

CHEMISTRY

CHINESE

101*. *Elementary Chinese I*
Fall. 4(4-1)

Pronunciation, writing system, and basic vocabulary and sentence patterns, with emphasis on conversation.
QA: CHS 101 CHS 102

102*. *Elementary Chinese II*
Spring. 4(4-1)

P: CHS 101 or R: approval of department.
Further work on conversation, character writing, and comprehension, with increasing emphasis on vocabulary building and grammar.
QP: CHS 101 QA: CHS 102 CHS 103

201*. *Second-Year Chinese I*
Fall. 4(4-1)

P: CHS 102 or R: approval of department.
Intermediate-level work on skills in conversation, comprehension, and grammar. Practice in composition.
QP: CHS 103 QA: CHS 201 CHS 202

202*. *Second-Year Chinese II*
Spring. 4(4-1)

P: CHS 201 or R: approval of department.
Further intermediate-level work on skills in conversation, comprehension, and grammar. Continued practice in composition.
QP: CHS 201 QA: CHS 202 CHS 203

301*. *Third-Year Chinese I*
Fall. 4(4-0)
P: CHS 202.

Advanced-level work on speaking, listening comprehension, reading, and writing skills, based on materials of cultural interest.
QP: CHS 203 QA: CHS 301 CHS 302

302*. *Third-Year Chinese II*
Spring. 4(4-0)
P: CHS 301.

Advanced-level work on speaking, listening comprehension, reading, and writing skills, based on materials of cultural interest.
QP: CHS 301 CHS 321 QA: CHS 302 AND CHS 303

350*. *Studies in the Chinese language*
Fall. 3(3-0)
P: CHS 202.

Chinese phonology, morphology, and syntax.
QP: CHS 203

401*. *Advanced Chinese I*
Fall. 3(3-0)
P: CHS 302

Reading, discussion and writing on original materials, including classical texts cultural interest.
QP: CHS 303 CHS 321 QA: CHS 401 CHS 431

402*. *Advanced Chinese II*
Spring. 3(3-0)
P: CHS 401

Continuation of CHS 401. Reading, discussion and writing on advanced materials, including classical texts of broad cultural interest.
QP: CHS 303 CHS 321 QA: CHS 401 CHS 420

499*. *Senior Thesis Research*
Fall, Spring, Summer. 1 to 4 credits.
May reenroll for a maximum of 4 credits.

R: Approval of the 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.

CHS

CIVIL ENGINEERING

271. *Engineering Surveying*
Fall, Spring. 4(3-3)
P: MTH 132.

Application of surveying and error analysis to civil engineering problems. Earth work. Calculations. Layout and management of construction sites.
QP: MTH 112 QA: CE 252 CE 251

280*. *Introduction to Environmental Engineering*
Fall, Spring. 3(3-0)
P: CEM 141 or CEM 151, MTH 132, CPS 130 or CPS 131.

Elements of hydrology. Groundwater and surface water supply and contamination. Treatment systems for drinking water, wastewater, air, and solid and hazardous waste. Introduction to noise and radiation pollution.
QP: CEM 141 CEM 151 MTH 112 CPS 112 QA: CE 280

305*. *Structural Analysis*
Fall, Spring. 3(3-0)
P: MMM 211, CE 390 or concurrently. R:

Open only to College of Engineering majors.
Determinate and indeterminate plane structures. Linearity, stability, determinacy. Virtual-work calculation of forces and displacements. Flexibility and stiffness methods in plane structures.
QP: MMM 211 QA: CE 305 CE 306

312*. *Soil Mechanics*
Fall, Spring, Summer. 3(2-3)
P: MMM 211. R: Open only to Civil Engineering and Agricultural Engineering majors.

Engineering properties of soil and their measurement. Effective-stress concept. Permeability and seepage. Compaction. Consolidation, shear strength and stress-strain behavior.
QP: MMM 211 QA: CE 312

321*. *Introduction to Fluid Mechanics*
Fall, Spring. 4(3-2)
P: MMM 306 or concurrently. R: Open

only to Civil Engineering and Agricultural Engineering majors. 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.
QP: MTH 310 MMM 306 QA: CE 321

337*. *Civil Engineering Materials I*
Fall, Spring. 4(3-3)
P: MMM 211 or concurrently. R: Open

only to Civil Engineering majors.
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.
QP: MMM 211 QA: CE 308

346*. *Transportation*
Fall, Spring. 3(3-0)
P: MTH 133. R: Open only to Civil Engineering, Engineering Arts, and Urban Planning students.

Planning, design, and evaluation of transportation systems. Transportation demand, capacity, delay, and service quality. Elements of geometric design.
QP: MTH 113 QA: CE 346

370*. *Engineering Economics*
Fall, Spring. 3(3-0)
P: MTH 133. R: Open only to College of Engineering students.

Economic decision making in the context of evaluation of engineering projects. Net present worth and related methods of analysis. Depreciation. Before- and after-tax analysis. Sensitivity analysis, inflation, expected value.
QP: MTH 113 QA: CE 370

CE

373. *Construction Estimating and Scheduling*
Fall. 3(3-0)

R: Open only to College of Engineering and Building Construction Management majors.
Estimating quantities and costs for construction projects. Optimal scheduling of personnel and equipment subject to constraints and uncertainty.
QA: CE 372 CE 471

390*. *Civil Engineering Analysis*
Fall, Spring. 3(3-0)
P: CPS 130 or CPS 131, MTH 235, MMM

211 or concurrently R: Engineering majors
Application of numerical methods and computing to civil engineering problems. Problem solving methods. Report preparation. Random variables in civil engineering.
QP: CPS 112 MTH 310 MMM 211 QA: CE 390

400*. *Structural Mechanics*
Fall. 3(3-0)
P: CE 305, CE 390. R: Open only to Civil

Engineering majors.
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.
QP: CE 306 CE 390 QA: CE 400 CE 410

405*. *Design of Steel Structures*
Fall, Spring. 3(3-0)
P: CE 305. R: Open only to Civil Engineering

majors.
Design of steel beams, columns, tension members and connections. Stability and plastic strength.
QP: CE 306 CE 390 QA: CE 405

406*. *Design of Concrete Structures*
Fall, Spring. 3(3-0)
P: CE 305, CE 337. R: Open only to Civil

Engineering majors.
Design of reinforced concrete beams, slabs, columns and footings.
QP: CE 306 CE 308 CE 390 QA: CE 406

407*. *Structural System Design*
Spring. 3(3-0)
P: CE 405 or concurrently; CE 406. R:

Open only to Civil Engineering majors.
Building or bridge design using steel, concrete, wood, or other materials. Approximate methods. Wind and earthquake forces.
QP: CE 405 CE 406 QA: CE 407

418*. *Geotechnical Engineering*
Fall. 4(4-0)
P: CE 312, CE 390. R: Open only to Civil

Engineering majors.
Shallow foundation design including 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.
QP: CE 312 CE 390 QA: CE 418 CE 419

421*. *Engineering Hydrology*
Fall. 3(3-0)
P: STT 351; CE 321 or concurrently. R:

Open only to College of Engineering, College of Natural Science, and Crop and Soil Sciences majors.
Hydrologic cycle, streamflow, precipitation, evapotranspiration, infiltration, groundwater. Quantitative methods of analysis: probability, unit hydrograph, routing, and flow nets. Groundwater supply development, well flows.
QP: CE 321 STT 351 QA: CE 421