

**Students are required to take at least 5 technical electives. A minimum of 3 courses must be taken from List A and up to 2 from List B. No more than one course may be outside the Department of Civil Engineering.**

Students interested in pursuing more focused studies may choose to complete a **stream**. Specific technical elective courses are required if students wish to pursue a **Stream**.

Students wanting to pursue a more general degree may choose technical electives from a variety of research areas from the approved list of technical elective courses.

Please note:

- Technical elective course offerings vary from year to year and may have limited enrollment.
- Most technical electives courses are offered on two-year rotation.
- Check current course schedules on the Civil Engineering website and Aurora Schedule for details.
- Information regarding individual course content is posted in UM Learn in the **Civil UG Advising** course.
- Students are encouraged to discuss their program with members of the academic staff to obtain advice concerning the best choice of electives for their needs.

### List A (Select 3 to 5 courses)

Course #	Course Title	Hrs	Prerequisites	Stream(s) *
CIVL 3710	Finite Element Analysis	4	CIVL 2790, 2800, 3590	GEO/SC/TR
CIVL 4020	Masonry Design and Construction	4	CIVL 2770, 3760	SC
CIVL 4022	Properties and Design of Concrete Mixtures	4	CIVL 2770	SC/TR
CIVL 4024	Sustainable Building Design	4	p or c CIVL 3770	SC
CIVL 4028	Building Information Modeling in Construction	4	ENG 3000	SC
CIVL 4030	Advanced Structural Design	4	p or c 3770	SC
CIVL 4032	Bridge Engineering	4	CIVL 2770, 3760	SC/TR
CIVL 4040	Structural Dynamics	4	CIVL 3760	SC
CIVL 4100	Engineering Management & the Environment	4	p or c CIVL 3700	EW
CIVL 4120	Water Treatment Plant Design	4	CIVL 3690	EW
CIVL 4130	Solid Waste Management	4	p or c CIVL 3700	EW/GEO
CIVL 4180	Environmental Systems	4	CIVL 2780,3690,3750	EW
CIVL 4200	Groundwater Contamination	4	GEO 1340,CIVL 2790, p or c CIVL 3690	EW/GEO
CIVL 4230	Geotechnical Engineering	4	CIVL 3730	GEO
CIVL 4232	Geotechnical Earthquake Engineering	4	CIVL 3730	GEO
CIVL 4250	Groundwater Hydrology	4	GEO 1340, CIVL 2790, MATH 2130, 2132	EW/GEO
CIVL 4300	Design of Urban Water Systems	4	CIVL 2790, p or c CIVL 3750	EW
CIVL 4350	Hazardous Waste Treatment	4	CIVL 3690	EW
CIVL 4360	Water Resources Planning and Management	4	CIVL 2780, 3590, p or c 3750	EW
CIVL 4410	Transportation Systems	4	CIVL 3790	TR
CIVL 4420	Pavement Engineering	4	p or c CIVL 3790	TR
CIVL 4470	Watershed Processes	4	CIVL 3750, p or c CIVL 3740	EW

### List B (Up to 2 courses, only 1 from outside of Civil Engineering.)

BIOE 4560	Structural Design in Wood	4	CIVL 3770	SC
CIVL 4000	Uncertainty Analysis in Civil Eng Systems	4	CIVL 3590, MATH 2130, STAT 2220	EW/SC/TR
CIVL 4332	Civil Engineering Thesis Project	4	ENG 2010/30/40 & 120 cr hrs	EW/GEO/SC/TR
CIVL 4500	Contemporary Topics in Civil Engineering	4	Varies - topic may be eligible for List A & Stream(s). Confirm with Dept.	

#### \* Stream Abbreviations

Environmental and Water Resources Stream (EW)  
Geotechnical and Geo-environmental Stream (GEO)

Structures and Construction Stream (SC)  
Transportation Stream (TR)