

**UNIVERSITY OF UTAH
(DEPARTMENT OF GEOGRAPHY)**

TO: Wayne Blanchard

FROM: Fred May

SUBJECT: University of Utah, Center for Natural and
Technological Hazards Program

DATE: September 12, 1994

The Cnth program is oriented mainly toward hazard mitigation, with one of the two leading courses being *Principles of Natural Hazards Reduction*. In this course the students learn about sequences of events that cause impacts in disasters and how to develop mitigation strategies for these events. Besides mitigation, we also offer an emphasis in Disaster Reduction Planning, through Lorayne's class called Principles of Disaster Management.

The overall program has a planning emphasis, where students learn the basics of hazards and disaster reduction planning.

We have placed two students with FEMA, three in our agency, one with the State Dam Safety Program, and we now seem to be placing one with a county emergency management agency.

Our program is an applied program and we emphasize applied research. We have had several graduate students, mainly in the Geography Department, but also in Civil Engineering (we obtained \$23,000 in grants for this student).

The intern projects result in various kinds of useful studies, such as the intern project attached on wind velocity records in Utah.

Call me back if you have any more questions.

UNIVERSITY OF UTAH
CENTER FOR NATURAL AND
TECHNOLOGICAL HAZARDS
(C^{nth})

The University of Utah has a specialized program that offers students the potential for appealing career opportunities in emergency management. This program is offered through the Geography Department of the University of Utah, FEMA (Federal Emergency Management Agency), and the Utah Division of Comprehensive Management (CEM).

Earthquakes, Hurricanes and Floods are a few of the Natural hazards that affect the lives of many each year. By understanding and learning about the potential danger caused by these various hazards and about effective mitigation and preparation, numerous lives and structures will be preserved. This is a growing interest in the levels of local, state and federal governments as well with individuals and their concern for their own safety. With the growing interests come career opportunities at different levels of government and the private sector.

*WHO SHOULD STUDY EMERGENCY
MANAGEMENT?*

What if I'm not a Geography major? All disciplines can enjoy the opportunity to complete the program and earn a certificate, which will enhance your resume! Majors that can utilize this program are: Architecture, Biology, Business, Civil Engineering, Economics, Medicine, Geology, Geophysics, Health Education, Management, Engineers, Military Science, Nursing, Political Science, Sociology, Urban Planning and many more. Graduate research work can also be applied to a Masters or Ph.D. program.

WHAT IS THE PROGRAM?

The program offers four different certifications through the cooperative effort between Cnth, FEMA Region VIII, and the Utah Division of Comprehensive Emergency Management. Each certificate requires four courses and a two-credit-hour internship and can be obtained in 3 to 4 quarters and a 2 credit hour internship. The 5 areas of certification are:

1. Hazard Reduction Planning
2. Disaster Reduction Planning
3. Flood Plain Management
4. Personal Community Emergency Preparedness
5. Earthquake Hazards Reduction

These certifications encompass our environment and the natural hazards that it manifests. Through the courses offered you will be able to effectively mitigate and prepare for a natural disaster on a local and a individual level.

WHAT ARE THE COURSES?

The courses are designed to assist the student in learning more about natural hazards and disasters and how to plan, mitigate, prepare and respond to them. The hazards and disasters that will be discussed include: Earthquake, Hurricane, Tornado, Floods, Urban/Wildland-Interface Fires, Volcanoes, Avalanches and more.

Upon completion of the certificate the student will have a working knowledge of the various hazards/disasters and how to effectively respond to them.

For more information please contact the Geography Department or Dr. Fred May.

Utah Division of Comprehensive Emergency Management.

CLASS COURSES OFFERED:

Lorayne Frank, Director, Utah Division of Comprehensive Emergency Management.

- GEOG 191 Utah's Disaster Risk
- GEOG 192 Preparing for Utah's Natural Disasters
- GEOG 193 Responding to Utah's Natural Disasters
- GEOG 329 Hydrogeography
- GEOG 334 Modern Natural Disasters
- GEOG 530 Applied Geomorphology
- GEOG 533 Urban Natural Hazards
- GEOG 534 Principles of Natural Hazard Risk Reduction
- GEOG 593 Special Topics Courses:
 - GEOG 593 - Flood Plain Management
 - GEOG 593 - Natural Hazards For Urban Dwellers
 - GEOG 593 - Principles of Disaster Management
 - GEOG 593 - U.S. Earthquake Risk
- GEOG 594 Internship

Jeff Keaton, Ph.D., P.E., SHB Engineering, Salt Lake City, Utah.

Ralph Becker, J.D., Environmental Law Attorney, Salt Lake City, Utah.

EXAMPLES OF CAREERS IN EMERGENCY MANAGEMENT:

Federal Emergency Management Agency—ten Regions

U.S. Army Corps of Engineers—Branches of Emergency Management

U.S. Department of Energy, Energy Emergency Management Office

Office of Foreign Disaster Assistance

County and City Emergency Management Offices

State Emergency Management Agencies

ADJUNCT FACULTY

The evening program is taught by the following adjunct faculty:

Fred E. May, Ph.D., Cnth Director and Emergency Preparedness Planner with the

SYLLABUS
PRINCIPLES OF NATURAL HAZARDS REDUCTION

Instructor: Fred May, Ph.D.

Text: Materials provided in class.

Grading: Mid-Term 30%; Final Exam 35%, class presentation 35%.

March 29	Introduction to Hazards Reduction Planning; Functional Classification of Hazards; Disaster Cycle; Planning Matrix; Hazard Tree Analysis.
April 5	Flood Hazard Mitigation EENET Telecourse - Floodplain Management (Modules 1 and 2) Videos: River Channel Forms; Catchment Structures, Breaking the Cycle – Video
April 12	Flood and Debris Flows Raw footage, Rudd Canyon debris Flows 1983 Utah Flooding
April 19	Dam Failure Hazards Quail Creek Dike Failure Johnstown Flood Wildfire Hazard Wasatch Mountain Wildfire Emigration Canyon Wildfire
April 26	Earthquake Loma Prieta Earthquake MacKay, Idaho, Earthquake
May 3	Mid-Term Examination Hurricane Hazard
May 10	Hurricane Hazard Tornado Hazard
May 17	Class Presentations
May 24	Last Evening of Class Class Presentations
May 31	Memorial Day - Holiday
June 7	Final Exam

SYLLABI - SEE BELOW

HOME - U OF U STUDENTS

MODERN NATURAL DISASTERS - See Below

NATURAL HAZARDS FOR URBAN DWELLERS - *Click Here*

Course Listing for Hazards Center - *Click Here*

U of U Hazards Center on *fema.gov*

UNITED STATES EARTHQUAKE AND FLOOD RISK - See Below

RESOURCE CONSERVATION AND ENVIRONMENTAL MANAGEMENT - *Click Here*

Other Syllabi to be Posted

MODERN NATURAL DISASTERS

GEOGRAPHY 3340 R1

Course Objective: This course provides students with information on actual historic natural disasters worldwide which are analyzed in terms of their threat, impact, and mitigation. Students learn to understand the major forces of nature relative to the disasters they cause, the planning required to reduce or eliminate disaster impact, and how national and international agencies and governments respond to these events.

Application of Internet Databases: Students will also learn to use internet data-bases to analyze and manage current hazard's behavior and disaster information and to forecast disaster events. The following major sources of internet data will be applied: 1) Federal Emergency Management Agency, 2) National Weather Service, 3) U.S. Geological Survey, 4) Natural Resources Conservation Service, 5) U.S. Bureau of Reclamation, 5) United Nations, 6) International Disaster Relief Organizations, and others.

Certificate Programs: Students may take this course as a matter of interest. It is not necessary for students to attain certification, but students who wish to attain certification may follow these instructions (also review the more detailed instructions on the Geography Department Website, under Cnth - FEMA Certificate Programs). The Federal Emergency Management Agency (FEMA) allows the University of Utah, Center for Natural and Technological Hazards (Cnth), to offer FEMA certification in: 1) Hazards Reduction Planning, 2) Disaster Reduction Planning, and 3) Disaster Information Management and Forecasting. Students must take three (or four) courses within the Hazards Center and a two credit hour internship, to be discussed in class.

Instructor: Fred May, Ph.D., Geologist. Interagency Technical Team Coordinator, Utah Division of Comprehensive Emergency Management.

Text: Earthshock, by Andrew Robinson (pub. Thames and Hudson); Price approximately \$20.00. This is an excellent publication on international disaster events and their causes. Available in U of U Bookstore. Some separate reading assignments will be made, asking students to read disaster field publications of the National Research Council.

Room: Orson Spencer Hall, Room 102.

Meeting Time: Thursday evenings from 6:30 until 9:30.

Credits: 3 semester units.

Grading:

25% Mid-Term Exam

35% Final Exam

10% Media Scrapbook on Current Disasters

20% Term Paper

10% Home Work

Media Scrapbook: Students are required to maintain, during the semester, a scrapbook of newspaper and magazine clippings of current disaster events around the world. The purpose is to teach students to be aware of the frequency of disaster events in the world and their effects on peoples and governments.

Term Paper: A term paper will be prepared by each student describing a country (not the United States) and its disaster geography, demographics, and history. This paper should be at least six pages, single-spaced, containing maps of the country, illustrations, and a bibliography.

TEACHING SCHEDULE

Thursday Evenings—6:30 - 9:30 p.m.

1) Aug 24	Course overview - Principles of Hazards and Disaster Management - Global Hazards Overview - Nature's Fury.
2) Aug 31	Living with Disaster - National Disaster Resistance - U.S. Disaster Assistance to International Community. The Federal Emergency Management Agency (FEMA). Disaster Information Management and Forecasting - Global Disaster Information Network.
3) Sept. 7	Myths and Realities of Disaster - Myths, Illusions, and Realities. Computer Lab Internet Exercise: Relief Web - United Nations Website for disaster relief.
4) Sept. 14	Hurricanes - Hurricanes Hugo, Iniki, and Agnes. Computer Lab Internet Exercise: Websites for National Hurricane Center and Joint Typhoon Warning Center.

5) Sept. 21	Tornadoes - Mid-West Tornadoes 1999, Oklahoma and Kansas - Xenia, Ohio. Computer Lab Internet Exercise: National Weather Service - IWIN (Integrated Weather Information Network) for U.S. real-time weather, weather advisories, watches, and warnings.
6) Sept. 28	MID-TERM EXAM Dams and Dam Failures - Johnstown Flood Dam Failure Disasters - Teton Dam Failure Computer Lab Internet Exercise: U.S. Bureau of Reclamation dam monitoring.
Oct. 5	SEMESTER BREAK
7) Oct. 12	Flood - Rapid City, South Dakota Computer Lab Internet Exercise: U.S. Geological Survey and National Weather Service websites for real-time river monitoring.
8) Oct. 19	Volcano - Krakatau, Indonesia Volcano Disaster - Mt. St. Helens
9) Oct. 26	Earthquake I - San Francisco 1906 Earthquake Earthquake II - New Madrid, Missouri, 1811-12 Earthquakes Computer Lab Internet Exercise: Various earthquake monitoring websites.
10) Nov. 2	Earthquake III - Kobe and Tokyo, Japan Earthquakes.
11) Nov. 9	Disaster Preparedness - The First 72-Hours Computer Lab Internet Exercise: Federal Emergency Management Agency (FEMA); various State Emergency Management agencies.
12) Nov. 16	Course Review
13) Nov. 23	THANKSGIVING HOLIDAY
14) Nov. 30	Student Reports
15) Dec. 7	Student Reports - Final Evening of Class
16) Dec. 14	FINAL EXAM

SYLLABUS

U.S. AND UTAH EARTHQUAKE RISK

GEOGRAPHY 393 R1 AND 593 R1

INSTRUCTOR: Dr. Fred May

TEXT: U.S. and Utah Earthquake Risk, by Dr. Fred May, available from Alpha Graphics (professor publishing) 273 S. 1300 E. The First 72 Hours. By Fred May.

GRADING:

30% mid-term

40% final

30% term project

INDIVIDUAL PROJECT: Each student will select a state and prepare a report on that state's earthquake history and prognosis for the future. The report should not be less than six pages in length, plus include an earthquake map of the state. Each student will also make a brief class presentation on that subject.

LECTURES: Thursday evenings from 6:30 to 9:30.

1) 1/13	Introduction to earthquake risk principles The continuity sequence; loss estimation. Disaster Information Management and Forecasting - Global Disaster Information Network.
2) 1/20	Buildings and Earthquake Risk
3) 1/27	Building and Earthquake Risk - New England States - Computer Lab Internet Exercise
4) 2/3	Earthquake Preparedness: The First 72-Hours - Eastern and Southern States
5) 2/10	Myths, Illusions and Realities of earthquakes - Southern States - Computer Lab Internet Exercise
6) 2/17	Hazard and risk assessment principles - Central States – MID-TERM EXAM

7) 2/24	How Big of an Earthquake Can You Get? Mountain States - Computer Lab Internet Exercise
8) 3/2	When Earthquake Hits Home - Western States
9) 3/9	Before, During and After an Earthquake - Alaska and Hawaii
10) 3/16	SEMESTER BREAK
11) 3/23	Floodplains and Floods
12) 3/30	Monitoring National Flood Potential - Computer Lab Internet Exercise
13) 4/6	Flooding - Eastern U.S. - Computer Lab Internet Exercise
14) 4/13	Flooding - Central U.S. - Computer Lab Internet Exercise
15) 4/20	Flooding - Western U.S. - Computer Lab Internet Exercise
16) 4/27	Last Night of Class Class Presentations
17) 5/4	FINAL EXAM

SYLLABUS

NATURAL HAZARDS FOR URBAN DWELLERS

CREATING COMMUNITY DISASTER RESISTANCE

GEOGRAPHY 5963 R3 (three credit hours)

15 May to 22 June, 2000

Tuesday and Thursday, 6:30 - 9:30 p.m.

INSTRUCTOR: Fred May, Ph.D., Geologist - State Hazard Mitigation Planner, Utah Division of Comprehensive Emergency Management.

TEXT: Materials Provided; Utah Natural Hazards Handbook; State Hazard Mitigation Plans; Community Disaster-Resistance Materials.

ROOM: OSH 133

GRADING:

30% Mid-Term Exam

40% Final Exam

15% Scrapbook of Utah hazard newspaper articles

15% Homework

OVERVIEW:

You can become a critical player in assisting your community to become disaster resistant. As the costs of disaster nationwide continue to increase, the only apparent answer for community public safety from natural hazards is pre-disaster hazard mitigation - the elimination or reduction of risk for natural hazards before disaster strikes. This course teaches students to understand the basics of natural hazards that may affect them and their community and to take steps to reduce the risk. How can you help create a disaster-resistant community.

This course will teach you:

Date	Topics
May 16	<p>Introduction: Overview of Utah hazards and associated human consequences. Application of disaster resistance principles to living safely in Utah. Participating in the process of creating a disaster resistant community.</p> <p>Facing Hazards on Valley Floors/Floodplains: Introduction to floodplains, floodplain management, and residential living. Flood mitigation. Utah flood years of 1983-1986. Review flood disaster templates. Dam failures.</p>

May 18	Facing Hazards on Mountain Fronts: Urban Wildfire Interface Communities and wildfire threat and risk. Review of State Wildfire Plan and Wasatch Mountain Wildfire. Wildfire and flash flood threat and mitigation. Review wildfire disaster templates. Slope, Stability, landslides. Earthquake induced landslides.
May 23	Facing Hazards in Canyon Mouths: Flash floods and debris flows. Review of the East Layton and Rudd Canyon Debris Flows. Review Centerville Debris Flow Hazard Mitigation Plan. Debris flow mitigation.
May 25	Facing Hazards on Foothills: Earthquake hazard in Utah. Review of county hazard maps and Utah Strategic Earthquake Plan. Earthquake mitigation.
May 30	1) Creating a Disaster-Resistant Community: The national disaster expense. Creating a disaster-resistant nation, states, and communities. Congress and disaster resistance. The value of top-level governmental support.
June 1	Mid-Term Exam 2) Creating a Disaster-Resistant Community: Being a community asset in disaster resistance. Creating a Disaster-Resistant Community. Designing a community and placing its hazards. Evaluating a community hazards.
June 6	3) Creating a Disaster-Resistant Community: Conducting a card-storming exercise. Categories of disaster resistance. Evaluating what is needed.
June 8	4) Creating a Disaster-Resistant Community: Creating a community vision for disaster resistance. Identifying key-players. Creating committees. Designing disaster resistance projects.
June 13	5) Creating a Disaster-Resistant Community: Creating public- and private-sector partnerships for community disaster resistance. Identifying and obtaining needed resources.
June 15	6) Creating a Disaster-Resistant Community: Conducting a Community Signing Ceremony for a disaster-resistant community. The value of formalizing disaster resistance.
June 20	7) Creating a Disaster-Resistant Community: Environmental considerations in creating a disaster-resistant community. Implementing disaster resistance projects. Creating a sustaining effort in disaster resistance.
June 22	Final Exam

Land Use Planning (5220/6220)
Fall Semester 1999-2000
9:10:-10:30 a.m. M.W.
Instructor: Dr. Chung-Myun Lee

Office: Room 270 F OSH
Phone: 581-7680 Or 8218

**Textbook: *Land Resource Economics-
Economics of Real Estate***

1st Week (August 22-28)

Introduction

1. Class outline and frame of reference
2. Introduction to the subject

Lecture: Definition and characteristics of land use Planning

1. Necessity of land use planning
2. Rural and Urban land use
3. Role of land use planning

Reading: Material will be suggested

2nd Week (August 29-September 4)

Lecture: Historical characters of land use planning

1. Before the industrial society
2. Land use in the industrial society

Reading: Material will be suggested

Lecture: The recent trend of land use planning

1. Power of the local government participation from the private sector
2. The awareness of environmental problems
3. The influential power from the interesting groups
4. Concerning of conservation
5. Use of information system

Reading: Material will be suggested

3rd Week (September 5-11)

Lecture: Theories of Land use

1. Urban ecological approach
2. Land economic approach
3. Social, structural approach
4. Behavioral approach

Reading: Material will be suggested

4th Week (September 12-18)

Lecture: Public intervention toward land use

1. Change of the concept of land ownership
2. The contents of public intervention toward land

Reading: Text 32, 376-377, 380, 394-433, 515

Lecture: Public intervention for spatial harmonization

1. Problems of Spatial disharmony
2. Intervention toward spatial disharmony
3. The case of spatial disharmony

Reading: Material will be distributed

5th Week (September 19-25)

Lecture: Concept of land and its use

1. Concept of land
2. The European view toward land
3. The view of Easterner
4. Separation of the use power and development power
5. Legal foundation of land use control

Reading: Text 538-541, 519-527, also material will be distributed

6th Week (September 26-October 2)

Lecture: Land use in the United States

1. The view of American people toward land
2. Market economy and local government
3. Control of private land use-zoning ordinance
4. Diversity of zoning system

Reading: Text pp. 509-546, 527-538

Lecture: Land use planning in Socialism countries

1. Land nationalization and land use
2. Anti-market, symbolic planning

Reading: Material will be suggested

7th Week (October 3-9)

Lecture: Reality of land use planning

The process of land use planning

1. What is planning theory
2. Nature and principle of land use planning
3. Location factor affecting land use

The steps of Land use planning process

1. Setting up the target
2. Present survey and analysis
3. Forecast of demanding by land use
4. Allocation of land by land use
5. Appreciation of an alternative plan

Reading: Material will be distributed

8th Week (October 10-16)

Lecture: Practice of land use planning

1. Trail design
2. Airport planning (refer to Kansai airport)

Reading: Material will be distributed

9th Week (October 17-23)

Lecture: National park

1. Citizen's component property
2. Park management and its problems
3. Yellowstone and Teton National park
4. Arches National Park

Reading: Material will be suggested

10th Week (October 24-30)

Lecture: The example of land use planning

1. Urban land use
 - 1) The case of existing urban
 - 2) The case of the new town
 - 3) Technopolis
2. The example of the housing development (housing project)
 - 1) Land use for residential housing

11th Week (October 31-November 6)

Lecture: Land use planning in major countries

1. United Kingdom
2. France
3. Germany
4. Japan

Reading: Material will be suggested

12th Week (November 7-13)

Lecture: Examination of airport planning (site selection)

1. Kansai International airport-Osaka
2. Narita International airport
3. Salt Lake International airport

Reading: Material will be distributed

13th Week (November 14-20)

Lecture: Natural hazard and Environmental pollution

1. Geological hazard
2. Earthquake

Environmental threaten to man

1. Air pollution in land use planning
2. Water pollution in land use planning

Reading: Text pp. 44-50, 182-184, 260-261, 544-546

14th Week (November 21-27)

Lecture: Water rights

1. Riparian doctrine
2. Appropriation

Reading: Text: pp. 344-346, 346-349, 352-356.

15th Week (November 28-December 4)

Lecture: Institutions of land use control and guidance

- Salt Lake City
- Salt Lake County

Reading: Material will be suggested

16th Week (December 5-11)

Slide show: Student and instructor

1. Student paper and guest lecture

Lecture: Future aspects of land use planning

1. Structural change of land use
2. Land use planning under the environmental management
3. The information society and land use
4. The future of planning profession
5. Final examination will be discussed

Final examination: December 8 (Wed) 10:10- 12:00 a.m.

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** Journal of the American Institute of Planners

** Town Planning Review

GEOGRAPHY 3310
INTRODUCTION TO NATURAL HAZARDS OF UTAH
Spring, 2000

SYLLABUS

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Office Hours:	3:00 - 4:00 M, W		

INTRODUCTION

This course provides an introduction to Utah's natural hazards by studying landforms and the processes that shape them. Emphasis will be on identifying stable and unstable landscapes, recognition and assessment of natural hazards, and ways to reduce risk. Through class lectures, readings, field trips, and projects, students will learn about hazards associated with landslides and debris flows, earthquakes and faults, floods, avalanches, rockfalls, problem soils, and shallow ground water. At the end of this course the student should be able to recognize and understand physical processes, and be familiar with the procedures for conducting investigations, quantifying hazards, and implementing mitigative measures.

COURSE OBJECTIVES

The objective of this course is to introduce the ways in which Earth scientists gain knowledge and understanding of natural hazards. Specifically, we will: 1) study the fundamental principles governing natural processes; 2) see how investigations are designed to collect data on hazards; 3) examine methods for quantifying the magnitude and probability of occurrence of hazards; and 4) explore measures for reducing the risk from natural hazards. By following these steps through various natural processes, the student will become familiar with the scientific process of assessing hazards.

Fundamental Principles - We will begin by studying the physical principles governing geologic processes at the Earth's surface. We will also examine new ideas that enhance our basic understanding of the processes and see how our understanding of these processes has changed through time. This will provide the student with the conceptual and technical foundation on naturally occurring processes that have the potential to be hazards.

Methods of Investigation - We examine the methods by which hazards are recognized and investigated. We will use maps, publications, and reports of previous investigations to see how the location of each hazard is delineated. We will discuss changes in methodology and new techniques that yield more precise and accurate determination of hazards.

Quantitative Analysis - We will examine a variety of methods for quantitatively assessing the magnitude of hazards; for example earthquake magnitude, or flood peak discharge. We will also become familiar with the assumptions, data inputs, and results for various predictive models such as rainfall - runoff models and rockfall behavior models. These models illustrate the process of building a conceptual framework based on observation and physical processes, collecting and analyzing data, and developing results that can be used to guide mitigation. Once the magnitude of the hazard has been quantified, the probability of occurrence can be determined. We will see how this is accomplished through probabilistic and deterministic methods.

Hazard Mitigation - For each natural hazard, we will discuss specific methods of mitigation. These methods vary widely, depending on the hazard, but are all intended to reduce the risk associated with the hazard. Hence, mitigation provides a solution to the hazard. We will use examples from the Wasatch Front to see how mitigative measures have (and have not) been implemented, and how these measures have changed as our understanding of the physical processes themselves has changed through new and improved methods of investigation and quantitative analysis.

SCHEDULE

The class meets from 6:00 to 9:00 p.m. on Wednesdays. We will use this time for lectures and for working on the projects.

Two field trips are scheduled and are required for the class. These will be on Saturday, April 1, and Saturday, April 8, 2000. They will be full-day trips (8:00 to 5:00). We will use the field trips to observe active natural hazards along the Wasatch Front, and to do the mapping and data collection portions of the projects.

REQUIRED READING

Coch, N. K., 1995, Geohazards - Natural and Human: Prentice Hall, New Jersey, 481 p.

Additional required reading material will be handed out in class and placed on reserve in the library.

GRADING

Projects:

There will be two term projects, each consisting of a map and report. The purpose of these projects is to gain hands-on experience in identifying natural hazards. In the first project we will prepare a detailed map and report of recent landslide activity in Provo Canyon. This report will identify types of landslides, causes of movement, and possible mitigation measures. The second report will be to identify all natural hazards that exist at the site of a proposed subdivision at the base of the Wasatch Mountains. The report will discuss the location, magnitude and frequency, methods of assessing risk, and possible mitigation measures to reduce the risk. We will spend time in the field completing the mapping portions of the projects, and in class on the analysis and report preparation. I will give you more information on the projects as we start them. Each of the projects (maps and report) will be worth 35% of the final grade.

Exams:

There will be one mid-term exam and one final exam; each will be worth 15% of the final grade.

KEYDATES

March 8, 2000	Mid-Term Exam
April 1, 2000	First Field Trip - Provo Canyon
April 8, 2000	Second Field Trip - Salt Lake Valley/Wasatch Fault Zone
April 19, 2000	First Project Report Due
April 26, 2000	Second Project Report Due
May 3, 2000	Final Exam: 6:10 - 8:10 p.m., OSH 174

COURSE SCHEDULE

Date	Readings	Topics
1/12	Chapters 1, 2, 3	Introduction - Approaches to Assessing Hazards and Risk, Geologic Principles, Earth's Interior, Earth's Surface, Geologic History of Utah
1/19	Chapter 9, Cruden & Varnes	Landslides - Recognition, Classification, Types of Movement
1/26		Landslides - Methods of Investigation, Analysis of Stability (Qualitative and Factor of Safety Calculations)
2/2		Landslides - Risk Assessment and Mitigation Debris Flows - Processes, Hazard Evaluation, Risk Assessment, and Mitigation
2/9		Rockfalls - Processes, Methods of Evaluation, Predictive Models, Mitigation
2/16	Chapter 5	Earthquakes and Faults - Processes, Magnitude and Intensity, Faults in Utah, Methods of Investigation
2/23		Hazards Associated with Earthquakes - Ground Shaking: Deterministic and Probabilistic Risk Assessment Methods, Damage Potential, Mitigation Surface Ground Rupture: Location, Hazard Assessment, Mitigation
3/1		Hazards Associated with Earthquakes - Liquefaction: Processes and Location, Ground Failure, Risk Assessment, and Mitigation Earthquake Induced Landslides: Risk Assessment Tectonic Subsidence: Magnitude, Location Earthquake Forecasting
3/8		Midterm Exam
3/22	Chapter 7	Floods - Types and Sources of Floods, Rainfall - Runoff Models
3/29		Preparation for First Field Trip - Review Landslide Identification and Mapping, History of Landslides in Provo Canyon, Discuss Report Outline and Format
4/1		First Field Trip - Provo Canyon
4/5		Hazards Mapping - Objectives of Mapping, Review of Existing Hazard Maps, Development of Hazard Map Units, Preparation for Second Field Trip - Discuss Report Outline and Format
4/8		Second Field Trip - Salt Lake Valley/Wasatch Fault Zone
4/12		In-Class Work on Projects - Review Mapping and Description, Writing Style
4/19		Floods - Flood Hydrographs, Flood Frequency, Paleoflood Analysis, Snowmelt Floods, Dambreak Floods, Mitigation
4/26	Chapter 8, 10	Problem Soils - Mechanics, Location, and Mitigation of Expansive Soils, Collapsible Soils, Gypsiferous Soil and Rock, Limestone and Karst Terrain, Piping, Dunes, and Peat Shallow Groundwater - Location and Mitigation
5/3		Final Exam - Wednesday 5/3/00, 6:10 - 8:10 p.m., OSH 174

Miscellaneous Information

Important Dates

January 16, 2000	Last day to drop (delete) courses.
January 17, 2000	Human Rights Day Holiday.
January 21, 2000	Last day to withdraw with no tuition penalty (a W will appear on transcript).
February 21, 2000	Presidents Day Holiday
February 22, 2000	Substitute Day (THE UNIVERSITY WILL FOLLOW ITS MONDAY CLASS SCHEDULE IN PLACE OF ITS TUESDAY SCHEDULE).
March 2, 2000	Second session begins.
March 3, 2000	Last day to withdraw from Semester classes.
March 13-17, 2000	SPRING BREAK
April 2, 2000	Daylight savings time begins.
April 27, 2000	Classes end.
May 1-4,2000	Final Exam Week
May 16, 2000	Grades available to students.

Persons with disabilities requiring special accommodations to meet the expectations of this course are encouraged to bring this to the attention of the Instructor as soon as possible. Written documentation of the disability should be submitted during the first week of the semester along with the request for special accommodations. To do so, contact the Center for Disabled Student Services, located in room 162, Union Building, 581-5020.