51-320 – Geomorphology

3 credits

Fall 2012

Syllabus

INSTRUCTOR: Dr. William N. Mode

OFFICE: 214 Harrington

TELEPHONE: 424-7004

OFFICE HOURS: Monday, Wednesday, and Friday, 9:10 to 10:10 a.m.; Tuesday and Thursday, 10:20 to 11:20 a.m.; or by appointment or chance

TEXTS: *Global Geomorphology*, by M. A. Summerfield
Landforms of the United States (map), by Erwin Raisz
Geomorphology Course Manual (2012 edition), by William N. Mode

ADDITIONAL MATERIALS: Go to Polk Library's E-Reserve webpage (http://eres.uwosh.edu/eres/)

CLASS ROOM: Harrington 217

LECTURE HOURS: 8:00 - 9:00 a.m., Tuesday and Thursday

LAB HOURS: 9:10 a.m. - 10:10 p.m., Tuesday and Thursday

COURSE GOALS: To be able to recognize, analyze, and describe **landforms**, **materials** of which they are composed, and **processes** by which they form. Because of the rich, holistic view of landscape that this course provides, it fulfills the goals of a liberal arts education.

FIELD TRIP: The course field trip on **Saturday, September 22 is required**. A quiz on the trip will be given in laboratory.

EXAMINATIONS: Three essay examinations will be given on the following dates:

Exam 1 - **Thursday, October 4**
Exam 2 - **Tuesday, November 8**
Exam 3 - **Thursday, December 13**

TERM PAPER: A 10- to 15-page research paper is required and is due **Thursday, November 15**. The laboratory manual contains detailed information about the paper.

GRADING: One-fifth of the grade is determined by each of the three exams. Laboratory work constitutes one-fifth, and the term paper constitutes the final one-fifth. You must pass both lecture and lab and complete in a passing term paper in order to receive a passing grade. A scale no more rigorous than the following will be used to assign grades based on average percentage scores:

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      92 - 100%   A
      90 - 91     A-
      87 - 89     B+
      83 - 86     B
      80 - 82     B-
      77 - 79     C+
      73 - 76     C
      70 - 72     C-
      67 - 69     D+
      63 - 66     D
      60 - 62     D-
less than 60      F
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SCHEDULE

Week of	Assigned Readings/Topics (in Summerfield)	Supplemental Reading
Sept. 5 (Week 1)	Introduction & Basic Concepts: Chaps. 1 & 2, E-reserves	Melhorn & Flemal, 1975; Coates & Vitek, 1980
Sept. 10 (Wk. 2)	Constructional Landforms: Chaps. 3 & 4 (tectonic) & 5 (igneous)	Ollier, 1981; Williams & McBirney, 1979
Sept. 17 (Wk. 3)	Weathering: Chap. 6, E-reserves	Ollier, 1984; Jennings, 1985; Bland and Rolls, 1998
Sept. 24 (Wk. 4)	Karst: p. 228-231, and Mass Wasting: Chap. 7 (slopes)	Carson & Kirkby, 1972
Oct. 1 (Wk. 5)	Mass Wasting: Chap. 7 **(END, UNIT 1)**; **Exam 1**, **Thurs., Oct. 4**	

Oct. 8 (Wk. 6)	Fluvial Processes: Chap. 8, E-reserves	Morisawa, 1985; Leopold, 1994; Schumm, 1977
Oct. 15 (Wk. 7)	Fluvial Landforms: Chap. 9, E-reserves	Leopold, Wolman, and Miller, 1964
Oct. 22 (Wk. 8)	Rates of Change: Chap. 15	Morisawa and Hack, 1985
Oct. 29 (Wk. 9)	Structural Control: Chap. 16 (tectonics and drainage development)	Gerrard, 1988; Keller and Pinter, 2002;
Nov. 5 (Wk. 10)	Long-term Change: Chap. 18: **(END, UNIT 2)**; **Exam 2, Thurs., Nov. 8**	Melhorn & Flemal, 1975
Nov. 12 (Wk. 11)	Climate: Chap. 14 & Eolian Geomorphology: Chap. 10, E-reserves	Bradley, 1999; Cronin, 1999; Cooke & Warren, 1973; Lancaster, 1995
Nov. 19 (Wk. 12)	Glacial Geomorphology: Chap. 11, E-reserves	Benn & Evans, 1998; Bennett and Glasser, 1996
Nov. 26 (Wk. 13)	Periglacial Geomorphology: Chap. 12	French, 1976; Washburn, 1979
Dec. 3 (Wk. 14)	Coastal Geomorphology: Chap. 13 & Sea Level: Chap. 17, E-reserves	King, 1972; Komar, 1976, 1983
Dec. 10 (Wk. 15)	Geochronology: Appendix B: & E-reserves; **(END, UNIT 3); Exam 3**, **Thursday, Dec. 13**	Wagner, 1998; Noller et al., 2000

SELECTED BASIC REFERENCES (Geomorphology)

Allen, P. A., 1997, Earth surface processes: Oxford, U.K., Blackwell Science, 404 p.

Benn, D. I., and Evans, D. J. A., 1998, Glaciers and glaciation: New York, John Wiley and Sons, 734 p.

Bennett, M. R., and Glasser, N. F., 1996, Glacial geology: New York, John Wiley and Sons, 464 p.

Bird, E. C. F., 1978, Coasts: Cambridge, Massachusetts, MIT Press, 246 p.

Birkeland, P.W., 1999, Soils and geomorphology (3rd edition): New York, Oxford University Press, 430 p.

Bland, W., and Rolls, D., 1998, Weathering: New York, Oxford University Press, 271 p.

Bloom, A.L., 1998, Geomorphology (3rd ed.): Englewood Cliffs, New Jersey, Prentice-Hall, 482 p.

Bradley, R. S., 1999, Paleoclimatology (2nd edition): San Diego, California, Academic Press, 613 p.

Bradshaw, M.J., Abbott, A.J., and Galsthorpe, A.P., 1978, The earth's changing surface: New York, John Wiley and Sons, 336 p.

Budel, J., 1982, Climatic Geomorphology: Princeton, New Jersey, Princeton University Press, 443 p.

Bull, W. B., 1991, Geomorphic responses to climatic change: Oxford, U.K., Oxford University Press, 326 p.

Butzer, K.W., 1976, Geomorphology from the earth: New York, Harper and Row, 512 p.

Carroll, D., 1970, Rock weathering: New York, Plenum, 203 p.

Carson, M.A., and Kirkby, M.J., 1972, Hillslope form and process: London, Cambridge University Press, 475 p.

Chorley, R.J. (ed.), 1969, Introduction to fluvial processes: London, Methuen, 218 p.

Chorley, R. J., Schumm, S. A., and Sugden, D. E., 1984, Geomorphology: London, Methuen, 607 p.

Coates, D. R., and Vitek, J. D. (eds.), 1980, Thresholds in gomorphology: London, Allen and Unwin, p.

Cooke, R. U., and Doornkamp, J. C., 1990, Geomorphology and environmental management (2nd ed.): Oxford, U.K., Oxford University Press, 410 p.

Cooke, R.V., and Warren, A., 1973, Geomorphology in deserts: Berkeley, California, University of California Press, 394 p.

Costa, J. E.,and Baker, V. R., 1981, Surficial geology: building with the earth: New York, John Wiley and Sons, 498 p.

Costa, J. E., Miller A. J., Potter, K. W., and Wilcock, P. R. (eds.), 1995, Natural and anthropogenic influences in fluvial geomorphology: Washington, D.C., American Geophysical Union, Geophysical Monograph 89, 239 p.

Cronin, T. M., 1999, Principles of paleoclimatology: New York, Columbia University Press, 560 p.

Cullingford, R.A., Davidson, D.A., and Lewin, J. (eds.), 1980, Timescales in geomorphology: New York, John Wiley and Sons, 360 p.

Davis, R. A., Jr., and Fitzgerald, D. M., 2004, Beaches and coasts: Malden, Massachusetts, Blackwell Science, Ltd., 419 p.

Derbyshire, E., Gregory, K. and Hails, J. 1979, Geomorphological processes: Boulder, Colorado, Westview, 312 p.

Douglas, I., 1977, Humid landforms: Cambridge, Massachusetts, MIT Press, 288 p.

Easterbrook, D.J., 1969, Principles of geomorphology: New York, McGraw-Hill, 462 p.

Embleton, C., Brunsden, D., and Jones, D.K.C. (eds.), 1978, Geomorphology, present problems and future prospects: London, Oxford University Press, 281 p.

Embleton, C., and King, C.A.M., 1975a, Glacial geomorphology: New York, John Wiley and Sons, 573 p.

Embleton, C., and King, C.A.M., 1975b, Periglacial geomorphology: New York, John Wiley and Sons, 203 p.

Embleton, C., and Thornes, J. (eds.), 1979, Process in geomorphology: New York, John Wiley and Sons, 436 p.

Fairbridge, R.W. (ed.), 1968, The encyclopedia of geomorphology: New York, Van Nostrand Rheinhold, 1295 p.

French, H.M., 1976, The periglacial environment: London, Longman, 309 p.

Garner, H.F., 1974, The origin of landscapes; a synthesis of geomorphology: London, Oxford University Press, 734 p.

Gerrard, J.H., 1988, Rocks and landforms: London, Unwin Hyman, 319 p.

Graf, W.L. (ed.), 1987, Geomorphic systems of North America: Boulder, Colorado, Geological Society of America, Centennial Special Volume 2, 643 p.

Gregory, K. J., 1977, River channel change: New York, John Wiley and Sons, 450.

Gregory, K.J., and Walling, D.E., 1973, Drainage basin form and process: New York, John Wiley and Sons, 456 p.

Hollicay, V. T. (ed), Soils and archaeology: Washington, D.C., Smithsonian Institution Press, 254 p.

Jennings, J.N., 1985, Karst geomorphology: Blackwell, Oxford, 296 p.

Keller, W.D., 1957, The principles of chemical weathering: Columbia, Missouri, Lucas Brothers, 111 p.

Keller, E. S., and Pinter, N., 2002, Active tectonics (2nd ed.), Upper Saddle River, New Jersey, Prentice-Hall, 298 p.

King, C.A.M., 1972, Beaches and coasts (2nd ed.): London, Edward Arnold, 570 p.

Komar, P.D., 1976, Beach processes and sedimentation: Englewood Cliffs, New York, Prentice-Hall, 429 p.

----------, (ed.), 1983, CRC handbook of coastal processes and erosion: Boca Raton, Florida, CRC Press, 305 p.

Lancaster, N., 1995, Geomorphology of desert dunes: London, Routledge, 290 p.

Leopold, L. B., 1994, A view of the river: Cambridge, Massachusetts, Harvard University Press, 298 p.

Leopold, L.B., Wolman, M.G., and Miller, J.P., 1964, Fluvial processes in geomorphology: San Francisco, W.H. Freeman, 522 p.

Mabbutt, J. A., 1977, Desert landforms: Cambridge, Massachusetts, MIT Press, 340 p.

Machatschek, F., 1969, Geomorphology: New York, American Elsevier, 212 p.

Martin, L., 1965, The physical geography of Wisconsin (3rd ed.): Madison, Wisconsin, University of Wisconsin Press, 608 p.

Melhorn, W. N., and Flemal, R. C., (eds.), 1975, Theories of landform development: Binghampton, New York, State University of New York, p.

Morisawa, M., 1985, Rivers: New York, Longman, 222 p.

Morisawa, M., and Hack, J. T. (eds.), 1985, Tectonic geomorphology: London, U.K., Allen and Unwin.

Noller, J. S., Sowers, J. M., and Lettis, W. R., eds., 2000, Quaternary geochronology: Washington, D.C., American Geophysical Union, AGU Reference Shelf 14, 581 p.

Ollier, C.D., 1981, Tectonics and landforms: London, Longman, 324 p.

--------, 1984, Weathering (2nd Edition): New York, Longman, 280 p.

Pitty, A. F., 1971, Introduction to geomorphology: London, Methuen, 526 p.

Rachocki, A., 1981, Alluvial fans: New York, John Wiley and Sons, 161 p.

Rice, R. J., 1988, Fundamentals of geomorphology (2nd ed.): Essex, U.K., Longman, 420 p.

Ritter, D. F., Kochel, R. C., and Miller, J. R., 1995, Process geomorphology (3rd Ed.): Dubuque, Iowa, William C. Brown, 546 p.

Ruhe, R.V., 1975, Geomorphology: Boston, Houghton Mifflin, 246 p.

Scheidegger, A.E., 1970, Theoretical geomorphology (2nd ed.): New York, Springer-Verlag, 435 p.

Schumm, S.A., 1977, The fluvial system: New York, John Wiley and Sons, 338 p.

Selby, M.J., 1985, Earth's changing surface: Oxford, Oxford University Press, 607 p.

Small, R.J., and Clarke, M.J., 1982, Slopes and weathering: London, Cambridge University Press, 112 p.

Sparks, B.W., 1986, Geomorphology (3rd ed.): London, Longman, 561 p.

Sugden, D.E., and John, B.S., 1976, Glaciers and landscape: New York, John Wiley and Sons, 376 p.

Sweeting, M.M., 1973, Karst landforms: New York, Columbia University Press, 362 p.

Thornbury, W.D., 1965, Regional geomorphology of the United States: New York, John Wiley and Sons, 609 p.

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Tricart, J., 1974, Structural geomorphology (translated by S.H. Beaver and E. Derbyshire): London, Longman.

Trudgill, S., 1985, Limestone geomorphology: New York, Longman, 196 p.

Twidale, C.R., 1976, Analysis of landforms: New York, John Wiley and Sons, 572 p.

----------, 1982, Granite landforms: Amsterdam, Netherlands, 372 p.

Wagner, G. A. 1998, Age determination of young rocks and artifacts: Berlin, German, Springer-Verlag, 466 p.

Washburn, A.L., 1979, Geocryology: London, Edward Arnold, 406 p.

Williams, H., and McBirney, A. R., 1979, Volcanology: San Francisco, Freeman and Cooper, p.

JOURNALS OF GEOMORPHOLOGY

(Volumes held in Polk Library are indicated by year)

- Annals of Glaciology (Cambridge)
- Arctic (Calgary) (1970-1974)
- Arctic and Alpine Research (Boulder) (1969-1975)
- Boreas (Oslo)
- Earth Surface Processes and Landforms (New York)
- Eiszeitalter und Gegenwart (Oehringen)
- Geografiska Annaler (Stockholm) (1968 to date)
- Geographie Physique et Quaternaire (Montreal)
- Geomorphology (Amsterdam)
- Journal of Glaciology (Cambridge) (1968 to date)
- Polarforschung (Muenster)
- Progress in Physical Geography (London)
- Radiocarbon (New Haven)
- Quaternary Research (Seattle) (1970 to 1986; 1996 to date)
- Quaternary Science Reviews (London)
- Zeitschrift fur Geomorphologie (Stuttgart) (1969-1974)

General Journals (all held in Polk Library) carrying numerous relevant papers:

- Nature (London)
- Science (Washington, D.C.)
- Journal of Geology (Chicago)
- Geological Society of America Bulletin (Boulder)
- Geology (Boulder)
- American Journal of Science (New Haven)

Specialty Abstracts and Indexes (held in Polk Library)

Geographical Abstracts - Part A Landforms and the Quaternary
(formerly Geomorphological Abstracts (1965) and Geo Abstracts - Part A (1972-1985)

Laboratory Schedule, Fall Semester, 2012

In order to successfully learn to do geomorphology in lab, you must do your own work, which includes reading the lab exercises carefully and answering questions in your own words. You will work extensively throughout the semester with topographic, geologic, and physiographic maps; if your skills with map scale, slope, and vertical exaggeration of profiles are not sharp, practice them.

Lab meets for one hour each on Tuesday and Thursday. Lab work will be introduced on Tuesday (except week #1). Exercises are due within one week of the day they are assigned; no credit is given for late assignments. The required field trip will make up for class sessions when no labs are scheduled.

Most lab assignments require you to use the *Atlas of Landforms*, one copy of which will be assigned to you and your lab partner(s). Do not remove this manual from the lab room. If you are unable to complete a lab exercise during lab time, you will need to come in another time when the room is not in use in order to use the *Atlas*. Other lab materials (stereoscopes, maps, etc.) are also restricted for use only in the lab room.

Your lab score will constitute one-fifth of your course grade. It comprises the average of 12 laboratory exercises (50%) and 2 laboratory quizzes (25% each).

WEEK NO.	LABORATORY EXERCISE
1	1. U.S. Physiography (due at end of semester), 2. Constructional Landforms due to Endogenesis, and Discussion of research papers

2 3. Chemical Weathering

3 4. Soils

4 5. Karst; references, interlibrary loan request, and first article summary for research paper **due Thursday;**

Field trip Saturday, September 22 (see articles on E-reserve)

5 6. Mass wasting; **field trip quiz Thursday**; second article summary for research paper **due Thursday**

6 7. Surficial Geology; third article summary for research paper **due Thursday**

7 7. Surficial Geology; **research paper outline due Thursday**

8 8. Fluvial Landforms and Structural Control

9 no lab

10 no lab

11 9. Arid and Eolian Landforms; **research paper due Thursday**

12 10. Glacial Landforms

13 11. Coastal Landforms

14 **Physiographic Map** (Lab #1) **due Tuesday**

15 **Lab quiz Tuesday**