

CHINESE

CHS

**Department of Linguistics
and Germanic, Slavic,
Asian and African Languages
College of Arts and Letters**

101 Elementary Chinese I
Fall. 5(5-0) Not open to students with credit in CHS 112.

Pronunciation, writing system, and basic vocabulary and sentence patterns, with emphasis on conversation.

102 Elementary Chinese II
Spring. 5(5-0) P:M: (CHS 101) Not open to students with credit in CHS 105.

Further work on conversation, character writing, and comprehension, with increasing emphasis on vocabulary building and grammar.

105 Introductory Chinese with Business Emphasis
Summer. 5(5-0) SA: CHS 111, CHS 112 Not open to students with credit in CHS 101.

Beginning-level speaking, listening comprehension, and reading for Chinese in business-related contexts. Economic conditions and business culture in China.

201 Second-Year Chinese I
Fall. 5(5-0) P:M: (CHS 102)
Intermediate-level work on skills in conversation, comprehension, and grammar. Practice in composition.

202 Second-Year Chinese II
Spring. 5(5-0) P:M: (CHS 201)
Further intermediate-level work on skills in conversation, comprehension, and grammar. Continued practice in composition.

301 Third-Year Chinese I
Fall. 4(4-0) P:M: (CHS 202)
Advanced-level work on speaking, listening comprehension, reading, and writing skills, based on materials of cultural interest.

302 Third-Year Chinese II
Spring. 4(4-0) P:M: (CHS 301)
Advanced-level work on speaking, listening comprehension, reading, and writing skills, based on materials of cultural interest.

350 Studies in the Chinese Language
Spring. 3(3-0) P:M: (CHS 201)
Grammatical structures of modern Chinese. Grammar review, sound system, word formation, sentence and discourse structures, historical evolution of the Chinese language, dialects, sociolinguistics.

401 Fourth-Year Chinese I
Fall. 3(3-0) P:M: (CHS 302) R:
Reading, discussion, and writing of advanced materials, including classical texts of broad cultural interest.

402 Fourth-Year Chinese II
Spring. 3(3-0) P:M: (CHS 401)
Further reading, discussion and writing based on original materials, including classical texts of broad cultural interest.

499 Senior Thesis Research
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Approval of department.

An individual research project supervised by a faculty member that demonstrates the student's ability to do independent research and submit or present a major paper.

CIVIL ENGINEERING CE

**Department of Civil and
Environmental Engineering
College of Engineering**

271 Engineering Surveying
Fall, Spring. 4(3-3) P:M: (MTH 114 or MTH 116 or MTH 124 or MTH 132 or MTH 152H or LBS 117 or LBS 118)
Application of surveying and error analysis to civil engineering problems. Earth work. Calculations. Layout and management of construction sites.

280 Introduction to Environmental Engineering
Fall, Spring. 3(3-0) P:M: (CEM 141 or CEM 151 or LBS 171) and (MTH 132 or concurrently or MTH 152H or concurrently or LBS 118 or concurrently)
Elements of hydrology. Groundwater and surface water supply and contamination. Treatment systems for drinking water, wastewater, air, and solid and hazardous waste. Noise and radiation pollution.

305 Introduction to Structural Analysis and Design
Fall, Spring. 4(3-2) P:M: (MSM 211) R:
Open only to juniors or seniors in the Department of Civil and Environmental Engineering.
Analysis and design of structural systems. Loads estimation and placement. Structural analysis theory. Manual and computer analysis methods and validation of results from computer analysis methods. Proportioning of structural members in steel and reinforced concrete. Applications including bridges and building frames.

312 Soil Mechanics
Fall, Spring. 4(3-3) P:M: (MSM 211) and completion of Tier I writing requirement. R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering or in the Biosystems Engineering major.
Engineering properties of soil and their measurement. Effective-stress concept. Permeability and seepage. Compaction. Consolidation, shear strength and stress-strain behavior.

321 Introduction to Fluid Mechanics
Fall, Spring. 4(3-2) P:M: (MTH 234 or MTH 254H or LBS 220) and (ME 221) and completion of Tier I writing requirement. R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering or in the Biosystems Engineering major. Not open to students with credit in ME 332.

Fluid properties, fluid statics, fluids in motion. Conservation of mass, energy and momentum. Dimensional analysis and similitude. Internal and external flows. Applications.

337 Civil Engineering Materials I
Fall, Spring. 4(3-3) P:M: (MSM 211 or concurrently) R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering.

Common civil engineering construction and paving materials: aggregates, inorganic cements, asphalts, concretes, wood and steel. Composition, structure, physical and mechanical properties, tests, and production mix design.

341 Transportation Engineering
Fall, Spring. 3(3-0) P:M: (MTH 234 or concurrently or MTH 254H or concurrently or LBS 220 or concurrently) and completion of Tier I writing requirement. RB: (STT 351) R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering or in the Urban and Regional Planning major. SA: CE 346
Overview of transportation system issues and problems. Fundamentals of highway design and operations. Planning and evaluation of transportation system alternatives.

375 Cost Engineering and Engineering Ethics
Fall. 3(3-0) R: Open only to juniors or seniors in the College of Engineering. SA: CE 370
Cost engineering concepts and applications. Time value of money, alternative definitions and decision criteria. Equivalent cash flows. Cost benefit analysis, rate of return, depreciation. Moral foundations, engineering codes of ethics and case studies.

400 Structural Mechanics
Spring. 3(3-0) P:M: (CE 305) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.
Matrix methods of structural analysis. Flexibility method. Direct stiffness method for plane structures. Elastic supports, inclined supports, member releases and non-prismatic members. Application software.

405 Design of Steel Structures
Fall. 3(3-0) P:M: (CE 305) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.
Design of steel beams, columns, tension members and connections. Stability and plastic strength.

406 Design of Concrete Structures
Spring. 3(3-0) P:M: (CE 305 and CE 337) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.
Design of reinforced concrete beams, slabs, columns and footings.

418 Geotechnical Engineering
Fall, Spring. 3(3-0) P:M: (CE 312) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Shallow foundation design: bearing capacity, stress distribution, and settlement analysis. Pile foundations. Design of retaining structures, including rigid walls, braced excavations, and sheet-pile walls. Stability of slopes and embankments.

421 Engineering Hydrology
Fall. 3(2-2) P:M: (CE 321) RB: (STT 351) R: Open only to juniors or seniors or graduate students in the College of Engineering or College of Natural Science or Department of Crop and Soil Sciences.

Hydrologic design of stormwater systems. Equilibrium hydrograph analysis, unit hydrographs, infiltration, hydrograph synthesis, and reservoir routing. Groundwater: Darcy's law, flow nets, well hydraulics, design of capture wells.

422 Applied Hydraulics
Spring. 3(2-2) P:M: (CE 321 or ME 332) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering or Department of Mechanical Engineering or in the Biosystems Engineering major.

Fundamentals of open-channel flow. Rapidly and gradually varied nonuniform flow analysis. Confined flows past submerged bodies, in pipe networks, and in turbo machinery. Design applications.

431 Pavement Design and Analysis I
Fall. 3(3-0) P:M: (CE 312 and CE 337) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Highway and airfield pavement structural design. Performance measures. Failure mechanisms. Popular thickness design procedures. Design considerations for surface friction, pavement joints, and drainage.

432 Pavement Rehabilitation
Spring. 3(3-0) P:M: (CE 312 and CE 337) RB: (CE 431) R: Open only to seniors or graduate students in the Department of Civil and Environmental Engineering.

Engineering concepts and information needed to rehabilitate pavements. Network and project survey and evaluation: design of rigid and flexible overlays, other methods of rehabilitation, selection of rehabilitation alternatives. Initial and life cycle cost analysis of various rehabilitation alternatives.

444 Principles of Traffic Engineering
Fall. 3(3-0) P:M: (STT 351 and CE341) R: Open only to juniors or seniors or graduate students in the Civil Engineering major.

Driver and vehicle characteristics affecting traffic flow and safety. Speed, density, capacity relationships. Signal control in street networks. Freeway management systems. Risk management and liability.

448 Transportation Planning
Spring. 3(3-0) P:M: (CE 341 and STT 351)
Transportation planning process and procedures. Estimation of travel demand using traditional models of trip generation, trip distribution, modal split, and traffic assignment. Use of "quick-response" procedures. Traffic impact of new facilities.

449 Highway Design
Fall, Spring. 3(3-0) P:M: (CE 341) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Geometric design of highways. Operation, capacity, safety, and geometric features. Alignment, drainage and pavement design. Use of CAD systems in preparing contract plans.

462 Technical Communication
Spring. 3(3-0) RB: Junior status in a degree program in the College of Engineering.

Major modes of technical communication such as letters, memoranda, research reports, analysis/decision papers, presentations, information graphics, procedures. Communication planning, audience analysis, and information design. Case studies, exercises and writing workshops.

471 Construction Engineering - Equipment, Methods and Planning
Spring. 3(3-0) P:M: (CE 305 and CE 312) or (BCM 305 and BCM 322) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering and the Building Construction Management program.

Engineering and construction fundamentals of earthwork operations, moving of materials, concrete construction, form work, false work and other temporary structures. Relationship to a construction project's constructability, cost and schedule.

480 Water and Wastewater Analysis Laboratory
Fall. 1(0-3) P:M: (CEM 161 or CEM 185H or LBS 171L) and (CE 481 or concurrently) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Chemical and microbial analysis of water and wastewater.

481 Environmental Engineering Chemistry
Fall. 3(3-0) P:M: (CEM 151 and CEM 152) or (CEM 181H and CEM 182H) or (LBS 171 and LBS 172) and (CEM 251 or CEM 351)

Chemistry of environmental processes including alkalinity, precipitation-dissolution reactions, chemical complexation and redox reactions. Engineering applications to processing plants for water and wastewater.

483 Water and Wastewater Treatment
Fall. 3(3-0) P:M: (CE 280 and CE 321 or concurrently) R: Open only to juniors or seniors or graduate students in the Department of Civil and Environmental Engineering.

Distribution of water and collection of sewage. Theory and design of water treatment processes.

485 Solid and Hazardous Waste Management
Spring. 3(3-0) P:M: (CE 280) R: Open only to juniors or seniors or graduate students in the College of Engineering.

Design of solid waste collection and disposal systems. Definition of hazardous waste problems and selection of treatment alternatives.

487 Microbiology for Environmental Health Engineering
Spring. 3(3-0) P:M: (CHE 201) R: Open only to juniors or seniors or graduate students in the College of Engineering or graduate students in the College of Natural Science.

Use and control of microorganisms for the protection of public health and the environment. Thermodynamics of microbial populations and microbial transformations.

490 Independent Study
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering. Approval of department.

Civil engineering problem of specific interest to the student and a faculty member. May be analysis or design.

491 Civil Engineering Design Project
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to juniors or seniors in the Department of Civil and Environmental Engineering. Approval of department.

Planning, specification, and design of a civil engineering project or facility.

492 Selected Topics in Civil Engineering
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.

Selected topics related to construction engineering, environmental engineering, fluid mechanics, geotechnical engineering, hydrology, pavements, structural engineering, or transportation engineering.

495 Senior Design in Civil Engineering
Fall, Spring. 3(1-3) P:M: (CE 321 or CE 341) and (CE 280 or CE 337) and (CE3 05 and CE 312) and (CE 405 or CE 406 or CE 485 or CE 418 or CE 421 or CE 422 or CE 431 or CE 444 or CE 448 or CE 449 or CE 483)

Preliminary design. Application of design concepts in civil engineering. Integrated design solutions for situations with geotechnical, hydrological, pavement, structural, environmental and transportation considerations. Planning the design process. Design specifications. Cost. Written and oral presentations.

CLASSICAL STUDIES CLA

Department of French, Classics, and Italian College of Arts and Letters

120 Latin and Greek Roots of English Words
Spring of even years. 3(3-0)
Prefixes, suffixes, and roots of English vocabulary from Greek and Latin word elements.

140 Greek and Roman Mythology
Fall. 3(3-0)
Introduction to Greek and Roman myths, with emphasis on myth as social discourse and as an influence on ancient poets and thinkers.

160 Myth, Legend, and J.R.R. Tolkien
Spring. 3(3-0)
Myth and myth-making in Tolkien's The Lord of the Rings and his other works. Ways of reading myth and legends that served as Tolkien's sources and inspiration.