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COURSE DESCRIPTION: NS 481/581 is an intensive field-based course designed to train undergraduate science majors, undergraduate education majors, and continuing M.Ed. students in tools and techniques employed in Natural Science research and education via collaborative, integrated field modules. The course for summer 2001 will cover aspects of geology (geomorphology), vegetation analysis & climate, environmental chemistry, and biology (botany / field ecology) through utilization of the Willamette watershed. In addition, mandatory fieldtrips may be scheduled after the course begins. Notes: 1) Graduate students are strongly encouraged to enroll in GS 515M, a course designed for students to apply content to curriculum design - it is being offered August 6th through August 10th; 2) the first day of class is June 25th.

REQUIRED TEXTBOOKS AND MATERIALS: Safety goggles, chem cards. Students are expected to dress appropriately! We will be conducting fieldwork and/or laboratory work on a daily basis.

REQUIRED FIELDTRIPS: As this is a field-based course, you should be prepared to conduct fieldwork every class period. You are expected to bring water everyday. You should plan on bringing a lunch (and possibly snacks). In addition, sunscreen, hats, long-sleeve shirts and pants (no shorts – POISON OAK!) are strongly recommended.

COURSE OBJECTIVES: Students who successfully complete NS 481/581 will have a basic understanding of several modern tools and techniques used by Natural Scientists, including Geographic Information Systems (GIS), global positioning systems (GPS), and digital photography. Furthermore, students will demonstrate this understanding through the completion of an independent project.

INSTRUCTIONAL FORMAT: NS 481/581 will consist of four 24-hour weeks of intensive field and laboratory-based scientific research, apportioned equally among the following four content areas: Geomorphology, Paleoclimatology, Botany / Field Ecology, and Environmental Chemistry. The content core will be followed by two weeks of independent work which will result in an independent project or report that applies Summer Institute course content to curriculum designed for the science classroom (see below).

COURSE OUTLINE:

- GEOMORPHOLOGY** [25 June to 28 June]- (1) overview of geomorphic principles, (2) morphometric analysis of basic watershed parameters (e.g. drainage area, stream density, stream gradients, hillslope gradients), (3) geomorphic mapping of fluvial and hillslope landforms (e.g. floodplain, channel, landslide deposits), (4) basic watershed hydrology (stream discharge, stage, precipitation levels), and (5) data synthesis using Geographic Information Systems.
- BOTANY/FIELD ECOLOGY** [2 July to 3 July AND 5 July to 6 July]: (1) introduction to basic ecological and botanical survey principles and techniques; (2) examination and sampling of Willamette riverine floras using existing and new plant specimen collections, literature, and internet sources; (3) mapping of both habitats along with species encountered in these areas; and (4) data synthesis and analysis using Geographic Information Systems (GIS)
- VEGETATION ANALYSIS & CLIMATE** [9 July to 12 July]: (1) the geological, physiographic, and biological development of Oregon and the Northwest (2) Earth processes that influence the distribution and relationships of plants and animals (3) the use of functional morphological adaptations of plants to quantitatively evaluate climatic and environmental data from the fossil record (4) field excursions to significant local geological and paleontological localities
- ENVIRONMENTAL CHEMISTRY** [16 July to 19 July]: (1) examination of the water pollution chemistry of the lower Willamette River (2) effects on water quality due to the large amounts of herbicides applied to agricultural areas within the Willamette watershed (3) investigations and explanations of the contamination of drinking water.
- INDEPENDENT PROJECT** [23 July to 1 August]: Students will work independently (see below) on a project or a report that applies Summer Institute course content to curriculum designed for the science classroom. All materials are due on **Wednesday, 1 August, 2001 (no later than 5 PM).**

COURSE REQUIREMENTS & GRADING POLICY:

GRADES FOR THE COURSE ARE BASED ON THE FOLLOWING:

TAYLOR = 20%, DUTTON = 20%, MYERS = 20%, POSTON = 20%, INDEPENDENT PROJECT = 20%

UNDERGRADUATES:

FIELD NOTEBOOK/EXERCISES: You will be expected to maintain a field notebook and/or complete exercises as they are assigned.

INDEPENDENT PROJECT OPTIONS – UNDERGRADUATE STUDENTS WILL CHOOSE ONE OF THE FOLLOWING OPTIONS:

1. An integrated report inclusive of three of the four content areas (a detailed outline and focus questions will be provided). A minimum of five (5) “professional journal” type publications must be referenced. In addition, web references may be included, but you must indicate the full URL along with the date you accessed the site. Web references are in addition the minimum five journal references (a sample bibliography will be provided).
2. Sample curricula based, in part, on the four content areas covered during the first four weeks of the course. The curricula must include two-weeks worth of 1 hour lesson plans (i.e., 10, 1 hour plans). Additional instructions will be provided.
3. Alternative project plans will be accepted upon approval of the course instructors.

Additional instructions for this assignment will be distributed during the “content” portion of this course (25 June to 20 July, 2001).

The projects/reports are due during the 6th week (1 August, 2001 – NO LATER THAN 5PM).

EXAMS: Each instructor will provide further details regarding grading of his module.

GRADUATES:

FIELD NOTEBOOK/EXERCISES: You will be expected to maintain a field notebook and/or complete exercises as they are assigned.

INDEPENDENT PROJECTS – GRADUATE STUDENTS WILL CHOOSE ONE OF THE FOLLOWING OPTIONS:

1. Write an article for publication to a science education journal (e.g., *The Science Teacher* or *Science Scope* or *Science and Children*) about your experiences doing field work and how it affected you as a teacher. Furthermore, you MUST include four (4) activities based on each of the four content areas.
2. Write a grant proposal for equipment you will need to do Natural Science field work at your school. You must present a Request for Proposal (RFP) or an equivalent from a funding source PRIOR to embarking on this option.
3. Sample curricula based, in part, on the four content areas covered during the first four weeks of the course. The curricula must include two-weeks worth of 1 hour lesson plans (i.e., 10, 1 hour plans). Your curricula must be site-specific (I.e., you MUST select a location or locations) and MUST be accompanied by at least one map along with a detailed description of the site(s).
4. Alternative project plans will be accepted upon approval of the course instructors.

Additional instructions for this assignment will be distributed during the “content” portion of this course (25 June to 20 July, 2001).

The projects/curricula are due during the 6th week (1 August, 2001 – NO LATER THAN 5PM).

EXAMS: Each instructor will provide further details regarding grading of his module.

Final grades will be calculated on a percentage basis from total possible points as follows:

A=90%, B=80-89%, C=70-79%, D=60-69%, F=<60%

Policy on Cheating:

During a quiz or exam any written or spoken interaction with other students will be regarded as cheating. The use of crib notes (i.e., pre-prepared notes) and looking at other student’s test papers will be regarded as cheating.

When preparing papers for submission to an instructor some paraphrasing may be appropriate. However, when a book or article is quoted at any length, quotation marks must be included. Also, the work of another student may not be copied or paraphrased as your own – any such action will be regarded as cheating.

The penalty for cheating will be a zero grade for the test or quiz or assignment in question.

Disclaimer: This course syllabus is tentative and subject to change.