufficient background course work. Any required leveling course work must be completed with grades of B or better prior to admission.

Degree Requirements

The Master of Science (M.S.) degree with a major in Civil Engineering requires 31 semester credit hours, with either a thesis or non-thesis option. Non-credit (leveling) course work may be required prior to admission into the program if you lack sufficient background course work. Any required leveling course work must be completed with grades of B or better prior to admission.

For the thesis option, all students will have a faculty advisor and a graduate committee composed of a minimum of three graduate faculty members (including the faculty advisor). The faculty advisor will provide technical direction for the student's project, and the graduate committee will be responsible for approving the project proposal, receiving project progress reports, and approving the final project presentation and written report. The oral project presentation will serve as the comprehensive examination.

Code	Title	Hours
Required Courses		
CE 5100	Civil and Environmental Engineering Seminars	1
Prescribed Electives		18
Select 18 hours from the courses below		
CE 5320	Water Quality Management	
CE 5331	Computational Methods in Civil Engineering	
CE 5340	Advanced Infrastructure Materials	
CE 5350	Highway Bridge Design	
CE 5360	Pavement Design	
CE 5370	Urban Stormwater Management	
CE 5390	Infrastructure Systems Analysis	
CE 5391	Advanced Mechanics of Materials	
ENGR 5321	Environmental Chemistry	
ENGR 5322	Low Impact Development and Green Infrastructure	
ENGR 5323	Soil and Groundwater Remediation	
ENGR 5324	Water Reuse	
ENGR 5330	Advanced Soil Mechanics	
ENGR 5332	Earth retaining structures and slopes	
ENGR 5333	Ground Improvement Techniques	
ENGR 5334	Advanced Foundation Engineering	
ENGR 5341	Advanced Bituminous Materials	
ENGR 5351	Advanced Reinforced Concrete Members	
ENGR 5352	Advanced Prestressed Concrete	
ENGR 5353	Earthquake Engineering	
ENGR 5361	Pavement Asset Management	
ENGR 5362	Advanced Traffic Engineering	
ENGR 5363	Road Infrastructure Safety	
ENGR 5372	Water, Climate, and Disasters	
CE 7336	Discrete Element Methods for Granular Materials	
CE 7364	Non Destructive Testing and Forensic Studies	
CE 7366	Advanced Statistical and Econometric Modeling	
CE 7371	Remote Sensing in Hydrology	
CE 7395	Computational Methods in Civil Engineering	
CE 7396	Life Cycle Assessment of Infrastructure	
Open Electives		6
Select 6 hours from any graduate level courses based on advisor's recommendation		
Thesis		
ENGR 5399A	Thesis	3
ENGR 5399B	Thesis	3
Total Hours		**31**

Master's level courses in Civil Engineering: CE (http://mycatalog.txstate.edu/graduate/science-engineering/ingram-school/civil-engineering-thesis-ms/#CE), ENGR (http://mycatalog.txstate.edu/graduate/science-engineering/ingram-school/civil-engineering-thesis-ms/#ENGR)

Civil Engineering (CE)

CE 5320. Water Quality Management.
This course examines principles and practices for drinking water quality management in engineered water supply systems. Topics include physicochemical and microbiological characteristics of drinking water, regulatory frameworks (e.g., primary and secondary standards, health advisories, and emerging contaminant programs), and public health implications. Emphasis is placed on contaminant sources, occurrence, and treatability in relation to water treatment processes. Students engage in evaluation of water quality requirements and treatment approaches for compliance and protection of public health. By the end of the course, students are expected to assess drinking water quality and select appropriate treatment and management strategies.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5331. Computational Methods in Civil Engineering.
This course introduces numerical analysis and computational methods in civil engineering. Topics include a survey of the finite element method, along with a review of differential equations, boundary conditions, integral formulations, and numerical integration techniques. Emphasis centers on applying numerical methods to model and solve steady-state and transient problems in solid and fluid systems. Students develop practical skills in simulation and computational problem-solving relevant to real-world civil engineering applications, strengthening their ability to analyze complex systems using modern numerical tools.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5340. Advanced Infrastructure Materials.
This course examines advanced topics in infrastructure materials, including cement concrete and asphalt concrete, with emphasis on material behavior, performance, and characterization of cement concrete. The composition and interactions of cementitious systems are analyzed in relation to fresh and hardened properties, microstructure development, and long-term performance. This course evaluates factors influencing material response under mechanical and environmental loading and considers advanced material design and modification approaches. Asphalt materials are reviewed in the context of engineering applications and emerging developments. Emphasis is placed on analytical frameworks and current practices used to assess and predict material performance in civil engineering systems.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5350. Highway Bridge Design.
This course presents the principles and practices involved in the design of highway bridge structures, including both superstructure and substructure components. Emphasis focuses on structural analysis, load evaluation, material selection, and design detailing in accordance with current Federal Highway Administration (FHWA) specifications. Students develop the ability to design bridge elements, assess structural performance, and apply relevant codes and standards. The course integrates practical design considerations with engineering judgment to address safety, serviceability, and durability requirements in modern bridge engineering projects.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5360. Pavement Design.
This course develops students' ability to analyze, evaluate, and design modern pavement systems using state-of-practice and advanced methodologies. Students examine ASTM, AASHTO, and FHWA standard and specifications in pavement materials. Students explore key design approaches, identify critical input variables, and apply AASHTO methods for flexible and rigid pavements. Students also design flexible and rigid pavements using advanced mechanistic-empirical design framework, interpretation of design outcomes, and recommendation of optimal solutions. Through real-world case studies and collaborative projects, students synthesize knowledge, develop rehabilitation strategies, and demonstrate effective teamwork, leadership, and communication skills.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5370. Urban Stormwater Management.
This course examines the planning, design, operation, and maintenance of urban stormwater management systems. It explores political, social, economic, and environmental factors that influence system development and performance. Students analyze how these factors shape decision making and infrastructure outcomes. The course also evaluates the impacts of extreme events on stormwater systems and the urban landscape. Emphasis is placed on sustainable design strategies, resilience, and practical approaches to managing runoff, reducing flood risks, and protecting communities and ecosystems in rapidly changing urban environments.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5390. Infrastructure Systems Analysis.
This course examines the planning, operation, and maintenance of infrastructure systems in municipal and commercial contexts. Political, social, economic, environmental, and engineering factors influencing infrastructure decision-making are analyzed. Methods for evaluating system performance, lifecycle considerations, and system interactions are investigated. Strategies for enhancing infrastructure safety, reliability, and economic value are evaluated within the context of modern infrastructure management practices, including asset management, risk assessment, long-term system performance evaluation, decision-making under uncertainty, and integration of data-driven approaches for infrastructure system analysis and management.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

CE 5391. Advanced Mechanics of Materials.
This course is an advanced study of stress, strain, and deformation in elastic bodies with emphasis on rigorous formulation and solution of structural mechanics problems. Topics covered include torsion of noncircular members, unsymmetrical bending of prismatic and thin-walled sections, nonlinear beam behavior, and stress concentrations in structural details and connections. Additional topics address beams on elastic foundations, energy methods, stability-related effects, and advanced use of Mohr's circle for multi-axial stress and strain. The course also includes an introduction to the theory of elasticity, emphasizing the formulation of governing equations and classical two- and three-dimensional solution techniques.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

Engineering (ENGR)

ENGR 5100. Seminar in Engineering.
This course examines principles of professional engineering discourse and current research trends in academia and industry. Students analyze technical presentations and scholarly work to evaluate emerging technologies and interdisciplinary research approaches. Topics include professional ethics, leadership in engineering, and the societal context of technological development. The course emphasizes critical assessment of research methodologies, synthesis of complex technical information, and effective communication of engineering ideas. Students examine connections between theoretical frameworks and applied engineering practice.
1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5101. Academic Instruction for Engineering Graduate Assistants.
This course examines principles of pedagogical theory and professional responsibilities associated with academic instruction in engineering contexts. Students analyze teaching methodologies, classroom management strategies, and assessment practices used in undergraduate instruction. Topics include technical communication, academic policies, laboratory safety, and student privacy regulations. The course also addresses inclusive instructional practices and evaluation of teaching effectiveness. Emphasis is placed on the relationship between subject matter expertise and the communication of complex engineering concepts in classroom and laboratory settings.
1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing|Graduate Assistantship|Exclude from Graduate GPA
Grade Mode: Leveling/Assistantships

ENGR 5105. Engineering Internship.
This course examines engineering practice in professional work environments through supervised internship experiences. Students analyze organizational structures, workflows, and technical processes within engineering firms. The course emphasizes application of engineering theory to real-world projects, including design, manufacturing, or system management contexts. Topics include professional ethics, workplace safety, technical communication, and documentation of engineering work. Students evaluate the relationship between academic preparation and professional practice while engaging in collaborative project environments. Prerequisite: Instructor approval.
1 Credit Hour. 0 Lecture Contact Hours. 1 Lab Contact Hour.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5198B. Project.
This course examines advanced project implementation and technical documentation in graduate engineering study. Students analyze experimental or theoretical data to evaluate project outcomes and design objectives. The course emphasizes application of analytical methods, integration of complex data, and development of technical conclusions under faculty supervision. Topics include evaluation of project results in relation to industry standards, documentation of methodologies, and preparation of comprehensive project reports. Students present and communicate project findings using professional engineering formats. Prerequisite: Instructor approval.
1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5199B. Thesis.
This course examines advanced data synthesis and technical writing required for completion of a master’s thesis in engineering. Students analyze experimental or theoretical results to evaluate research questions and hypotheses. The course emphasizes application of analytical frameworks, integration of complex data, and documentation of research methodologies under faculty supervision. Topics include evaluation of findings in relation to existing scholarly literature and professional standards, as well as preparation of a formal thesis. Students present and defend their research using appropriate academic and professional formats.
1 Credit Hour. 1 Lecture Contact Hour. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5201. Academic Instruction for Engineering Graduate Assistants.
This course examines pedagogical strategies, instructional design, and professional responsibilities for graduate instructional assistants in engineering. Topics include development of course materials, grading methodologies, and university policies related to academic instruction. Students engage in reflective analysis of teaching practices, with attention to critical thinking and instructional approaches in technical curricula. The course addresses evaluation of student learning outcomes, classroom and laboratory management strategies, and development of instructional plans in engineering education contexts.
2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Graduate Assistantship|Exclude from Graduate GPA
Grade Mode: Leveling/Assistantships

ENGR 5299B. Thesis.
This course examines advanced data synthesis and technical writing required for completion of a master’s thesis in engineering. Students analyze experimental or theoretical results to evaluate research questions and hypotheses. The course emphasizes application of analytical frameworks, integration of complex data, and documentation of research methodologies under faculty supervision. Topics include evaluation of findings in relation to existing scholarly literature and professional standards, as well as preparation of a formal thesis. Students present and defend their research using appropriate academic and professional formats.
2 Credit Hours. 2 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5310. Probability, Random Variables, & Stochastic Processes for Engineers.
This course introduces the fundamental principles of probability, statistics, random variables, and stochastic processes used in the analysis and design of engineering systems. Core topics include probability theory, discrete and continuous probability distributions, and mathematical descriptions of random variables. Statistical methods for analyzing engineering data, including estimation and inference, are examined. Stochastic processes are presented as models for systems that evolve over time under uncertainty. Applications of probabilistic and statistical methods are analyzed in engineering contexts such as system performance evaluation, signal behavior, control systems, and modeling of physical systems affected by randomness.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5321. Environmental Chemistry.
This course examines environmental chemistry principles relevant to natural and engineered systems. Topics include geochemistry and atmospheric chemistry to understand pollutant sources, transport, transformation, and impacts across the atmosphere, hydrosphere, lithosphere, and biosphere. The course integrates concepts from sustainability, green chemistry, and green engineering. Students engage in quantitative analysis, modeling, and evaluation of treatment and remediation processes. Emphasis is placed on analyzing contaminant behavior and evaluating environmentally responsible approaches to materials, processes, and technologies.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5322. Low Impact Development and Green Infrastructure.
This course covers the principles and practices of Low Impact Development and Green Infrastructure (LID/GI) for sustainable development and water management. Students study approaches such as rainwater harvesting, small-scale systems, and resource recovery. The course examines design strategies and technologies used to reduce environmental impacts and manage water resources. Students evaluate LID/GI practices related to system performance, efficiency, and sustainability. Emphasis is placed on practical applications and techniques used in water resources and urban infrastructure systems.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5323. Soil and Groundwater Remediation.
This course covers remediation technologies for contaminated soil and groundwater. Topics include subsurface hydrology, contaminant fate and transport, and physicochemical and biological remediation methods. The course examines monitoring techniques and strategies for brownfield redevelopment. Students evaluate subsurface contamination and its environmental impacts. Emphasis is placed on practical applications, regulatory considerations, and approaches to site cleanup. The course addresses design and implementation of remediation systems in environmental engineering contexts.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5324. Water Reuse.
This course explores the role of water reuse in water resources management, addressing engineering principles and interdisciplinary considerations. Topics include advanced treatment technologies, regulatory frameworks, and environmental and economic impacts across agricultural, industrial, and urban applications. Students engage in case studies, quantitative analysis, and system-level evaluation of water reuse applications. Emphasis is placed on design and assessment of water reuse systems in relation to regulatory requirements and operational considerations.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5330. Advanced Soil Mechanics.
This course is a graduate-level geotechnical engineering course covering fundamental principles of soil behavior. Topics include soil composition, index properties, classification, compaction, total and effective stress, consolidation and secondary compression, and drained and undrained shear strength, including friction, cohesion, dilatancy, and critical state concepts. The course also examines the effects of stress history and rate of loading. A required laboratory component provides experience in characterizing soils for engineering purposes, including stress–deformation and strength behavior, and introduces ASTM geotechnical laboratory testing procedures and standards.
3 Credit Hours. 2 Lecture Contact Hours. 1 Lab Contact Hour.
Grade Mode: Standard Letter

ENGR 5332. Earth retaining structures and slopes.
This course covers the analysis and design of a range of earth retaining structures and the evaluation of slope stability. Students learn fundamental lateral earth pressure theories and apply them to the design of gravity walls, cantilever walls, mechanically stabilized earth walls, soil nails, and tiebacks. Slope stability analysis includes infinite slopes, methods of slices, chart-based solutions, and finite element methods using commercial software. Additional topics address slope remediation techniques and the use of geosynthetics for stabilization in geotechnical engineering practice.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5333. Ground Improvement Techniques.
This course presents advanced topics in ground improvement for challenging sites, including remediation of seepage and strength-related issues. Topics include techniques such as deep soil mixing, jet grouting, dynamic compaction, vibro-compaction, stone columns, rigid inclusions, and permeation grouting. Emphasis is placed on addressing liquefaction, settlement, hydraulic conductivity, and stability concerns. The course integrates field investigation methods, design principles, performance evaluation, and long-term monitoring considerations. Applications include natural and reclaimed land environments, such as coastal, offshore, and urban redevelopment sites.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5334. Advanced Foundation Engineering.
This course examines advanced topics in foundation design, including analysis and construction of shallow and deep foundations. Shallow foundation topics emphasize mat foundations and their application to pile-raft systems. Deep foundation topics include driven piles, drilled shafts, micropiles, and auger cast-in-place piles. The course covers axial and lateral capacity, settlement, and pile group effects for various foundation types. Additional topics include subsurface exploration and analysis of pile behavior using wave equation methods.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5341. Advanced Bituminous Materials.
This course examines advanced concepts in bituminous materials, including asphalt binders, aggregates, and mixture systems used in pavement engineering. Emphasis is placed on the characterization of asphalt materials and their influence on mixture design and performance. The course analyzes mix design procedures, material interactions, and factors affecting mechanical response and durability. Modern approaches to asphalt pavement design and construction are considered, including performance-based specifications and evaluation methods. Applications include the assessment of mixture behavior under traffic loading and environmental conditions using current engineering practices.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5351. Advanced Reinforced Concrete Members.
This course examines advanced topics in reinforced concrete materials, specifications, behavior, and structural design. Topics include flexural behavior and design of reinforced concrete members, behavior and design of slender columns, and design of structural components such as frame joints and walls. Additional emphasis is placed on serviceability, durability, and anchorage design using splices, hooks, and mechanical devices. Students interpret design provisions and apply engineering principles to evaluate and design reinforced concrete systems in accordance with relevant standards and specifications.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5352. Advanced Prestressed Concrete.
This course examines the fundamental theories, principles, and behavior of prestressed concrete systems. Topics include the analysis and design of prestressed components subjected to axial, flexural, and shear loads. Emphasis is placed on prestress effects, load transfer mechanisms, and structural responses under service and ultimate limit states. Applications of prestressed elements in infrastructure systems, including bridges and structural components, are addressed, with attention to practical design considerations, material behavior, and relevant design codes and specifications for engineering practice.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5353. Earthquake Engineering.
This course examines earthquake ground motion, wave propagation, and structural dynamics, including modal analysis and linear and nonlinear response of single- and multi-degree-of-freedom systems. The effects of earthquakes on structures are analyzed, and earthquake-resistant design principles, including force-based, displacement-based, and energy-based approaches, are evaluated. Emphasis is placed on understanding dynamic structural response, interpreting analytical results, and applying seismic design concepts to structural systems subjected to earthquake loading in practical engineering applications and design scenarios encountered in engineering practice.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5361. Pavement Asset Management.
This course examines data-driven strategies for managing pavement systems at network and project levels. Topics include condition evaluation technologies for flexible and rigid pavements, including distress, roughness, friction, and structural assessment based on national and state standards. The course covers application of statistical models for performance prediction and interpretation of results to inform maintenance and rehabilitation decisions. Students design optimization and ranking techniques for resource allocation. The course includes collaborative projects involving analysis and communication of pavement management solutions.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5362. Advanced Traffic Engineering.
This course provides an advanced introduction to the components of highway traffic systems and traffic engineering principles. Topics include traffic stream characteristics, level of service, and capacity of urban and rural highways. The course covers traffic data collection using fixed and mobile sources, macroscopic and microscopic traffic modeling, warrants for traffic control devices, and design and analysis of traffic signals and timing plans. Analysis of traffic characteristics using empirical data and simulation software is included.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5363. Road Infrastructure Safety.
This course introduces road infrastructure safety and related analytical methods. Topics include road safety analysis, highway safety management systems, count data modeling, crash severity modeling, short-term crash prediction, road safety audits, network screening, and choice modeling. The course also covers fundamentals of artificial intelligence and machine learning, human factors in transportation, and safety-focused design principles, including the Safe System Approach. Emphasis is placed on analysis of roadway safety data and evaluation of engineering approaches to roadway safety.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5372. Water, Climate, and Disasters.
This course examines interactions between water and climate systems and their relationship to the occurrence, magnitude, and frequency of natural disasters. Topics include climate impacts on hydrology, water resources, and extreme events such as floods, droughts, heat waves, landslides, and wildfires. The course also addresses disaster risk management and adaptation strategies in relation to weather- and climate-related hazards. Emphasis is placed on analysis of hydroclimatic processes and evaluation of approaches to managing risks associated with extreme events.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Standard Letter

ENGR 5384. Problems in Engineering.
This course provides graduate students with the opportunity to investigate a specialized engineering topic through development of a technical problem, review of relevant literature, and presentation of findings. Students conduct independent study under faculty supervision, focusing on a defined area of engineering. The course includes formulation of research questions, application of appropriate analytical or design methods, and evaluation of results. Deliverables may include research papers, presentations, or project reports that demonstrate application of engineering principles and technical communication skills. Prerequisite: Instructor approval.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Standard Letter

ENGR 5398A. Project.
This course examines foundational project development and methodologies required for initiating a graduate-level engineering study. Students analyze technical literature and existing frameworks to define an original engineering problem. The course emphasizes formulation of a project proposal and identification of experimental or theoretical approaches to address technical challenges. Students apply analytical methods, simulation tools, and engineering principles under faculty supervision. Topics include preliminary data collection, feasibility assessment, and consideration of ethical and regulatory factors in project design. Prerequisite: Instructor approval.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5398B. Project.
This course examines advanced project implementation and technical documentation in graduate engineering study. Students analyze experimental or theoretical data to evaluate project outcomes and design objectives. The course emphasizes application of analytical methods, integration of complex data, and development of technical conclusions under faculty supervision. Topics include evaluation of results in relation to industry standards, documentation of methodologies, and preparation of a comprehensive project report. Students present and communicate project findings using professional engineering formats. Prerequisite: Instructor approval.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5399A. Thesis.
This course examines foundational research methods and processes required for development of a master's thesis in engineering. Students analyze technical literature to define a research problem and develop a thesis proposal. The course emphasizes selection of experimental or theoretical approaches, application of analytical methods, and integration of modeling and simulation tools under faculty supervision. Topics include feasibility assessment, preliminary data analysis, and consideration of ethical and intellectual property issues. Students prepare a formal thesis proposal and supporting documentation.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit

ENGR 5399B. Thesis.
This course examines advanced data synthesis and technical writing required for completion of a master's thesis in engineering. Students analyze experimental or theoretical results to evaluate research questions and hypotheses. The course emphasizes application of analytical frameworks, integration of complex data, and documentation of research methodologies under faculty supervision. Topics include evaluation of findings in relation to scholarly literature and professional standards, as well as preparation of a formal thesis and presentation of research results.
3 Credit Hours. 3 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5599B. Thesis.
This course examines advanced data synthesis and technical writing required for completion of a master's thesis in engineering. Students analyze experimental or theoretical results to evaluate research questions and hypotheses. The course emphasizes application of analytical frameworks, integration of complex data, and documentation of research methodologies under faculty supervision. Topics include evaluation of findings in relation to scholarly literature and professional standards, as well as preparation of a formal thesis and presentation of research results.
5 Credit Hours. 5 Lecture Contact Hours. 0 Lab Contact Hours.
Course Attribute(s): Exclude from 3-peat Processing
Grade Mode: Credit/No Credit

ENGR 5999B. Thesis.
This course examines advanced data synthesis and technical writing required for completion of a master's thesis in engineering. Students analyze experimental or theoretical results to evaluate research questions and hypotheses. The course emphasizes application of analytical frameworks, integration of complex data, and documentation of research methodologies under faculty supervision. Topics include evaluation of findings in relation to scholarly literature and professional standards, as well as preparation and defense of a formal thesis.
9 Credit Hours. 9 Lecture Contact Hours. 0 Lab Contact Hours.
Grade Mode: Credit/No Credit