Undergraduate Curriculum in Geological Engineering

(Effective for Students Entering GLE Fall 2005)

A. Mathematics Requirement (16 cr)

1) Calculus

Math 221	Calculus & Analytical Geometry	5 cr
Math 222	Calculus & Analytical Geometry	5 cr
Math 234	Calculus & Analytical Geometry	3 cr

Transfer students must have 3 equivalent math courses to meet the calculus requirement. If these courses total fewer than 9 cr, one additional math course is required. If they total fewer than 12 cr, additional Technical Elective credits (see Section E) may be taken to bring the total to 12 cr. All transfer students must have (or complete at UW-Madison) an introduction to differential equations.

2) Statistics

Stat 224	Elementary Statistical Analysis	3 cr

B. Science Requirement (47 cr)

1) Computer Science

Comp Sci 310	Problem Solving Using Computers	3 cr

2) Physics

Physics 202	General Physics	5 cr

Transfer students may satisfy the physics requirement with a 4 cr physics course having similar content as Physics 202. The additional credit can be satisfied with an additional 1 cr in Technical Electives (see Section E).

3) Chemistry

Chem 109 or 104	General Chemistry	5 cr

Students with high school chemistry should take Chem 109. Those without high school chemistry should take Chem 103 and 104. However, degree credit is only given for Chem 104 or 109. Transfer students may satisfy the Chemistry Requirement with 5 cr of chemistry courses having similar content as Chemistry 104 or 109.

4) Geology (19 cr)

Geology 202	Introduction to Geologic Structures	4 cr
Geology 203	Earth Materials	5 cr
Geology 204	Evolution of the Earth	4 cr
Geology 303	Fluids and Sedimentary Processes	3 cr
Geology 455	Structural Geology	3 cr

5) Mechanics (12 cr)

EMA 201	Statics	3 cr
EMA 202	Dynamics	3 cr
EMA 303	Mechanics of Materials	3 cr
CEE 310	Fluid Mechanics	3 cr

6) Engineering Economics (3 cr)

IE 313	Engineering Economic Analysis	3 cr

C. Required Geological Engineering (26 cr)

1) Introduction (1 cr)

GLE 171	Intro to Geological Engineering	1 cr

*NOTE: Students who elect to take INTEREGR 160 are exempt from GLE 171.

2) Photographic Systems and Remote Sensing (3 cr)

GLE 301	Intro to Aerial Photographic Systems	1 cr
GLE 302	Electro-optical & Microwave Rem Sens	1 cr
GLE 303	Intro to Rem Sens Digital Image Proc.	1 cr
or		
GLE 304	(Rem. sens. visual image interp. & GIS)	1cr

3) Geophysics (4 cr)

GLE 594	Intro to Applied Geophysics	3 cr
GLE 595	Intro to Applied Geophysics Lab	1 cr

4) Soil, Rock, Groundwater (14 cr)

GLE 330	Soil Mechanics	4 cr
GLE 474	Rock Mechanics	3 cr
GLE 475	Rock Mech. Appl to Environ. Probs.	3 cr
GLE 627	Hydrogeology	4 cr

5) Analysis and Design (4 cr)

GLE 478	Intro to Geological Engineering Design	1 cr
GLE 479	Geological Engineering Design	3 cr

D. Technical Electives (15 cr)

Students must take at least 15 credits in the Technical Electives category, with a minimum of two courses from the Geotechnics Electives category and a minimum of two courses from the Geoenvironment Electives category. Courses in the 'cross-cutting' category can be used as Geotechnics Electives or Geoenvironment Electives.

All students are required to accumulate **16 design credits** in their curriculum. Ten design credits are accumulated through the required courses in Sections B and C. Therefore, **a minimum of 6.0 design credits must be accumulated through the technical electives**.

1) Geotechnics Electives

EMA	549	Fracture Mechanics	3 cr
GLE	477	Geological Engineering Analysis	2 cr
GLE	530	Seepage, Slopes and Dams	3 cr
GLE	531	Retaining Structures	3 cr
GLE	532	Foundations	3 cr
GLE	735	Soil Dynamics	3 cr

2) Geoenvironment Electives

CEE	315	Hydrology	3 cr
CEE	320	Environmental Engineering	3 cr
CEE	427	Solid Waste Engineering	3 cr
CEE	357	An Intro to Geographic Info Systems	4 cr
CEE	555	Air Photo Interpretation for Terrain Eval.	2 cr
CEE	556	Remote Sensing Image Interpretation	3 cr
CEE	655	Computerized Land Info Systems	3 cr
Envir St	575	Analysis of Environmental Impact	3 cr
Geog	336	Our Hazardous Environment	3 cr
Geology	302	Physics & Chem. Of the Earth's Interior	3 cr
Geology	320	Geomorphology	3 cr
Geology	410	Minerals as a Public Problem	3 cr
Geology	411	Energy Resources	3 cr
Geology	420	Glacial and Pleistocene Geology	3 cr
Geology	421	Applied Surficial Geology	3 cr
Geology	456	Geologic Field Methods	2 cr
Geology	457	Conducted Field Trip	2 cr
Geology	459	Field Geology	6 cr
Geology	515	Principles of Economic Geology	4 cr
Geology	629	Contaminant Hydrogeology	3 cr
GLE	514	Coastal Engineering	3 cr
GLE	633	Waste Geotechnics	3 cr
GLE	635	Remediation Geotechnics	3 cr
Soil Sci	321	Soil & Environmental Chemistry	2 cr

3) Cross-Cutting Electives

EMA	405	Practicum in Finite Elements	3 cr
GLE	476	Field Methods in Geological Engr	3 cr
GLE	512	Groundwater Hydraulics	3 cr
GLE	514	Coastal Engineering	3 cr
GLE	596	Electrical & Electromagnetic Methods In Applied Geophysics	3 cr
GLE	597	Borehole Geophysics	3 cr
GLE	730	Engineering Properties of Soils	3 cr
GLE	731	Properties of Geosynthetics	3 cr

E. Communication Skills (7 cr)

EPD 275	Technical Presentations	2 cr
EPD 397	Technical Writing	3 cr

Students who do not test out of Part A of the UW General Education Requirement for Communications Skills must also take one of the following courses:

EPD 155	Basic Communication	2 cr
Ag Jour 100	Intro to Communication	3 cr
Com Arts 100	Intro to Speech Composition	3 cr
English 100	Freshman Composition	3 cr
English 118	ESL: English Composition	3 cr
ILS 200	Critical Thinking & Expression	3 cr

Courses used to satisfy the Part A requirement may be used to satisfy the free electives requirement (see Part H).

F. Liberal Studies (16 cr)

GLE students must take 16 credits from the College of Engineering, the Institute for Environmental Studies, or the College of Letters and Science that carry H, S, L or Z timetable breadth designators. These credits must fulfill the following sub-requirements.

(a) A minimum of two courses must be taken from the same department. At least one of these courses must be above the elementary level (i.e., must have I, A or D level designator), as indicated in the timetable.

(b) A minimum of 6 cr must be taken in courses designated as humanities (H, L or Z credit), and an additional minimum of three other credits must be taken in courses designated as social studies (S or Z). Foreign language courses count as H credits.

Note: "Retro-credits," which are credits awarded by foreign language departments for successful completion of a higher-level course, do **not** count toward this sub-requirement and do not count toward the 16 cr required in liberal studies. However, if a foreign language course is taken at the intermediate level, and retro-credits have been awarded, then sub-requirement (a) is satisfied.

(c) At least 3 cr in courses designated as ethnic studies (small case "e" in the timetable). These credits may help satisfy regulations (a) or (b) as well, but they only count once toward the total required.

G. Free electives (2 cr)

All courses in the UW-Madison timetable may be used to satisfy the free electives requirement.

H. Double Major in GLE and Geology and Geophysics

Students pursuing a double major with Geology and Geophysics (G&G) need to earn at least 2 additional G&G credits in an intermediate/advanced course (not including the required cross-listed courses GLE 475 and 627 listed under Section D). The course used for these credits must be among those approved for the G&G major (either 100, 106 or 101 taken before the 200 level core courses for the major, or most courses numbered 300 or above). A student may satisfy this requirement by selecting a G&G course as one of the technical electives listed under Section E. A student may satisfy this requirement by taking a G&G course to earn the required 2 credits of Free Electives (see Section C.8).

I. Geological Engineering Bachelor of Science Degree Typical Four-Year Plan

Freshmen Year

Fall Semester		Spring Semester	
Course	**Credits**	**Course**	**Credits**
Math 221	5	Math 222	5
Chem 109	5	Free Elective	2
Geology 202	4	Geology 204	4
		EMA 201	3
Communications Elective “A”	2	GLE 171	1
Total	**16**	**Total**	**15**

Sophomore Year

Fall Semester		Spring Semester	
Course	**Credits**	**Course**	**Credits**
Math 234	3	Physics 202	5
Comp Sci 310	3	CEE 310	3
EMA 202	3	Geology 203	5
EPD 275	2	EMA 303	3
EPD 397	3		
Liberal Electives	3		
Total	**17**	**Total**	**16**

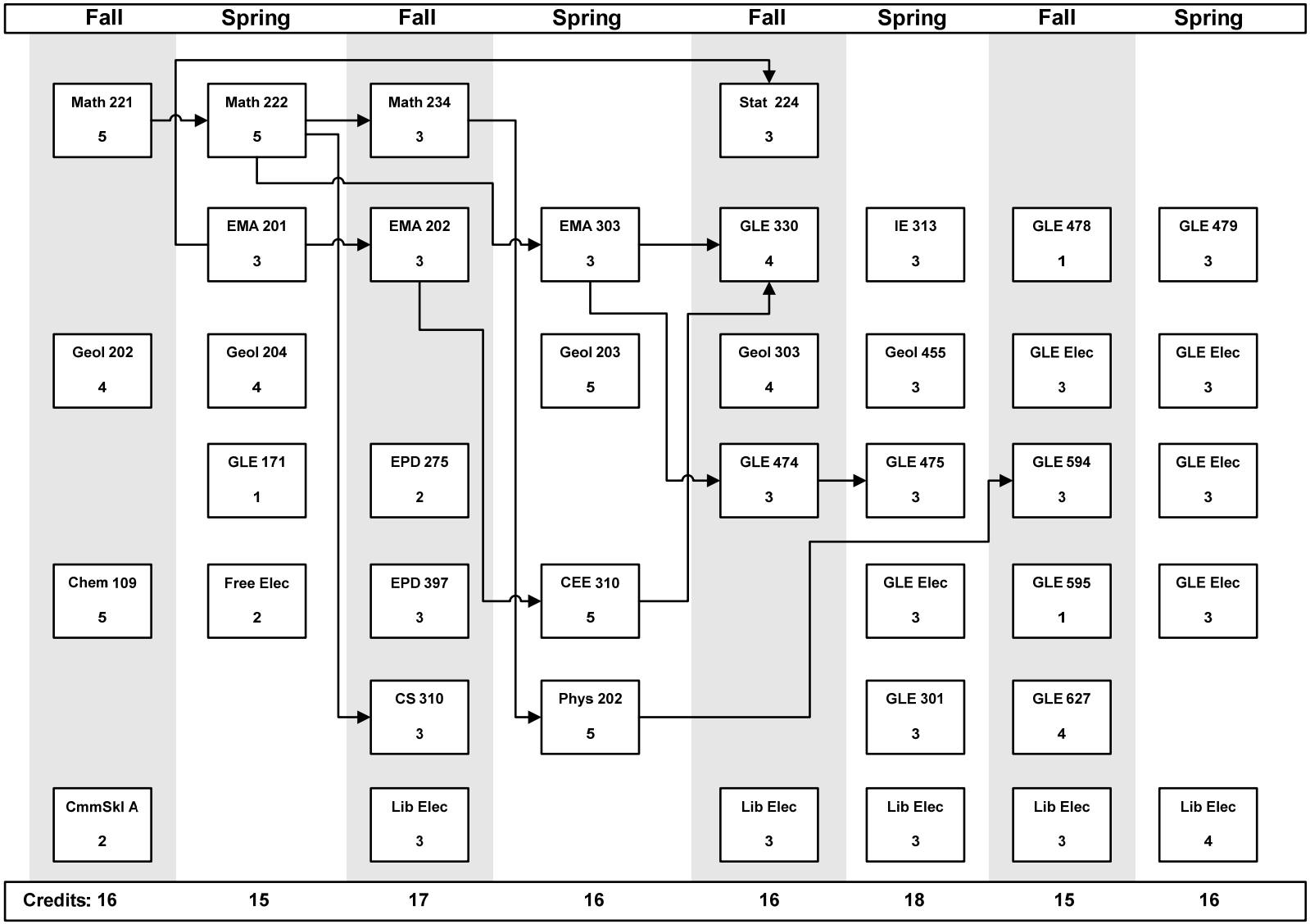
Junior Year

Fall Semester		Spring Semester	
Course	**Credits**	**Course**	**Credits**
Stat 224	3	Geology 455	3
GLE 474	3	GLE 475	3
Geology 303	3	Technical Elective	3
GLE 330	4	GLE 301, 302, and 303 or 304	3
Liberal Electives	3	Liberal Electives	3
		IE 313	3
Total	**16**	**Total**	**18**

Senior Year

Fall Semester		Spring Semester	
Course	**Credits**	**Course**	**Credits**
Geology 594	3	GLE 479	3
Geology 595	1	Technical Elective	3
GLE 627	4	Technical Elective	3
GLE 478	1	Technical Elective	3
Technical Elective	3	Liberal Electives	4
Liberal Electives	3		
Total	**15**	**Total**	**16**

J. Geological Engineering Bachelor of Science Degree Curriculum Flow Chart



Grand Total = 129