



**Department Catalog
and Guide to
Academic Programs**

CLASS OF 2010



**Department of Geography and
Environmental Engineering**

United States Military Academy



*Department of Geography and
Environmental Engineering*



**SERVING
CADETS,
USMA,
AND OUR
NATION**



DEPARTMENT CATALOG AND GUIDE TO ACADEMIC PROGRAMS

FOR THE CLASS OF 2010

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TABLE OF CONTENTS

Message to Cadets	i
Geography and Environmental Engineering after Graduation	1
Geography and Environmental Engineering at West Point	3
Programs for Class of 2010	6
Program Descriptions	7
Faculty Counselors.....	9
Program Details.....	13
Course Offerings and Descriptions.....	28
Department Faculty	46
List of Majors.....	74
Hometown Distribution, USMA Class of 2010.....	Inside Back Cover

Department Web Site External to USMA:

<http://www.dean.usma.edu/geo/gene.htm>

Department Web Site Internal to USMA:

<http://www-internal.dean.usma.edu/departments/geo/gene.htm>



MESSAGE TO CADETS

The mission of the Department of Geography and Environmental Engineering is to enhance the intellectual, military and ethical development of all cadets by providing an understanding of the Earth, its people, and the interactions between the two. We offer studies in geography, environmental engineering, environmental science, and geospatial science, disciplines that have unquestionable relevance for our Army and Nation.

The Department's overarching theme is to better understand the world in which we live. We offer a diverse group of majors and honors programs, which prepare cadets for service in the Army and encourage a lifetime of intellectual growth. These include:

1. **Human Geography:** the spatial study of people, their activities, and the places they inhabit.
2. **Environmental Geography:** the study of the interactions between people and the natural environment.
3. **Environmental Science:** an integrative study of processes that shape the environment and how human activity affects and is affected by these processes.
4. **Environmental Engineering:** the study of engineered processes to solve environmental problems to protect human health and preserve the fragile environment in which we live.
5. **Geospatial Information Science:** the integration and analysis of satellite, GPS, and map intelligence information.

Our majors and honors programs will prepare cadets for lifelong professions that are personally rewarding and important to our Nation. Despite the continual changes in our Army and throughout the world, there are several constants that continue to serve as guideposts for our profession.

- ★ Understanding weather and terrain will always be among the keys to victory in battle.
- ★ Understanding other people is necessary to preserve peace.
- ★ Understanding our Earth is critical for our future health and well-being.

These imperatives describe what we in the Department of Geography and Environmental Engineering offer to you, first in our core course in physical geography and continuing with our exciting majors, honors programs, and environmental engineering sequence. In some respects, our mission is the same as every academic department at West Point, to prepare cadets for a career in the Army and a lifetime of service to the Nation. Each academic course has the objective of developing you as a self-learner, problem solver, and critical thinker; all of which are attributes critical for success as a leader in the Army. In choosing a major, you select a subject to investigate in depth. Both the knowledge gained and the learning skills developed in this process better prepare you to contribute to the Army and the Nation. Your task in selecting a major is to find the subject that excites you and inspires a vision for your future. We have much to offer—Let me tell you more!

Geography programs are alive and well in more than 275 universities across the country. Geography is an exciting discipline with great variety and tremendous relevance for future Army officers. Our program at West Point teaches cadets about the Earth as the home of humanity. We offer studies focused on the diverse peoples of the Earth. Our **Human Geography** major examines the spatial differentiation and organization of people, their activities, and lifestyles. Majoring in **Environmental Geography** enables the student to comprehend the processes - natural and human - that form and change the Earth and to understand how people interact with the natural environment. We use the Army as our laboratory to demonstrate how geography is used to accomplish military operations across the spectrum from peacetime to war. Geography majors have opportunities for advanced studies that literally take cadets around the world.

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The world's population of over 6 billion people places a serious burden on the sustainability of the Earth. The effects are now visible everywhere and include negative impacts on the air we breath, water we drink, and soils that we depend on for growing food. Environmental Scientists and Engineers are at the tip of the spear in trying to solve environmental dilemmas. We are going to have to find ways to co-exist with our natural environment. The **Environmental Science** majors develop an understanding of the physical, chemical and biological processes that govern the Earth's activities. Cadets can choose to study in depth any of the ecological processes or methods that we use to manage and protect the environment. Majoring in **Environmental Engineering** enables cadets to develop the skills needed to control human pollution of the air, land, and water. The major is an ABET approved engineering program that prepares you to clean and sustain the environment, protecting all of us from the adverse impacts of human activity. Our graduates well exceed the national average pass rates on the Fundamentals of Engineering exam, the first important step in becoming a licensed professional engineer.

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In our **Geospatial Information Science** program, you learn to analyze, describe, and visualize the features of the Earth in remarkable detail. The newest and best computer hardware and software are used to instruct you in remote sensing, surveying, computer cartography, and geographic information systems, just to highlight a few areas. Army applications of this technology for analyzing the battlefield are obvious, but there is much more ongoing in this field. If you have interest in this area, visit the instructors and let them tell you about this area of study and show you our state of the art Geospatial Science Laboratory.

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Regardless of your major, the **Environmental Engineering Sequence** will enhance your West Point experience. This sequence accomplishes two goals in preparing you as an educated leader. First, it develops your ability to solve complex problems by introducing you to a decision-making process that is applied to current environmental issues. Second, the sequence provides an understanding of the key environmental issues threatening the well-being of the world today, such as safe and sufficient water for a growing world population, clean air and global atmospheric protection, and the management of hazardous and toxic wastes. You will examine the science underlying these issues as well as the laws and regulations established to protect people and the environment. The sequence culminates

by providing cadets with the opportunity to solve a complex environmental problem with competing technical, socio-cultural, political, and economic requirements.

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Your options are exciting and the possibilities are numerous. Please look through this booklet, consider what interests you, and then visit with our faculty, who are anxious to assist you in understanding the rewarding opportunities that are available within our department. ★



EUGENE J. PALKA
Colonel, US Army
Professor and Head
Department of Geography
and Environmental Engineering





MAJ Chastain and CDTs Bridie Burke, David Groves, and Conor Lawrence discuss Roman architecture outside of Avignon Pont du Gord



CDTs Casey Miller, Gregory Rueth, Nicholas Cosmas and Brian Hewko, and LTC Steve Oluic present a G&EnE coin to HRH Prince Regent Alexander II. during the 2007 Bosnia/Serbia AIAD.

GEOGRAPHY AND ENVIRONMENTAL ENGINEERING AFTER GRADUATION

Each of our majors is focused on preparing you for success as a leader. Successful leaders are incisive thinkers who critically evaluate and solve problems. Regardless of your major, you will develop analytical problem solving skills in our classes that will serve you well in the future. Many of the problems you will face in the Army will be examined in our classes because the Army is our laboratory and we study real world examples. You will also become a capable user of some of the most up-to-date technology in your field. The department has the best undergraduate laboratory facilities in the country, and our Geospatial Sciences Laboratory is world-class. Thus, you will learn to understand the world around you, and be prepared to solve its most complex environmental problems. Our AIAD programs will provide you with an opportunity to see how the Army uses your discipline through assignments to Army and DoD activities throughout the world.

Majoring in this department does not limit your branch opportunities – on the contrary, it expands your value in whatever branch you choose. Each branch needs leaders who understand the world, its people, and how they interact – our programs will give you those skills. All Army units must train and operate in varied operational environments and within the guidelines of established environmental regulations in a way that sustains limited training lands. Finally, the special skills learned as part of the geospatial sciences program are critical to all types of military planning and provide the critical spatial data that every Army deployment requires. ★

- **What Geographers and Environmental Engineers do for the Army**

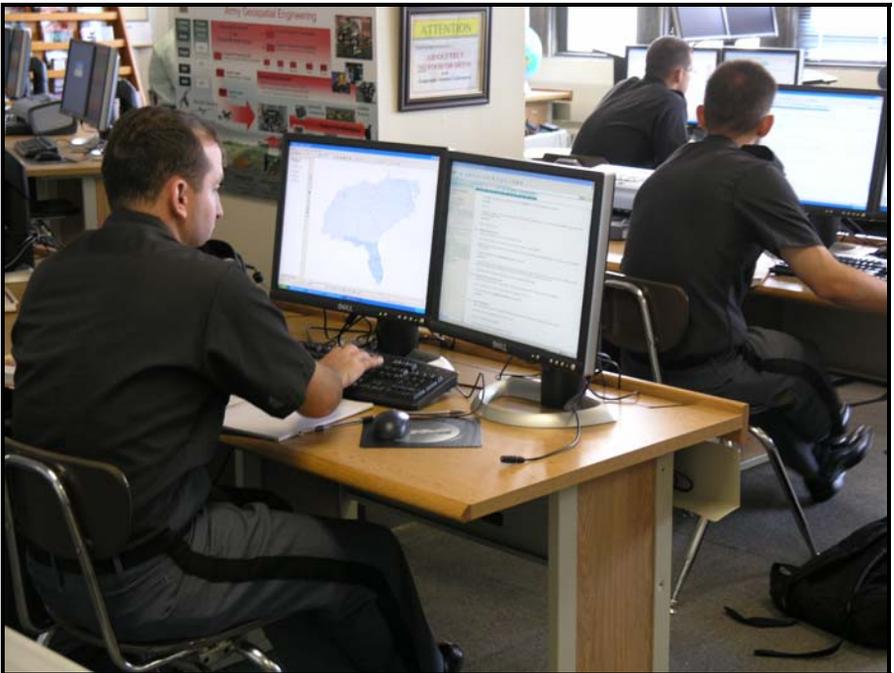
As a geographer or environmental engineer, you will be an asset to any branch or functional area. Your keen understanding of culture, technology, and engineering will provide you valuable insights for any mission. As our Army continues to place increased emphasis on cultural awareness and environmental issues, you will be well positioned to succeed regardless of your branch. Here are just a few examples:

WARFIGHTING: Geographers and environmental engineers are found in all combat and support branches. Terrain, weather, climate, and cultural landscapes are typically the decisive geographic elements common to every tactical environment and across the spectrum of Army missions. An understanding of physical geography enables the officer to judge the influence of climate, soils, vegetation, and terrain on military operations. A clear awareness of the fundamentals of cultural geography is a critical element in operational planning, given the high probabilities of low and mid-intensity conflict. Officers trained in the geospatial information sciences permit the Army to retain an advantage in maintaining information dominance on the battlefield. Environmental engineers and scientists are well suited to understanding and addressing environmental issues associated with warfare ranging between the use of environmental warfare by our adversaries to the protection of our troops from disease and other wartime environmental hazards.

OPERATIONS OTHER THAN WAR: As the Army's mission profile increasingly moves to stability and support operations, the need for well-trained geographers and environmental engineers will become critical. Today's peacekeeping and humanitarian support missions

occur around the world. Likewise, humanitarian assistance has been provided in places such as Haiti, Zaire, Rwanda and Sudan. These examples reflect the diverse array of culture systems and physical environments with which our soldiers must contend. Officers trained in human geography understand cultural, political, and economic situations and are a valuable asset to every peacekeeping mission. Environmental geographers can assess the natural landscape, environmental resources, and human-environment interaction, thus providing useful information during peacekeeping or disaster relief operations. The environmental engineer is well suited to meet the demands of these situations by providing safe drinking water, improving sanitary conditions, and mitigating adverse impacts of military operations. Finally, all Army units rely on geospatial information.

SUPPORTING MILITARY TRAINING: During peacetime operations, leaders are increasingly challenged to develop imaginative ways in which to provide tough, realistic training while sustaining and improving the condition of our training areas. In preparing for the unit's wartime mission, a geographer's understanding of contingency locations around the world is useful in developing realistic training conditions. Environmental scientists and engineers implement policies that support a broad range of environmental protection regulations from resource management to hazardous waste disposal. Using modern geospatial information sciences and techniques, the spatial distribution of key training area resources as well as potential hazards can be accurately recorded and analyzed.



EV 398 (Geographic Information Systems) cadets use the latest technology to create maps in the Geospatial Laboratory (GSL).

GEOGRAPHY AND ENVIRONMENTAL ENGINEERING AT WEST POINT

- General

The Department offers some of the best undergraduate facilities in the country for the study of geography, geospatial information science, and environmental science/engineering. Each cadet's elective sequence, regardless of the program, is tailored according to personal interests and abilities. Throughout the program of study, special attention is focused on the analysis and evaluation of significant human-environment problems. This theme permeates all aspects of the academic program.

- Opportunities for Cadets Selecting Department Majors:

DEPARTMENT ACTIVITIES AND FACILITIES. Our majors are integrated into a variety of activities. Cadets are invited to attend lectures, seminars, and professional discussions on a wide array of subjects. Departmental facilities include a specialized library, map room, computer graphics center, a geology laboratory, cartography and remote sensing laboratory, and environmental laboratories. Picnics, luncheons, coffee calls, and colloquia are held frequently so that students and faculty can continue the interactive process of learning in a variety of forums.

ACADEMIC INDIVIDUAL ADVANCED DEVELOPMENT. The department sponsors an outstanding summer intern program for approximately 60 upper-class cadets as a part of Cadet Summer Training. Cadets have the opportunity to work with agencies such as the Army Environmental Center, Army Environmental Policy Institute, Topographic Engineer Center, National Imagery and Mapping Agency, Army Research Institute, Environmental Protection Agency, and Defense Intelligence Agency. Cadet travel can cover the entire world, including Central Asia, Southeast Asia, the Middle East, Southwest United States or any of an ever-changing array of locations. These programs offer unique opportunities for cadets to broaden their education while observing the critical contributions of their discipline at high levels of government.

INDIVIDUAL RESEARCH. Each semester a number of cadets are selected to participate in individually designed research and study programs on topics of special interest. Cadets and a faculty sponsor typically design projects jointly. Research endeavors such as these offer a unique opportunity to excel in an area of academic interest. Examples of recent projects include a base camp suitability model for Croatia using GIS, herbicide effectiveness on invasive lake species in Wilkins Pond, determining lead mobility from small arms ranges, mixing and stratification impact on water quality issues in Devils Lake North Dakota, and an evaluation of beach erosion hot-spots along the mid-Atlantic coast.

HONORS PROGRAMS. Five of the Department's six majors offer an Honors Program for qualified cadets. The Geography honors program begins during term seven as participants attend a research seminar. During this seminar, cadets explore salient research issues in their particular field, learn methodologies, and develop technical writing skills. As part of this seminar, each cadet will define a research topic, explore the literature, and develop a research proposal. During their final term, cadets will use the research proposal as a point of departure and conduct an independent study project. At the end of the year, the cadet will present his/her findings to the faculty and submit a written honors thesis. The GIS and

Environmental Science majors select one additional course from their respective electives list and will complete an independent research project (EV489A) during term 7 or 8 and present their findings to their classmates and faculty. Environmental Engineering majors will complete an independent research project as one of their electives. Refer to the detailed program descriptions in this book and see your academic counselor for the specific details for each Honors Program as well as entry standards.

ACADEMIC AWARDS. The Department recognizes its best cadets using a number of prestigious awards. The Congressional Medal of Honor Society Award is presented annually to a member of the graduating class for excellence in geography. The Order of the Founders and Patriots of America Award is presented annually to a member of the graduating class for excellence in environmental science or engineering. The National Organization of the Ladies Auxiliary Veterans of Foreign Wars of the United States Award is presented annually to a member of the graduating class for excellence in the Environmental Engineering sequence. The Environmental Systems Research Institute Award is presented annually to a member of the graduating class for excellence in geospatial information science. These honors are presented at the annual Graduation Awards Convocation to the cadet in each respective major with the highest grade point average in the elective program.



Cadets on the Geography of Vietnam AIAD strike a pose in front of a Buddhist temple in Ho Chi Minh City, Vietnam. From left to right: Cadet Mitch Tisdell, Cadet Katelin Grant, Cadet Yinchao Xie, MAJ Jason Ridgeway, and Cadet Garrison Haning.

Academic Awards - Previous Awardees

- Congressional Medal of Honor Society Award for Excellence in Geography

07 – Jennifer Lichty	02 - Eric Wilkinson	97 - Aaron Ecklund
06 – Sarah McNair	01 - Matthew Sullivan	96 - Brian Gavula
05 - Kristin Davis	00 - Joshua Schneider	95 - Mark Walters
04 - Charles Lewis	99 - Matthew Debiec	94 - Kevin Kercher
03 - Thomas Lainis	98 - Michael Lipsner	93 - Michael Senn

- Order of Founders and Patriots of America Award for Excellence in Environmental Science and Environmental Engineering

07 - Brandon Woerth	02 - Stephen Lewandowski	97 - Ralph Radka
06 – Justin Sprague	01 - Paul McBride	96 - David Hernke
05 - Sean Healy	00 - Jeffery Jager	95 - David Phillips
04 - Joe Marullo	99 - Travis Rayfield	94 - Brett Sylvia
03 - Sarah Williams	98 - Bradley Stoltz	93 - William Chess

- National Organization of the Ladies Auxiliary Veterans of Foreign Wars of the United States Award for Excellence in the Environmental Engineering Sequence

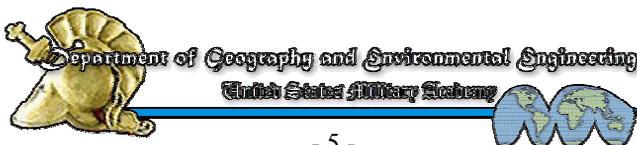
07 - Jeremy Stratman	02 - Jose Garcia-Aranda	97 - Jacob Kramer
06 – Matthew Schardt	01 - Jeffrey Han	96 - Brian Gavula
05 - Jordan Yokley	00 - Nicholas Schommer	95 - Jason Rowe
04 - Todd Martin	99 - Stephen Mintz	94 - Kevin Hicks
03 - Daniel Tran	98 - William Blake	93 - John Brown

- Environmental Systems Research Institute award for excellence in Geospatial Information Science

07 – Jeremy Stratman	03 - Jeffrey Oster
06 – Doug Calloway	02 - Miguel Gastellum
05 - William Zielinski	01 - Ryan Piotrowski
04 - Grace Chung	00 - Joshua Schneider

- BAE award for excellence in Photogrammetry

07 – Andrew Morgan



GEOGRAPHY & ENVIRONMENTAL ENGINEERING PROGRAMS: CLASS OF 2010

SCOPE: Our Geography, Environmental, and Geospatial Information Science programs are designed to prepare cadets for careers involving the observation, evaluation and design of human and physical systems in today's interdependent world. State of the art departmental laboratory facilities support our programs.

OPTIONS: Students desiring to complete a baseline program have six alternatives for a major. Those who desire academic enrichment in the discipline and meet academic requirements may apply to participate in an honors program in five of our six majors. The program areas are:

- ★ Human Geography
- ★ Environmental Geography
- ★ Environmental Science
- ★ Environmental Engineering
- ★ Environmental Engineering Studies
- ★ Geospatial Information Science

CORE REQUIREMENTS: You must complete or have received USMA credit for the 26 core courses as shown in the General Section of the USMA Academic Program (REDBOOK) for your class. You must also fulfill the Information Technology core course requirement.

ENGINEERING SEQUENCE: The **3-Course Environmental Engineering Sequence** is available to all cadets. It furnishes an engineering sequence that focuses on important environmental issues and provides cadets with the opportunity to develop viable, sustainable solutions. It offers an opportunity to learn and apply the engineering design process in the natural world, within which social, political, cultural, and economic considerations are critical factors in decision-making. The environmental engineering sequence has three important objectives:

- ★ Have cadets attain a fundamental appreciation of the most salient environmental issues and an understanding of their underlying causes and impacts on the natural environment.
- ★ Provide cadets with the ability to formulate and communicate practical engineering solutions to important environmental problems.
- ★ Teach cadets to develop and apply viable engineering solutions that conform to important economic, social, cultural, and political criteria.

The first course in the sequence, **EV300 (Environmental Science)**, provides cadets with a broad understanding of what the term "environmental issues" encompasses and how humans are negatively affecting the biosphere. The second course, **EV350 (Environmental Technologies)**, builds on the EV300 experience through the application of science-based engineered solutions to common environmental issues. Finally, in **EV450 (Environmental Decision Making)** cadets learn to balance engineered solutions with economic, social, political, and ecological considerations. Using many aspects of water resources, such as hydropower, navigation, drinking water supply, fish habitat, recreation, as a teaching model, cadets learn decision-making and policy development realities. ★

PROGRAM DESCRIPTIONS

• GEOGRAPHY:

Geographers examine the spatial arrangements, processes, distributions, and organization of natural and human landscapes. Geography is a broad, integrating discipline with methodologies and analytical foundations that span engineering, science, and the humanities. Majoring in geography requires persistent curiosity and inquiry into human-land-environment interfaces: how natural systems function; how physical landscapes evolve; how human populations adapt; and how humans shape the environment. Two majors allow cadets to explore geography either from a natural or social science perspective. The Environmental Geography program emphasizes the study of the natural landscape, anthropogenic influences on the environment, and natural hazards. The Human Geography program enables cadets to explore cultural diversity, population trends, and political systems from a global and regional perspective. Both programs integrate the use of geographic skills such as computer cartography, remote sensing, and geographic information systems. Geography is the ideal discipline for an Army officer expected to lead soldiers in a changing world. ★



Main Points of Contact:

Human Geography: Dr. Jon Malinowski, W5352, x4673,
email: jon.malinowski@usma.edu

Environmental Geography: Dr. Amy Richmond, W5412, x3735,
email: amy.richmond@usma.edu

• ENVIRONMENTAL SCIENCE:

The relationship between modern society and the Earth is controlled by pressures created by technological development and population growth. Environmental scientists conduct research and investigations with the purpose of identifying, abating, or eliminating sources of pressure that affect the fragile ecosystem and the health of the population. This major develops an understanding of processes that govern the Earth's environment by expanding upon the USMA core science education and adding studies in biology, geology, hydrology, and climatology. This broad academic background is excellent preparation for challenges faced by a military leader who must balance resource and human requirements. The program has two desired outcomes: (1) impart an understanding of ecosystem responses to human interaction; and (2) impart an understanding of environmental degradation and how to combat it. Both outcomes are critical in developing responsible environmental stewardship. ★



Main Point of Contact: Dr. Marie Johnson, W5416, x4855,
email: marie.johnson@usma.edu

• ENVIRONMENTAL ENGINEERING:

Environmental engineers face a range of issues from disasters like air pollution from the terrorist attack on the Twin Towers or water pollution from Hurricane Katrina in New Orleans to satisfying basic needs like safe drinking water. Environmental engineers use chemical, biological, and physical processes to engineer systems that address these issues. This discipline is evolving to face new challenges resulting from rapid growth in human population and technology. Environmental engineers are working in multidisciplinary teams to develop methods to combat global warming; find alternative sources of energy; and to recover materials from discarded products like cars and cell phones. It is not surprising that a report in Fortune Magazine identified environmental engineering as the fastest growing profession for the period 2002 to 2012. Our program provides you with an active learning experience focused on environmental issues, the reason behind their existence, and practicable control strategies. Becoming an environmental engineer major provides you with a solid foundation in engineering that will allow you to formulate creative solutions to dynamic issues. This skill has been invaluable to our graduates in the Army as they work environmental projects in Iraq and Afghanistan and look after the welfare of their soldiers. ★



Main Point of Contact: Dr. Mike Butkus, W5317, x2820,
email: mike.butkus@usma.edu

• GEOSPATIAL INFORMATION SCIENCE:

Fundamental to understanding our environment and the geography of the Earth is our ability to locate, measure, and quantify geographic phenomena. The discipline of geospatial information science (GIS) is concerned with the measurement of the earth and of all that is on it--natural and man-made. Cadets develop expertise in subjects ranging from traditional methods of land surveying to satellite imaging and positioning systems. The GIS curriculum builds on a firm math, science, and geography foundation with specialized courses in surveying, cartography, photogrammetry, remote sensing, and geographic information systems. Both the civil and military sectors of our society are placing an ever-increasing reliance on the ability to build and query geospatial information to support a myriad of social/economic and engineering issues. The cadet at USMA has a rare opportunity to pursue an integrated field of study that is commonly spread over several separate disciplines at other institutions. This major has applicability for the future military officer regardless of branch. Cadets majoring in GIS receive a 3Y (Space Activities) Skill Identifier on their official military record. The curriculum prepares cadets for advanced civil schooling in any of the specialized fields of GIS. ★



Main Point of Contact: Dr. John Brockhaus, W5302, x2063,
email: john.brockhaus@usma.edu

GEOGRAPHY AND ENVIRONMENTAL ENGINEERING FACULTY COUNSELORS FOR AY 07-08

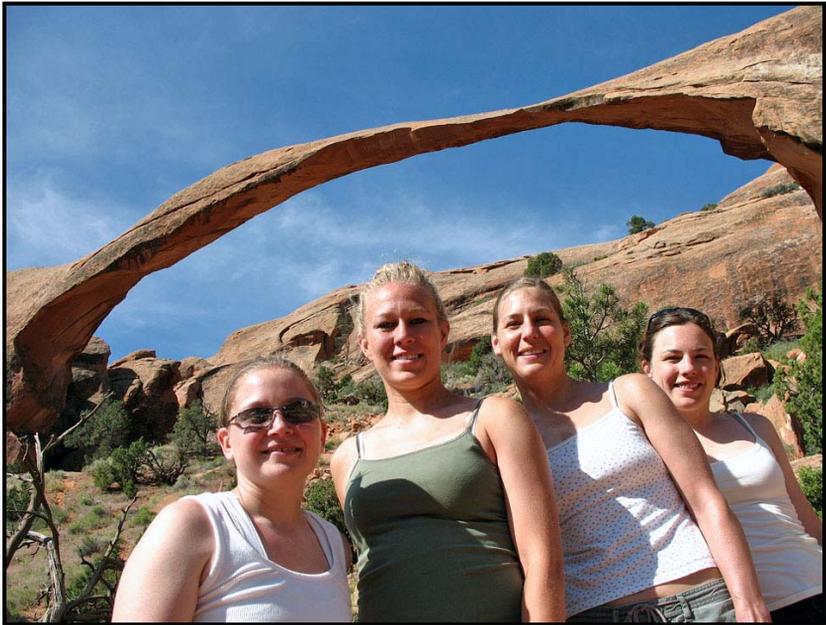
<u>PROGRAM</u>	<u>FIELD COUNSELOR</u>	<u>OFFICE</u>	<u>PHONE</u>
Geography and Foreign Area Studies	COL Hummel	W5303A	3161
Environmental Engineering and Science	COL Lynch	W5324	5126
Geospatial Information Science	Dr. Brockhaus	W5302	2063
Counseling and Scheduling	MAJ Day	W5413	3124

COURSE DIRECTORS

<u>COURSE</u>	<u>TITLE</u>	<u>COURSE DIRECTOR</u>	<u>OFFICE</u>	<u>PHONE</u>
EV203	Physical Geography	LTC Henderson	W5411	3938
EV300	Environmental Science	MAJ Davis	W5318	4135
EV301	Environmental Science for Engineers and Scientists	Dr. Johnson	W5416	4855
EV303	Foundations in Geography	Dr. Malinowski	W5323	4673
EV350	Environmental Engineering Technologies	MAJ Wallen	W5400	3166
EV365	Geography of Global Cultures	LTC Oluic	W5311	3531
EV371	Geography of Russia	LTC Oluic	W5311	3531
EV372	Geography of Asia	Dr. Malinowski	W5323	4673
EV373	Geography of Latin America	MAJ Ridgeway	W5400	2679
EV374	Geography of the Middle East and Africa	MAJ Chastain	W5400	5421
EV377	Remote Sensing	Dr. Brockhaus	W5302	2063
EV378	Cartography	MAJ Irmischer	W5414	4620
EV379	Photogrammetry	MAJ Day	W5413	3124
EV380	Principles of Surveying	MAJ Day	W5413	3124
EV384	Geography of North America	COL Palka	W6000	4354
EV385	Introduction to Environmental Engineering	MAJ Davis	W5318	4135
EV386	Geography of Europe	Dr. Siska	W5100	4949
EV387	Meteorology	LTC Rios	W5409	4869

<u>COURSE</u>	<u>TITLE</u>	<u>COURSE DIRECTOR</u>	<u>OFFICE</u>	<u>PHONE</u>
EV388A	Physical Geology	MAJ Kimball	W5319	4265
EV388B	Geomorphology	MAJ Clark	W5332	3986
EV389B	Climatology	LTC Rios	W5409	4869
EV390B	Urban Geography	LTC Oluic	W5316	3094
EV391A	Principles of Land Use Planning and Management	MAJ Verell	W5321	3540
EV391B	Environmental Geology	Dr. Johnson	W5416	4855
EV394	Hydrogeology	COL Lynch	W5324	5126
EV396	Environmental Biological Systems	MAJ McAllister	W6003	3509
EV397	Air Pollution Engineering	COL Lynch	W5324	5126
EV398	Geographic Information Systems	LTC Hendricks	W5303B	4869
EV399A	Geology Field Course	MAJ Kimball	W5319	4265
EV401	Physical and Chemical Treatment	Dr. Butkus	W5317	2820
EV402	Biochemical Treatment	Dr. Butkus	W5317	2820
EV450	Environmental Decision Making	MAJ Wallen	W5400	3166
EV471	Ecology	LTC Smith	W5320	3136
EV477	Advanced Remote Sensing	Dr. Brockhaus	W5302	2063
EV480	Honors Seminar in Geography	COL Hummel	W5303A	3161
EV481	Water Resources Planning and Design	COL Manous	W6001	2930
EV482	Military Geography	LTC Henderson	W5304	4035
EV485	Special Topics in Geography and the Environment	COL Hummel	W5303A	3161
EV486	Environmental Geography	Dr. Richmond	W5412	3735
EV487	Environmental Security	Dr. Johnson	W5416	4855
EV488	Solid and Hazardous Waste Treatment and Remediation	COL Lynch	W5324	5126
EV489A	Advanced Individual Study I	Assigned to individual cadets		
EV489B	Advanced Individual Study II	Assigned to individual cadets		

<u>COURSE</u>	<u>TITLE</u>	<u>COURSE DIRECTOR</u>	<u>OFFICE</u>	<u>PHONE</u>
EV490	Advanced Environmental Process Design	COL Manous	W6001	2930
EV498	Advanced Geographic Information Systems	LTC Hendricks	W5303B	4869
XS391	Principles and Applications of Environmental Chemistry	Dr. Butkus	W5317	2820



CDTs Brianna Dickenson and Jeralee Hartman, MAJ Megan Peguero and Dr. Amy Richmond enjoy Arches National Park during their AIAD of the Four Corners region.



Cadet Walt Peeples takes a dive into Hawaii's "Boiling Pots" as part of his 2007 AIAD experience. Walt and seven others studied the unique geological features of Hawaii, from volcanoes to waterfalls.

CDT Andrew Morgan operates the flight simulator during an EV 379 (Photogrammetry) visit to Keystone Aerial Surveys, Inc.



HUMAN GEOGRAPHY

HUMAN GEOGRAPHY MAJOR (GEO)

HUMAN GEOGRAPHY MAJOR WITH HONORS (GEOH)

CORE CURRICULUM AND ENGINEERING SEQUENCE:

- Complete the 26-course core curriculum
- Complete any 3-course core engineering sequence
- Complete one (1) of the two (2) following courses:

Course #	Course Title
IT305	Theory and Practice of Military IT Systems
IT355	Advanced Theory and Practice of Military IT Systems

FOUNDATION COURSES

- Complete the three (3) courses listed below:

Course #	Course Title
EV303	Foundations in Geography
EV365	Geography of Global Cultures
EV398	Geographic Information Systems

REGIONAL GEOGRAPHY

- Complete one (1) of the six (6) Regional Geography courses listed below:

Course #	Course Title
EV371	Geography of Russia
EV372	Geography of Asia
EV373	Geography of Latin America
EV374	Geography of the Middle East and Africa
EV384	Geography of North America
EV386	Geography of Europe

PHYSICAL GEOGRAPHY

- Complete one (1) of the four (4) courses listed below:

Course #	Course Title
EV388A	Physical Geology
EV388B	Geomorphology
EV389B	Climatology
EV391B	Environmental Geology

GEOGRAPHY TOOL

- Complete the course listed below:

Course #	Course Title
LX ____	Third Semester of Language

GEOGRAPHY ELECTIVE

- Complete two (2) of three (3) courses listed below:

Course #	Course Title
EV390B	Urban Geography
EV391A	Principles of Land Use Planning and Management
EV3XX	Any Regional Geography Course (see list on previous page)

GENERAL ELECTIVE

- Complete one (1) of the sixty-seven (67) courses listed below:

Course #	Course Title
EV371	Geography of Russia
EV372	Geography of Asia
EV373	Geography of Latin America
EV374	Geography of the Middle East and Africa
EV377	Remote Sensing
EV378	Cartography
EV384	Geography of North America
EV386	Geography of Europe
EV387	Meteorology
EV388B	Geomorphology
EV389B	Climatology
EV390B	Urban Geography
EV391A	Principles of Land Use Planning and Management
EV391B	Environmental Geology
EV397	Air Pollution Engineering
EV478	Geospatial Military Operations
EV483	Colloquium in Geography
EV485	Special Topics in Geography and the Environment (Systematic Human Geographies offered in Term 082 only)
EV487	Environmental Security
EV489A	Advanced Individual Study in Geography
EP333	Cultural Studies
EP392	Ethnic Literature
HI337	China – C. Kingdom to Communist Rule
HI339	The Modern Middle East
HI340	Colonial America
HI341	The Age of Exploration
HI342	The British Isles Since 1688
HI343	Modern Germany
HI345	Modern Africa
HI346	Modern South Asia
HI347	Asian Warfare and Politics
HI349	The Middle East to 1798
HI360	History of the Classical World
HI361	History of Medieval Europe

Course #	Course Title
HI362	History of Early Modern Europe
HI363	Europe in Transition and Revolution
HI364	Modern Western Europe
HI365	The Ancient World
HI367	History of Imperial/Soviet Russia
HI368	Mod. Central and E. Europe 1896-1989
HI369	American Frontiers
HI372	History of US Foreign Relations, 20 th Century
HI390	Early National America
HI391	History of World Religions
HI394	Revolutionary America
HI395	History of Civil War America
HI396	Making of Modern America
HI398	Society & Culture in American History
LW481	International Law
LX400	4 th Semester Foreign Language
MA376	Applied Statistics
MS360	Low Intensity Conflict
MS455	Comparative Military Systems
PL371	Introductory Sociology
PL377	Social Inequality: Race, Gender, and Ethnicity
SS360	Political Analysis
SS366	Comparative Politics
SS368	Econometrics
SS372	Politics and Gov. of China
SS374	Politics & Gov. of Korea & Japan
SS375	Politics and Governments of Russia & Neighbors
SS377	Politics & Gov. of Europe
SS381	Political and Cultural Anthropology
SS383	Politics and Governments of the Middle East
SS384	Politics and Governments of Latin America
SS385	Comparative Economic Systems
SS485	Politics and Development in Sub-Saharan Africa

INTEGRATING EXPERIENCE

- Complete the following course:

Course #	Course Title
EV482	Military Geography

HONORS PROGRAM IN HUMAN GEOGRAPHY

• Cadets pursuing the Honors Program in Human Geography must meet the entry-level requirement of having a 3.00 grade point average in the Core Curriculum, an APSC of at least 3.5 in the major, and approval by the Geography Program Director. Cadets approved for participation in the Honors Program must complete the following courses:

Course #	Course Title
EV480	Honors Seminar in Geography
EV489B	Advanced Individual Study II

Note: These courses may be taken as additional electives by any cadets, not just those in the honors program.



Cadets Sara Drane, Mark Seleen, Jeffrey Nichols, MAJ Brian Doyle, and CDTs Mary Kearney and Mary Comstock take a photo opportunity while visiting the Taj Mahal during the 2007 India AIAD.



Cadets James Blackwell, David Burris, Bill Lessner, and Ryan McAllister at Nijo Castle, the Kyoto residence of 17th century shogun Tokugawa Ieyasu.

ENVIRONMENTAL GEOGRAPHY

ENVIRONMENTAL GEOGRAPHY MAJOR (EGE) ENVIRONMENTAL GEOGRAPHY MAJOR WITH HONORS (EGEH)

CORE CURRICULUM AND ENGINEERING SEQUENCE:

- Complete the 26-course core curriculum
- Complete the Environmental Engineering Sequence
- Complete one (1) of the two (2) following courses:

Course #	Course Title
IT305	Theory and Practice of Military IT Systems
IT355	Advanced Theory and Practice of Military IT Systems

FOUNDATION COURSES

- Complete the three (3) courses listed below:

Course #	Course Title
EV303	Foundations in Geography
EV398	Geographic Information Systems
EV486	Environmental Geography

PHYSICAL GEOGRAPHY STEM

- Complete one (1) of the two (2) courses listed below:

Course #	Course Title
EV388B	Geomorphology
EV389B	Climatology

PHYSICAL GEOGRAPHY ELECTIVE

- Complete one (1) of the five (5) courses listed below:

Course #	Course Title
EV387	Meteorology
EV388A	Physical Geology
EV388B	Geomorphology
EV389B	Climatology
EV391B	Environmental Geology

GEOGRAPHY TOOLS AND LANDSCAPE ANALYSIS

- Complete one (1) of the three (3) courses listed below:

Course #	Course Title
EV377	Remote Sensing
EV390B	Urban Geography
EV391A	Principles of Land Use Planning and Management

CULTURE STEM

- Complete the following course:

Course #	Course Title
EV365	Geography of Global Cultures

REGIONAL GEOGRAPHY ELECTIVE

- Select one (1) of the six (6) Regional Geography courses listed below:

Course #	Course Title
EV371	Geography of Russia
EV372	Geography of Asia
EV373	Geography of Latin America
EV374	Geography of the Middle East and Africa
EV384	Geography of North America
EV386	Geography of Europe

GENERAL ELECTIVE:

- Complete one (1) of the thirty (30) courses listed below:

Course #	Course Title
EV371	Geography of Russia
EV372	Geography of Asia
EV373	Geography of Latin America
EV374	Geography of the Middle East and Africa
EV377	Remote Sensing
EV378	Cartography
EV379	Photogrammetry
EV380	Principles of Surveying
EV384	Geography of North America
EV386	Geography of Europe
EV387	Meteorology
EV388A	Geology
EV388B	Geomorphology
EV389B	Climatology
EV390B	Urban Geography
EV391A	Principles of Land Use Planning and Management
EV391B	Environmental Geology
EV394	Hydrogeology
EV397	Air Pollution Engineering
EV471	Ecology
EV483	Colloquium in Geography
EV485	Special Topics in Geography and the Environment (Systematic Human Geographies offered in Term 082 only)
EV487	Environmental Security
EV489A	Advanced Individual Study in Geography
LX300	3 rd Semester Foreign Language
SS485	Politics & Development of Sub-Saharan Africa

INTEGRATING EXPERIENCE

- Complete the following course

Course #	Course Title
EV482	Military Geography

HONORS PROGRAM IN ENVIRONMENTAL GEOGRAPHY

• Cadets pursuing the Honors Program in Human Geography must meet the entry-level requirement of having a 3.00 grade point average in the Core Curriculum, an APSC of at least 3.5 in the major, and approval by the Geography Program Director. Cadets approved for participation in the Honors Program must complete the following courses:

Course #	Course Title
EV480	Honors Seminar in Geography
EV489B	Advanced Individual Study II

Note: These courses may be taken as additional electives by any cadets, not just those in the honors program.



Cadets Mark Seelan and Mary Ann Kearney on AIAD in India get to experience another view of the culture from the back of an elephant, June 2007.

ENVIRONMENTAL SCIENCE

ENVIRONMENTAL SCIENCE MAJOR (ESC) ENVIRONMENTAL SCIENCE MAJOR WITH HONORS (ESCH)

CORE CURRICULUM AND ENGINEERING SEQUENCE:

- Complete the 26-course core curriculum
- Complete the Environmental Engineering Sequence
- Complete one (1) of the two (2) following courses:

Course #	Course Title
IT305	Theory and Practice of Military IT Systems
IT355	Advanced Theory and Practice of Military IT Systems

- Complete the six (6) courses listed below:

Course #	Course Title
CH375	Introduction to Biology
EV365	Geography of Global Cultures
EV388A OR EV399A	Physical Geology OR Geology Field Course (based on selection for summer AIAD)
EV387 OR EV389B	Meteorology OR Climatology
EV471	Ecology
EV487	Environmental Security

- Complete one (1) of the courses listed below:

Course #	Course Title
CH385	Introduction to Cell Biology
EV377	Remote Sensing
EV398	Geographic Information Systems

- Complete the two (2) of the seven (7) Environmental Science Directed Electives:

Course #	Course Title
CH383	Organic Chemistry I
CH384	Organic Chemistry II
EV391A	Land Use Planning and Management
EV391B	Environmental Geology
EV396	Environmental Biological Systems
EV398	Geographic Information Systems
XS391	Principles and Applications of Environmental Chemistry

- Complete one (1) course from the following list of Environmental Science Field Electives.

ENVIRONMENTAL SCIENCE FIELD ELECTIVES

Course #	Course Title
EV377	Remote Sensing
EV378	Cartography
EV380	Principles of Surveying
EV384	Geography of North America
EV386	Geography of Europe
EV387	Meteorology
EV388B	Geomorphology
EV390B	Urban Geography
EV391A	Principles of Land Use Planning and Management
EV391B	Environmental Geology
EV394	Hydrogeology
EV396	Environmental Biological Systems
EV397	Air Pollution Engineering
EV398	Geographic Information Systems
EV401	Physical and Chemical Treatment
EV482	Military Geography
EV488	Solid and Hazardous Waste Management
EV489A	Advanced Individual Study I
XS391	Principles and Applications of Environmental Chemistry
CE302	Statics and Dynamics
CE380	Hydrology/Hydraulic Design
CH357	Microbiology
CH383	Organic Chemistry I
CH384	Organic Chemistry II
CH385	Introduction to Cell Biology
CH387	Human Physiology
CH481	Physical Chemistry I
EP386	Philosophy of Science
EP393	Environmental Ethics
LW481	International Law
MA363	Vector Calculus and ODE
MA366	Vector Calculus and Introduction to PDE
MA391	Mathematical Modeling
MA396	Numerical Methods for the Solution of DE
MA476	Mathematical Statistics
MS350	Military Communications
EM381	Engineering Economy
SS479	Environmental Economics
SS480	Public Policy Making Process

- Cadets pursuing an HONORS PROGRAM will complete EV489A in addition.

ENVIRONMENTAL ENGINEERING

ENVIRONMENTAL ENGINEERING MAJOR (EVE)

- Complete the 26-course core curriculum
- Complete the following fifteen (15) courses:

Course #	Course Title
CE302	Statics and Dynamics
CE380	Hydrology and Hydraulic Design
EV301	Environmental Science for Engineers and Scientists
EV397	Air Pollution Engineering
EV388A OR EV399A	Physical Geology OR Geology Field Course (based on selection for summer AIAD)
EV394	Hydrogeology
EV396	Environmental Biological Systems
EV401	Physical and Chemical Treatment
EV402	Biochemical Treatment
EV481	Water Resources Planning and Design
EV488	Solid and Hazardous Waste Treatment and Remediation
EV490	Advanced Environmental Process Design
MA366	Vector Calculus and Introduction to PDE
ME311	Thermal Fluid Systems I
XS391	Principles and Applications of Environmental Chemistry

- Complete two (2) of the following to satisfy the Environmental Engineering Field Elective requirement. The sum of the Engineering Science (ES) and Engineering Design (ED) per the current Redbook for the two Field Electives must be 4.5 credits or greater.

Course #	Course Title
CH362	Mass and Energy Balances
EE301	Fundamentals of Electrical Engineering
EM381	Engineering Economy
EM411	Project Management
EV377	Remote Sensing
EV380	Surveying
EV388B	Geomorphology
EV391B	Environmental Geology
EV398	Geographic Information Systems
EV485	Special Topics in Geography and the Environment
EV489A	Advanced Individual Study I
EV489B	Advanced Individual Study II
ME312	Thermal-Fluid Systems II
SE375	Statistics for Engineers
SE385	Decision Analysis

- Cadets pursuing an HONORS PROGRAM must complete Advanced Individual Studies I (EV489A) as one of their Field Electives.



Environmental Engineers relax after the Fundamentals of Engineering Exam.



Environmental Scientists take a break during a field trip in EV471

ENVIRONMENTAL ENGINEERING STUDIES

ENVIRONMENTAL ENGINEERING STUDIES MAJOR (EES)

- Complete the 26-course core curriculum
- Complete the following eleven (11) courses:

Course #	Course Title
IT305 or IT355	Theory & Practices (or Advanced Theory) of Military IT Systems
EV301	Environmental Science for Engineers and Scientists
EV388A OR EV399A	Physical Geology OR Geology Field Course (based on selection for summer AIAD)
EV396	Environmental Biological Systems
EV397	Air Pollution Engineering
EV401	Physical and Chemical Treatment
EV402	Biological Treatment
EV481	Water Resources Planning and Design
EV490	Advanced Environmental Process Design
ME311	Thermal Fluid Systems I
XS391	Principles and Applications of Environmental Chemistry

- Complete two (2) Environmental Engineering directed electives:

Course #	Course Title
CE302	Statics and Dynamics
CE380	Hydrology and Hydraulic Design
MA366	Vector Calculus and Introduction to PDE
EV394	Hydrogeology
EV488	Solid and Hazardous Waste Treatment and Remediation

- Complete one (1) course from the Environmental Engineering field electives list:

Course #	Course Title
CE302	Statics & Dynamics
CE380	Hydrology & Hydraulic Design
EE301	Fundamentals of Electrical Engineering
EM381	Engineering Economy
EM411	Project Management
EV377	Remote Sensing
EV380	Surveying
EV388B	Geomorphology
EV391B	Environmental Geology
EV394	Hydrogeology
EV398	Geographic Information Systems
EV485	Special Topics in Geography and the Environment (with approval)
EV488	Solid and Hazardous Waste Treatment and Remediation
EV489A	Advanced Individual Study I
EV489B	Advanced Individual Study II
ME312	Thermal-Fluid Systems II
SE375	Statistics for Engineers
SE385	Decision Analysis

- No Honors Program is offered in the Environmental Engineering Studies major.



Environmental majors check out the final product of their fermentation lab



Having a little fun at the Environmental Program Welcome Back BBQ

GEOSPATIAL INFORMATION SCIENCE

GEOSPATIAL INFORMATION SCIENCE MAJOR (GIS) GEOSPATIAL INFORMATION SCIENCE MAJOR WITH HONORS (GISH)

CORE CURRICULUM AND ENGINEERING SEQUENCE:

- Complete the 26-course core curriculum
- Complete any 3-course engineering sequence
- Complete one (1) of the two (2) following courses:

Course #	Course Title
IT305	Theory and Practice of Military IT Systems
IT355	Advanced Theory and Practice of Military IT Systems

- Complete the following Fundamentals of GIS courses:

Course #	Course Title
EV377	Remote Sensing
EV378	Computer Cartography
EV398	Geographic Information Systems

- Complete one (1) of two (2) spatial data acquisition courses:

Course #	Course Title
EV379	Photogrammetry
EV380	Principles of Surveying

- Complete two (2) advanced spatial data analysis course:

Course #	Course Title
EV477	Advanced Remote Sensing
EV498	Advanced Geographic Information Systems

- Complete the following integrative experience:

Course #	Course Title
EV482	Military Geography

- Complete the following cultural immersion course:

Course #	Course Title
EV365	Geography of Global Cultures

- Select two (2) courses from the Geospatial Information Science elective list:

Course #	Course Title
EV300	Environmental Science
EV371	Geography of Russia
EV372	Geography of Asia
EV373	Geography of Latin America
EV374	Geography of the Middle East and Africa
EV379	Photogrammetry
EV380	Principles of Surveying
EV384	Geography of North America
EV386	Geography of Europe

Course #	Course Title
EV388A OR EV399A	Physical Geology OR Geology Field Course
EV388B	Geomorphology
EV389B	Climatology
EV390B	Urban Geography
EV391A	Principles of Land Use Planning and Management
EV391B	Environmental Geology
EV397	Air Pollution Engineering
EV478	Military Geospatial Operations
EV481	Water Resources Planning and Design
EV489A	Advanced Individual Study I
EV489B	Advanced Individual Study II

*NOTE: Cadets may select either EV388A or EV399A, but not both. Additionally, only cadets pursuing the Honors Program may select EV489B

- Cadets pursuing an Honors program in Geospatial Information Science must complete the following course, and select one additional course from the GIS electives list:

Course #	Course Title
EV489A	Advanced Individual Study I



Cadet Hartman collects GPS data with an ATV-mounted receiver during her AIAD in Alaska.

COURSE OFFERINGS

Course #	Course Title	081	082	091	092	101	102
EV203	Physical Geography	X	X	X	X	X	X
EV300	Environmental Science	X		X		X	
EV301	Env Sci for Engineers	X		X		X	
EV303	Foundations in Geography	X		X		X	
EV350	Env Engineering Technologies		X		X		X
EV365	Geography of Global Cultures	X	X	X	X	X	X
EV371	Geography of Russia	X		X		X	
EV372	Geography of Asia		X		X		X
EV373	Geography of Latin America	X		X		X	
EV374	Middle East & Africa		X		X		X
EV377	Remote Sensing	X	X	X	X	X	X
EV378	Cartography	X		X		X	
EV379	Photogrammetry		X		X		X
EV380	Principles of Surveying	X		X		X	
EV384	Geography of North America	X		X		X	
EV385	Introduction to Env Engineering		X		X		X
EV386	Geography of Europe		X		X		X
EV387	Meteorology		X		X		X
EV388A	Physical Geology	X	X	X	X	X	X
EV388B	Geomorphology		X		X		X
EV389B	Climatology	X		X		X	
EV390B	Urban Geography		X		X		X
EV391A	Land Use Plan & Management	X		X		X	
EV391B	Environmental Geology		X		X		X
EV394	Hydrogeology	X		X		X	
EV396	Environmental Biological Systems		X		X		X
EV397	Air Pollution Engineering		X		X		X
EV398	Geographic Information Systems		X		X		X
EV399A	Geology Field Course	AIAD – STAP Period					
EV401	Physical and Chemical Treatment		X		X		X
EV402	Biochemical Treatment	X		X		X	
EV450	Environmental Decision Making	X		X		X	
EV471	Ecology	X		X		X	
EV477	Advanced Remote Sensing		X		X		X
EV478	Geospatial Military Operations		X		X		X
EV480	Honors Seminar in Geography	X		X		X	
EV481	Water Resources	X		X		X	
EV482	Military Geography		X		X		X
EV485	Special Topics: Geography and the Environment		X	X	X	X	X
EV486	Environmental Geography	X		X		X	

Course #	Course Title	071	072	081	082	091	092
EV488	Solid and Hazardous Waste		X		X		X
EV487	Environmental Security		X		X		X
EV489A	Advanced Individual Study I	X	X	X	X	X	X
EV489B	Advanced Individual Study II		X		X		X
EV490	Advanced Env Process Design		X		X		X
EV498	Advanced GIS	X		X		X	
XS391	Principles and Applications of Environmental Chemistry	X		X		X	



Cadets Rueth, Miller, Cosmas and Hewko relax for lunch at a restaurant overlooking Jablanica Lake in western Bosnia.

Cadet Jacobsen at the Arctic Circle along the Dalton Highway in Alaska.



COURSE DESCRIPTIONS

EV203	PHYSICAL GEOGRAPHY
	3.0 Credit Hours (BS=2.0, ES=1.0); Prerequisite: MS102

SCOPE: Physical Geography is a core course provides cadets with a fundamental understanding of scientific principles and processes of earth science, meteorology, climatology, geomorphology and environmental systems, as well as an introduction to cultural geography. Further, the course furnishes cadets with the technical skills - digital terrain analysis, image interpretation and spectral analysis, remote sensing, global positioning system, geographic information systems cartography - to delineate the geographic distribution of landforms, weather, climate, and culture systems; and evaluate their potential impact on military operations. Lessons are reinforced by extensive use of in- and out-of-class practical exercises, terrain walks and computer exercises to demonstrate the interrelationship between physical and human systems, and their impact on the environment. Historical vignettes are employed to demonstrate how the factors of weather, climate, terrain, soils, vegetation and culture are important, cogent and frequently decisive in military operations.

LESSONS: 36 @ 55 min (2.5 Att/wk)

LABS: 4 @ 55 min

SPECIAL REQUIREMENTS: None

EV300	ENVIRONMENTAL SCIENCE
	3.0 Credit Hours (BS=1.0, ES=1.5, ED=0.5); Prerequisite: EV203; Disqualifier: EV301, EV390A

SCOPE: As the introductory course to the Environmental Engineering Sequence, EV300 provides the cadet with a broad understanding of what the term "environment" includes and how influences, especially anthropogenic, cause changes in the natural balance of the earth's chemical and biological cycles. Special attention is focused on those environmental influences causing the greatest detrimental effects to human and wildlife health along with techniques used for evaluating the level of risk associated with these influences. Discussions of anthropogenic influences are conducted with consideration of social, economic, technological and political impacts. Cadets learn to evaluate literature on environmental issues through readings and interactive debates. A course project applying the scientific method to evaluate a current environmental problem provides an opportunity to tie multiple course topics with an in-depth study of an issue of interest.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: Design and conduct an environmental study.

EV301	ENVIRONMENTAL SCIENCE FOR ENGINEERS AND SCIENTISTS
	3.0 Credit Hours (BS=1.0, ES=1.5, ED=0.5); Prerequisites: EV203 Disqualifier: EV300, EV390A

SCOPE: This course is similar to EV300, but takes a more quantitative approach to the subject material. EV301 provides the cadet with a broad understanding of what the term "environment" includes and how influences, especially anthropogenic, cause changes in the natural balance of the earth's chemical and biological cycles. Special attention is focused on those environmental influences causing the greatest detrimental effects to human and wildlife health along with techniques used for evaluating the level of risk associated with these influences. Discussions of anthropogenic influences are conducted with consideration of social, economic, technological and political impacts. Cadets learn to evaluate literature on environmental issues through readings and interactive debates. A course project applying the scientific method to evaluate a current environmental problem provides an opportunity to tie multiple course topics with an in-depth study of an issue of interest.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: 1 Field Trip, 2 In-class Labs

SPECIAL REQUIREMENTS: Design and conduct an environmental study, one educational trip.

EV303	FOUNDATIONS IN GEOGRAPHY
	3.0 Credit Hours; Prerequisite: None

** To be taken in 5th academic term for all cadets choosing a Human and Environmental Geography major*

SCOPE: This course presents the basic concepts, theories and methods of inquiry in the discipline of geography as a foundation for advanced study in Human Geography, Environmental Geography, or Geospatial information science. The course includes models and concepts from the many sub-disciplinary (systematic) areas of geography to include cultural, historical, economic, urban, political and military geography. The application of concepts to real-world issues is emphasized. Research skills and techniques used by professional geographers are presented. Cadets use these approaches to spatially analyze and map the distribution of human and environmental phenomena. Several short papers will be assigned.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: Requires Department Head approval for all cadets not selecting a major in the Department of Geography & Environmental Engineering.

EV350	ENVIRONMENTAL TECHNOLOGIES
Env CES Course	3.0 Credit Hours (BS= 0.0, ES=2.0, ED=1.0), Prerequisites: CH102 or CH152, MA205 or MA255, and EV300 or EV301, Disqualifiers: EV385

SCOPE: This course builds on environmental issues introduced in EV300 and further explores environmental engineering from a unit process and materials balance approach. Analyzing water (transport, quality, drinking water treatment, and wastewater treatment); air (transport, quality, and pollutant minimization); and pollutant management (solid and hazardous wastes), the cadet is exposed to the breadth of the environmental discipline. A laboratory experience is integral to the course. In the laboratory, physical, chemical, and biological quality are discussed and measured. An introductory environmental engineering design project on river water quality is developed within the semester.

LESSONS: 36 @ 55 min (2.5 Att/wk)

LABS: 6 @ 120 min

SPECIAL REQUIREMENTS: One design project.

EV365	GEOGRAPHY OF GLOBAL CULTURES
	3.0 Credit Hours; Prerequisite: EV203

SCOPE: This course provides the geographic foundation for study in interdisciplinary and management academic areas. Contemporary regions of the world political map serve as the framework within which geographic concepts and analytical techniques are applied. Each cadet will develop an awareness of the diversity and distribution of people on the earth, human organization and exploitation of territory, and interactions among culture groups. Particular emphasis is placed on social institutions, their impact on economic development, and the subsequent identification and analysis of developed, emerging, and underdeveloped states.

LESSONS: 38 @ 55 min (2.5 Att/wk)

LABS: 2 @ 55 min

SPECIAL REQUIREMENTS: One research paper.

EV371	GEOGRAPHY OF RUSSIA
	3.0 Credit Hours; Prerequisite: EV365

SCOPE: This course examines the political, economic, and cultural geography of Russia and its adjacent neighbors; the Baltic States, East Central European region, Transcaucasus, and Central Asia. Topics covered include: the Commonwealth of Independent States; ecocide in the former Soviet Union; disposition of the former Soviet military; and ethnic rivalries. The objective of the course is to provide the student with an understanding of the recent past of the traditional Soviet system in order to understand, as well as geographically evaluate, Russia's and the other former republics' situation today.

LESSONS: 40 @ 55 min (2.5 Att/wk); 1 field trip

LABS: None

SPECIAL REQUIREMENTS: One oral report; compensatory time provided.

EV372	GEOGRAPHY OF ASIA
	3.0 Credit Hours; Prerequisite: EV365

SCOPE: The course studies the physical and cultural environment of Asia with emphasis on those geographic elements related to the region's progress, developing states, and emerging world and regional powers. Topics covered include a consideration of the physical and resource base, environmental and cultural factors, spatial organization of agriculture and industrial economies, population patterns and problems, and examination of the realm's several major subregions.

LESSONS: 40 @ 55 min (2.5 Att/wk); 1 field trip

LABS: None

SPECIAL REQUIREMENTS: One written report and one oral presentation; compensatory time provided.

EV373	GEOGRAPHY OF LATIN AMERICA
	3.0 Credit Hours; Prerequisite: EV365

SCOPE: This course studies the physical and cultural landscape of Latin America, giving special treatment to the diversity and cultural identity of the region. Topics covered include a historical geography of the region, including Pre-Columbian civilizations, Iberian, African, and European influences; the geography of transportation networks, agriculture, urbanization, and population. National boundaries, major landforms and climatic conditions are discussed to describe their effect on civilization. This course also investigates the historical relationship between the United States and Latin America, and covers recent U.S. military interventions in the region.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: One oral report; compensatory time provided.

EV374	GEOGRAPHY OF THE MIDDLE EAST AND AFRICA
	3.0 Credit Hours; Prerequisite: EV365

SCOPE: The course examines Middle Eastern and African landscapes to include expressions of their dominant physical and cultural forms. The variety of Middle Eastern and African peoples are studied in a geographic context--tracing their origins, dispersal, spatial organization, the intrusion of alien cultures and the diversity of human use and resource exploitation of the land. Among issues examined are the distribution and strategic significance of critical mineral and energy resources, population and food disparities, nation-building programs and prospects, and regional development plans. The course concludes with study of the changing internal geographic patterns, extraregional spatial relationships, and geostrategic implications of East-West competition in these unstable regional environments.

LESSONS: 40 @ 55 min (2.5 Att/wk); 1 field trip

LABS: None

SPECIAL REQUIREMENTS: One oral presentation supported by a written report; compensatory time provided.

EV377	REMOTE SENSING
	3.0 Credit Hours (ES=2.5, ED=0.5); Prerequisite: EV203, IT105 or equivalent knowledge

SCOPE: Remote Sensing is learning about something without touching it--the most obvious example being the use of satellites to study the Earth. EV377, a techniques course applicable to both the humanities and engineering, studies how and what types of information can be carried by the electromagnetic spectrum. Students enjoy a wide range of practical exercises which introduce them to several remote sensing systems to include conventional and color infrared photography, multispectral scanners, satellite imagery, thermal infrared, and radar. The capstone exercise offers each student the opportunity to perform real-time automated image classification using satellite data on his/her own microcomputer. The final few lessons of the course encompass the military airborne and spaceborne remote sensing platforms and national systems. The course focus is on applying remotely sensed data to solve current problems.

LESSONS: 35 @ 55 min (2.5 Att/wk)

LABS: 5 @ 55 min

SPECIAL REQUIREMENTS: None

EV378	CARTOGRAPHY
	3.0 Credit Hours (ES=2.5, ED=0.5); Prerequisite: EV203, IT105 or equivalent knowledge

SCOPE: Cartography teaches the principles of cartographic communication and enables the student to apply map design principles along with computer mapping techniques to solve contemporary problems in geography, economics, international relations, and applied sciences. Cadets will study the basic cartographic design process and use mapping and analysis software in the Geographic Sciences Laboratory to produce topographic and thematic maps. A final course design project presents the opportunity for the cadets to demonstrate their ability to synthesize sound mapping principles.

LESSONS: 23 @ 55 min (2.5 Att/wk)

LABS: 17 @ 120 min

SPECIAL REQUIREMENTS: Course project included in lab periods.

EV379	PHOTOGRAMMETRY
	3.0 Credit Hours (BS=0.5, ES=2.5); Prerequisite: EV203, IT105 or equivalent knowledge

SCOPE: Photogrammetry, the art and science of making accurate measurements on photographs, is an important and fundamental discipline concerned with civilian and military mapping. Students, applying simple geometric principles to the photograph, determine object identity, size, spatial relationship, and position. An abundance of practical exercises, involving the use of sophisticated equipment, provide the opportunity to apply the fundamentals while arriving at solutions to real-world problems. An interesting field trip to a local mapping organization vividly displays how all these techniques may be blended to produce maps in the commercial business world.

LESSONS: 30 @ 55 min (2.5 Att/wk)

LABS: 10 @ 55 min

SPECIAL REQUIREMENTS: None

EV380	PRINCIPLES OF SURVEYING
	3.5 Credit Hours (BS=0.5, ES=2.0, ED=0.5); Prerequisite: NONE

SCOPE: A framework for understanding and applying practical surveying methods is developed. Consideration of error theory and the concepts of precision and accuracy yields understanding of the probabilistic nature of measurements. The principles of differential leveling, taping, electronic distance measurement and angular measurement are studied and applied using state-of-the-art surveying equipment and software tools. Plane surveys are principally explored, although the fundamentals of geodetic surveys are also presented. Traverse, triangulation, trilateration, level networks and the proper adjustment of related measurements are examined. Control survey, land survey, topographic survey, horizontal and vertical curve design, computer-aided mapping and GIS applications are included. Extensive use of laboratory periods permits application of surveying fundamentals, methods and planning skills to actual field situations. The principles of the global positioning system are explored and applications in the Army and surveying are applied in the final lab exercise.

LESSONS: 21 @ 55 min (2.5 Att/wk)

LABS: 19 @ 120 min

SPECIAL REQUIREMENTS: None.

EV384	GEOGRAPHY OF NORTH AMERICA
	3.0 Credit Hours; Prerequisite: EV365

SCOPE: This course provides a regional geography of North America, with balanced coverage of the human and physical geography of the United States and Canada. Lectures are appropriately supplemented with discussions of videos, current events and maps to reinforce the understanding of important themes that are prevalent in each of North America's 15 regions. Emphasis is placed on cultural patterns and contemporary environmental issues.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: One oral presentation; compensatory time provided.

EV385	INTRODUCTION TO ENVIRONMENTAL ENGINEERING
	3.5 Credit Hours (ES=2.5, ED=1.0); Prerequisite: CH102, CH152, MA205, MA255; Corequisites: PH204, PH254 Disqualifier: EV350, EV385B

SCOPE: This course introduces cadets to the study of environmental engineering from a unit process and a materials balance approach. The focus is design-oriented problem solving to protect human health and the health of ecosystems using fundamental physical, chemical, and biological processes. The concept and calculation of risk is introduced as a key factor in environmental decision-making. Through the study of contaminant removal from water and air to integrated management techniques for solid/hazardous wastes and ionizing radiation, the cadet is exposed to the breadth of the discipline. In the laboratory, the science behind physical, chemical, and biological processes are applied to the engineering discipline. A military oriented design problem allows application of engineered solutions to topical water and air quality issues.

LESSONS: 40 @ 55 min (2.5 Att/wk); 2 field trips

LABS: 6 @ 120 min

SPECIAL REQUIREMENTS: Course design project.

EV386	GEOGRAPHY OF EUROPE
	3.0 Credit Hours; Prerequisite: EV365

SCOPE: The course examines European cultural landscapes, focusing on the environmental and cultural diversity exhibited among the states of modern Europe. Nationalism and the territorial imperative, long recognized as major forces in Europe, are studied from a geographic perspective to include patterns and processes of both regional continuity and change. Emphasis is given to the rapidly developing urbanization and mutual interdependence among countries of Western Europe. West and East European agricultural/industrial resource bases and developmental strategies are compared and contrasted. Specific topics are tailored to current issues and include regional conflict, economic development and trade, and problems of energy and the environment. This course concludes with a study of contemporary European extraregional spatial relationships with other major world culture regions.

LESSONS: 40 @ 55 min (2.5 Att/wk); 1 field trip

LABS: None

SPECIAL REQUIREMENTS: One research paper, one oral report.; compensatory time provided.

EV387	METEOROLOGY
	3.0 Credit Hours; Prerequisite: EV203

SCOPE: This course introduces meteorological processes, systems, and patterns with emphasis on spatial distributions. The course begins with a comprehensive look at the structure of the atmosphere to include the energy budget, heat transfer mechanisms, as well as an examination of daily and seasonal patterns of temperature. A thorough look at atmospheric moisture and stability precedes a study of cloud and precipitation processes followed by a study of the atmosphere in motion, namely air pressure, governing forces, winds, small and local-scale wind systems and the general circulation of the planet. Specific phenomena are then examined, including mid-latitude cyclones, thunderstorms/lightning, tornadoes, severe thunderstorms, hurricanes, air pollution, and a brief look at climate and climate change. The end of the course focuses on the art and science of weather forecasting and its applicability to military operations. In-class labs.

LESSONS: 40 @ 55 min (2.5 Att/wk);

LABS: None

SPECIAL REQUIREMENTS: Term project.

EV388A	PHYSICAL GEOLOGY
	3.0 Credit Hours (BS=1.0, ES=1.5, ED=0.5); Prerequisite: EV203; Disqualifier: EV399A

SCOPE: Primary emphasis in the course is placed on understanding and interpreting the significant geologic processes that act on and within the earth. Topics studied include the formation and identification of minerals and rocks, plate tectonics, rock structures, geologic mapping, and elements of economic geology. Field trips are conducted to illustrate concepts and processes discussed in class. The course is capstoned by a geologic design that uses an interactive geologic exploration computer simulation. The cadet designs a geologic exploration project and develops a program for remediation of an environmental problem.

LESSONS: 30 @ 55 min (2.5 Att/wk); 2 field trips

LABS: 10 @ 110 min

SPECIAL REQUIREMENTS: One design project; compensatory time provided.

EV388B	GEOMORPHOLOGY
3.0 Credit Hours (BS=1.0, ES=1.5, ED=0.5); Prerequisite: EV203	

SCOPE: This course examines the processes that create landforms on the surface of the earth and their regional and global distributions. The course focuses on geomorphic processes and their inter-relationships with geology, soils, and climate. Processes emphasized include physical and chemical weathering, and landscape evolution due to water, wind, waves and ice. Each student prepares and presents a final research project synthesizing these geomorphic processes and how they relate to real-world applications.

LESSONS: 40 @ 55 min (2.5 Att/wk); 2 field trips

LABS: None

SPECIAL REQUIREMENTS: One research project; compensatory time provided.

EV389B	CLIMATOLOGY
3.0 Credit Hours; Prerequisite: EV203	

SCOPE: This course provides a comprehensive introduction to weather processes resulting in distinctive climates. Beginning with an examination of the basic physical and chemical principles of the atmosphere, stressing the heat budget of the earth and atmospheric motion, the course leads to an examination of global climates. Additionally, students will examine climate anomalies and climate oscillations such as El Nino-Southern Oscillation (ENSO) events. The theory of global warming is examined from an objective standpoint considering a variety of climate feedback mechanisms. The course culminates by examining Pleistocene climate change in terms of the structure and operation of the atmosphere-earth-ocean system.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: One research project; compensatory time provided.

EV390B	URBAN GEOGRAPHY
3.0 Credit Hours; Prerequisite: NONE	

SCOPE: This course examines the location, function, structure, growth and interactions of urban areas. Spatial techniques are used to explore the internal attributes of cities, as well as their connectivity to other places. While the primary focus is on urbanization within the United States, primate cities abroad are often used for comparative purposes. Emphasis is placed on contemporary urban problems, particularly environmental issues and social disparities.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: One research project; compensatory time provided.

EV391A	PRINCIPLES OF LAND USE PLANNING AND MANAGEMENT
3.0 Credit Hours (BS=1.5, ES=1.0, ED=0.5); Prerequisite: EV203	

SCOPE: An introduction to land use planning and management with focus on the land-law interfaces between the physical, cultural, and legal realms. The course surveys the policies and legislative basis for land use controls at the federal and regional levels to include national parks and forests, agricultural lands, rangelands, and military training areas. The environmental and economic impacts of these controls are explored. Urban and suburban planning and zoning are also addressed. The importance of geographic concepts is emphasized in the conduct of applied case studies addressing land use conflicts and environmental strategies.

LESSONS: 40 @ 55 min (2.5 Att/wk); 1 field trip.

LABS: None

SPECIAL REQUIREMENTS: One oral presentation; compensatory time provided.

EV391B	ENVIRONMENTAL GEOLOGY
3.0 Credit Hours (BS=1.0, ES=1.5, ED=0.5); Prerequisite: EV203	

SCOPE: This course focuses on natural phenomena that pose hazards to people. The cause, nature, and occurrence frequency of natural hazards such as flooding, earthquakes, hurricanes, and volcanic activity will be examined. Emphasis will also be placed on how people perceive and respond to these hazards. Land use policies and practices in these hazard areas will also receive attention. Students will participate in map based laboratory exercises.

LESSONS: 37 @ 55 min (2.5 Att/wk)

LABS: 3 @ 55 min

SPECIAL REQUIREMENTS: One research project.

EV394	HYDROGEOLOGY
	3.5 Credit Hours (ES=2.5, ED=1.0); Prerequisite: EV203

SCOPE: Hydrogeology covers the principles governing the movement of subterranean water (groundwater), the interaction of this water with a porous medium, and the transport of chemical constituents (contaminants) by this flow. This course explores traditional background elements of hydraulic engineering, well drawdown, engineering applications, and the use of computers to model groundwater flow and contaminant plumes. All course material will contribute to modeling a specific situation and developing recommendations for cleaning up contaminated groundwater. Offered Only in Fall Semester.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: 12 @ 55 min

SPECIAL REQUIREMENTS: One design problem and course project.

EV396	ENVIRONMENTAL BIOLOGICAL SYSTEMS
	3.5 Credit Hours (BS=1.0, ES=2.5); Prerequisites: CH102 or CH152, EV203 and EV300 or EV301 or EV385

SCOPE: This course examines biology from a practical environmental engineering and environmental science perspective. The foci of the course are applied public health, microbiology and microbial energetics. Specific topics include the biological health issues associated with drinking water, microbial aspects of industrial and domestic waste treatment and protection or restoration of natural water bodies from environmental contaminants. Students are also introduced to medical geography and the spatial biological health issues associated with a deployment. Laboratory exercises are used to introduce the student to water quality analyses and practices commonly used in the fields of environmental engineering and the environmental sciences.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: 10 @ 55 min (Double Hour)

SPECIAL REQUIREMENTS: None.

EV397	AIR POLLUTION ENGINEERING
	3.0 Credit Hours (BS=0.0, ES=2.5, ED=0.5); Prerequisite: EV203

SCOPE: This course employs a design approach to air pollution control. It begins by defining air pollution problems, to include pollutant types, sources, legislation, and effects on both local and global scales. The course then examines the design of various means of controlling particulate and gaseous air pollution from both mobile and stationary sources. Finally, students study the link between meteorology and air pollution, as well as pollutant dispersion modeling in the atmosphere. The culminating course project involves a numerical approach to dispersion modeling that incorporates modeling and solution optimization.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: In-class labs

SPECIAL REQUIREMENTS: None.

EV398	GEOGRAPHIC INFORMATION SYSTEMS
	3.0 Credit Hours (ES=2.0, ED=1.0); Prerequisites: EV377 or EV378, or permission of the Head of the Department of Geography and Environmental Engineering

SCOPE: Geographic Information Systems are hardware/software systems that permit the input, storage, retrieval, manipulation, analysis, and display of geocoded data. Used by environmentalists, engineers, land-use planners, architects, managers of large land holdings, and the military, these highly- intricate "decision support" systems assist managers in answering important "what if" questions. Using digitizers and microcomputers students will build a geocoded database and solve "real-world" problems.

LESSONS: 33 @ 55 min (2.5 Att/wk)

LABS: 7 @ 55 min

SPECIAL REQUIREMENTS: Short oral reports, one database design; compensatory time provided.

EV399A	GEOLOGY FIELD COURSE
	3.0 Credit Hours (BS=1.5, ES=1.5, ED=0.0); Prerequisite: EV203; Disqualifier: EV388A

SCOPE: The geology field course is a three-week long summer Individual Advanced Development Program. It is taught in the Rocky Mountain region of the western United States. Geologic concepts are presented in a classroom setting and supplemented with laboratory exercises. The majority of the course, however, is conducted at actual geologic sites in the field where concepts are illustrated and expanded. The course provides the cadet with knowledge of and appreciation for the science of geology as well as practical experience in geologic mapping using remote sensing and GIS. Field trips to active mines and a Superfund site relate classroom learning to the real world.

LESSONS: Variable

LABS: Variable

SPECIAL REQUIREMENTS: TDY travel to the course location in the western USA; excursions to remote field locations; one graded geologic mapping exercise and engineering design. Offered as an Academic Individual Advanced Development course.

EV401	PHYSICAL AND CHEMICAL TREATMENT
	3.5 Credit Hours; (ES=2.0, ED=1.5); Prerequisite: XS391; Corequisite: ME311, ME362, EM362A

SCOPE: This course takes a process approach to environmental engineering using engineering science and design of drinking water treatment systems as the primary foci. Building upon concepts gained in environmental chemistry, cadets study physical and chemical processes used in environmental engineering. Discussion includes the theories behind these processes and the design procedures involved in their application. The health implications associated with drinking water and water treatment in contingency operations and applicable occupational health issues are discussed during the course. Cadets develop comprehensive concept design of drinking water treatment processes. While the focus of the course is drinking water treatment, the processes developed are also applicable to wastewater treatment, groundwater remediation, air pollution control, and the treatment of solid and hazardous wastes.

LESSONS: 40 @ 55 min (2.5 Att/wk); 1 field trip

LABS: 12 @ 55 minutes (Double Hour)

SPECIAL REQUIREMENTS: One term project.

EV402	BIOCHEMICAL TREATMENT
	3.5 Credit Hours (ES=2.0, ED=1.5); Prerequisites: EV396, ME311, ME362, EM362A

SCOPE: This course provides cadets with the opportunity to apply the principles of microbiology to the protection and improvement of the environment. This course builds on the concepts learned in EV396, Environmental Biological Systems, and directly applies those concepts to the treatment of wastewater, removal of nutrients from wastewater, anaerobic digestion, bioremediation, industrial waste treatment, and emerging applications of biological treatment and modeling. A comprehensive, multi-step design project serves as the design experience for this course. Offered only in the spring semester.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: 7 x 120 minutes

SPECIAL REQUIREMENTS: Engineering design project with a written report.

EV450	ENVIRONMENTAL DECISION MAKING
Env CES Course	3.0 Credit Hours; (BS=0.0, ES=2.0, ED=1.0); Prerequisites: EV350 and standing as a First Class Cadet; Disqualifier: EV481

SCOPE: This course is the third in a three-course sequence and is concerned with the balance of engineered solutions with economic, socio-cultural, political, and ecological considerations evaluated during a decision-making process. Using management of water resources as a teaching model, the realities of decision-making and policy development for all areas of engineering, and particularly environmental engineering, are examined. The course begins with instruction on the tools available to water resource managers, to include both structural (engineered) and non-structural approaches to solve water resource problems. Elements of engineering design and the design process are introduced as well as methods of conducting tradeoff analyses. The course makes use of case studies of current water resource projects and includes a term project. Visiting speakers are employed to present views of government and concerned public interest groups.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: Written and oral research reports on a water resources project.

EV471	ECOLOGY
	3.0 Credit Hours; (BS=1.0, ES=0.5, ED=0.0); Prerequisites: CH385 or CH375 EV300 or EV301, EV350 or EV385B

SCOPE: This course examines ecosystems through the study of ecological principles related to an organism's relationship to its environment, population dynamics, species interactions, and community and ecosystem level dynamics. The fundamental influences of energy flow and material cycling are emphasized throughout as well as the role of surface water and watersheds within ecosystems. The course includes several field trips, which lead to a culminating term project designed to integrate previously acquired interdisciplinary environmental science technical skills and ecological principles.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: In-class labs and field trips

SPECIAL REQUIREMENTS: Term paper examining aspects of one of the world's ecosystems. Compensatory time provided

EV477	ADVANCED REMOTE SENSING
	3.0 Credit Hours; (ES=2.0, ED=1.0); Prerequisites: EV203, EV377

SCOPE: This course examines advanced remote sensing theory and digital image processing techniques suitable for the processing of remotely sensed data. Emphasis is on the processing and analysis of state-of-the-art spatial and spectral resolution data gathered by airborne and satellite sensors. Topics covered include geometric and radiometric image rectification; registration and resampling techniques, image enhancements, data merging, image segmentation, and automated feature extraction. A wide range of practical exercises and in-class laboratory assignments provides hands-on experience with a variety of remotely sensed imagery from multi-spectral to hyper-spectral data. The course culminates with a capstone term project that allows students to apply digital image processing skills to a scientific problem.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: In-Class Labs

SPECIAL REQUIREMENTS: Term project; compensatory time provided.

EV478	GEOSPATIAL MILITARY OPERATIONS
	3.0 Credit Hours; (ES=2.0, ED=0.0); Prerequisites: EV203

SCOPE: This course is designed to teach the most current state of geospatial operations in the military. It is built to provide the student an improved understanding of the cornerstone to the digital force - the "common operational picture" or COP. This course is divided into five major blocks of instruction: (1) a linked discussion of geospatial operations' development, organizations and data systems; (2) the geographic information system (GIS) as a military tool - system input, management, data analysis and production outputs; (3) Army geospatial operations in the garrison environment; (4) Army geospatial operations in combat environments; and (5) geospatial operations for joint/coalition forces. The course includes several relevant practical exercises and laboratories, a field trip, guest lectures and one panel discussion. Due to the currency of the material discussed a secret security clearance is required for all participants.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None.

SPECIAL REQUIREMENTS: None.

EV480	HONORS SEMINAR IN GEOGRAPHY
	3.0 Credit Hours; Must be selected for participation in the Honors Program

SCOPE: This course will examine major research initiatives in the discipline and delineate their data requirements. The primary objective of this course is to identify and outline the senior thesis, which is the culminating event for the Honors Program. Hence, cadets participating in this course will explore research methods and data sources used by geographers, conduct a critical analysis of seminal literature in the field, define a research problem, identify and evaluate data sources, and assemble a research proposal. The final product of this course will be a written research proposal that will define the senior thesis (written during EV489B). The cadet will make a formal presentation of this proposal to senior geography faculty. The course is conducted in a seminar and one-and-one format. Lessons and labs are established by consultation between the cadet and faculty advisor.

LESSONS AND LABS: 40 @ 55 min. (2.5 Att/wk).

SPECIAL REQUIREMENTS: n/a.

EV481	WATER RESOURCES PLANNING AND DESIGN
	3.0 Credit Hours; (ES=2.0, ED=1.0); Prerequisites: Standing as a First Class Cadet; Disqualifiers: EV450

SCOPE: The course is concerned with the effective use of water as a manageable natural resource and it begins with discussion concerning the varied uses of water and the structural (engineered) and non-structural approaches available to meet these needs. The bulk of the course is concerned with assessment of the impacts of various water resource development activities on the economic, socio-cultural and ecological sectors of the environment. Methods for conducting tradeoff analyses among the engineered and environmental aspects of projects are developed and applied in a term project. The course makes use of case studies of current water resource projects and includes visiting speakers to present views from government and public interest groups. Offered only in the fall semester.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: Written and oral research reports on a water resources project.

EV482	MILITARY GEOGRAPHY
	3.0 Credit Hours; Prerequisite: EV203

SCOPE: Military history is replete with examples of the influence of terrain, weather, climate and the cultural landscape on combat. The problems of war and every aspect of any military enterprise are immutably linked to geography. This course examines those links. Wars are fought to gain control over land, resources and peoples of the world. More recently, military undertakings by this nation have incorporated a wide range of Operations Other Than War (OOTW). Notwithstanding its purpose, the conduct of a military endeavor is conditioned by the character of the area of operations -- *the military operating environment*. This course focuses on the synergy between geography and military operations, and emphasizes the development of a geographic methodology for systematic analyses of military operating environments. Case studies and guest lectures are used to examine the impact of weather, climate, terrain and the cultural landscape on military operations from the tactical to strategic level. Further, the course investigates the subjects of geopolitics, geostrategy and strategic choke points, as well as environmental security and military lands.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: One written research project.

EV485	SPECIAL TOPICS IN GEOGRAPHY AND THE ENVIRONMENT
	3.0 Credit Hours; Prerequisite: EV203, and permission of the professor

SCOPE: This course explores an advanced topic in Human and Regional Geography, Environmental Geography, Environmental Science, Environmental Engineering, or Geospatial Information Science. Specific subject matter will vary with the expertise of the visiting professor or senior faculty member conducting the course.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: As specified by instructor.

EV486	ENVIRONMENTAL GEOGRAPHY
	3.0 Credit Hours; Prerequisite: EV203, EV365

SCOPE: Whereas physical geographers focus on the earth's surface and atmosphere, and human geographers concentrate on the spatial aspect of human activities, environmental geographers are interested in both how people adapt to specific environments and how they alter those environments through human activities. To understand these interactions and their implications, environmental geographers must fully appreciate natural processes and landform development within and on the surface of the earth, as well as the implications of human intervention in the natural system.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: None.

EV487	ENVIRONMENTAL SECURITY
	3.0 Credit Hours; Prerequisite: Standing as a First Class Cadet

SCOPE: This interdisciplinary seminar uses Environmental Security in a case study approach to study environmental issues potentially affecting U.S. National Security. Cadets will explore environmental security topics such as water, natural resource shortages, energy use and dependency, global climate change using an interdisciplinary approach from social, political, economic, and scientific-technological perspectives. The course culminates on a student team analysis of a developing country in terms of environmental security issues and the related US national security interests. The final project includes a formal brief and written paper.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: The final project includes a formal brief and written report.

EV488	SOLID AND HAZARDOUS WASTE MANAGEMENT AND REMEDIATION
	3.0 Credit Hours (ES=1.0, ED=2.0); Prerequisites: EV394 and EV402

SCOPE: This course examines the treatment, storage and disposal of solid and hazardous wastes. Both regulatory requirements and evolving technology associated with solving modern solid waste disposal problems are discussed. Processes for the investigation and remediation of contaminated waste sites are presented, along with design methodologies for solid and hazardous waste disposal systems. The course culminates in the application of hazardous waste engineering to the cleanup of a contaminated hazardous disposal site. Offered Only in Spring Semester.

LESSONS: 40 @ 55 min (2.5 Att/wk)

LABS: None

SPECIAL REQUIREMENTS: One design project and a research paper.

EV489A	ADVANCED INDIVIDUAL STUDY I
	3.0 Credit Hours; Prerequisite: Permission Required

SCOPE: The course is an individually supervised research and study program designed to provide cadets with the opportunity to pursue advanced topics within their discipline. The cadet prepares a research and study proposal setting forth the objectives, scope, and anticipated accomplishments of his/her efforts for the semester. If required for a specific degree, the proposal will include a justification for engineering science or design credit. Once approved, the proposal serves as a basis for the cadet's research and study program. Progress in research reports and observations by the faculty advisor form the basis for grades. The program for each cadet will culminate in one of two outcomes: 1) a discipline-appropriate written product (e.g., senior thesis or design project) with oral defense; or 2) enrollment in EV489B for the completion of the research and study program during the second academic term. Lessons and labs are established by consultation between the cadet and faculty advisor

LESSONS and LABS: Established by consultation between cadet and faculty advisor.

SPECIAL REQUIREMENTS: As determined by faculty advisor.

EV489B	ADVANCED INDIVIDUAL STUDY II
	3.0 Credit Hours; Prerequisite: Permission Required

SCOPE: The course is an individually supervised research and study program designed to provide cadets with the opportunity to pursue advanced topics within their discipline. The cadet uses a research and study proposal setting forth the objectives, scope, and anticipated accomplishments of his/her efforts for the semester. If required for a specific degree, the proposal will include a justification for engineering science or design credit. The proposal serves as a basis for the cadet's research and study program. Progress in research reports and observations by the faculty advisor form the basis for grades. The program for each cadet will culminate in a discipline-appropriate written product (e.g., senior thesis or design project) with oral defense. Lessons and labs are established by consultation between the cadet and faculty advisor.

LESSONS and LABS: Established by consultation between cadet and faculty advisor.

SPECIAL REQUIREMENTS: As determined by faculty advisor.

EV490	ADVANCED ENVIRONMENTAL PROCESS DESIGN
	3.5 Credit Hours (ES=1.5, ED=2.0); Prerequisites: EV301 or EV385B; Standing as a First Class Cadet in Environmental Engineering or Permission of the Department Head

SCOPE: This is the final design course for the major in environmental engineering. It exposes cadets to the complete design experience including project management, work scheduling, and development of plans and specifications. The course centers on a senior design project that requires the employment of concepts in engineering design to produce a 35% product for an actual customer. Working in small teams, cadets examine projects through the feasibility and concept design phases to evolve and develop concepts that are not only technically feasible, but economically, socially, and politically acceptable. The evaluation of alternatives employs trade-off analysis and the use of multi-attribute decision models. The final product includes a formal oral briefing and a written feasibility study. In addition to project management, course lectures cover engineering ethics, engineering economics, and topical coverage of fundamental engineering topics relevant to the problems under study. The course concludes with a field data, collection exercise where cadets develop collection protocols and logistical requirements and then execute the data collection plan and results analysis.

LESSONS: 40 @ 55 min a (2.5 Att/wk)

LABS: 12 @ 55 minutes (Double Hour)

SPECIAL REQUIREMENTS: Two design problems. First class cadets only.

EV498	ADVANCED GEOGRAPHIC INFORMATION SCIENCES
	3.0 Credit Hours (ES=2.0, ED=1.0); Prerequisite: EV398

SCOPE: This course examines the analytical methods used in Geographic Information systems (GIS) and provides cadets with a clear understanding of the theoretical/conceptual aspects of algorithms found in GIS software. Lectures focus on the underlying mathematical basis for widely used spatial analytical techniques. Among the topics covered are neighborhood operations, map transformation, spatial interpolation, terrain analysis, network analysis, spatial overlay, fuzzy sets, neural networks, and expert systems. In-class practical exercises and laboratory assignments compliment the lectures by providing hands-on experience with a variety of advanced analytical techniques. The course culminates with a capstone term project that allows cadets to identify a scientific problem, formulate a hypothesis, use GIS to solve the problem, and then present the results of their analysis.

LESSONS: 30 @ 55 min (2.5 Att/wk)

LABS: 10 @ 55 Min

SPECIAL REQUIREMENTS: Term Project. Compensatory time provided.

XS391	PRINCIPLES AND APPLICATIONS OF ENVIRONMENTAL CHEMISTRY
	3.0 Credit Hours (BS=1.0, ES=2.0); Prerequisites: CH102 or CH 152, MA103 or MA153, and MA104 or MA154

SCOPE: This course examines chemical interactions of pollutants in air, soil, and water systems. The focus of the course is problem solving with the following topic coverage: approximately 80% applied aquatic chemistry, 15% environmental organic chemistry, and 5% applied analytical chemistry. Specific topics include the chemistry applied in drinking water production and the chemical aspects of industrial and hazardous waste treatment. The fate of heavy metals and organic contaminants in soil and aqueous systems is also discussed.

LESSONS: 40 @ 55 min a (2.5 Att/wk)

LABS: Various in-class labs

SPECIAL REQUIREMENTS: None



MAJ McAllister (AKA "the Mad Scientist") assists engineering sequence cadets enrolled in EV350 conduct their jar test experiment.



On his AIAD with the U.S. Army Aberdeen Test Center, CDT Nate Whipple examines a test dummy that was placed inside a vehicle to monitor how humans deal with an IED blast.



Cadet Jeff Nichols tries his hand at charming snakes (yes, that's a cobra in the basket!) while taking in the local culture during the India AIAD.

Cadets Tanya Duester, Jiajing Thach and Dmitriy Shekyman complete their horizontal curve layout lab for EV380 (Principles of Surveying).



EV203 Cadets display their immense geographical knowledge, identifying West Point's location on a globe.



Cadets on the SE Asia AIAD explore temples in Khajuraho, India, June 2007.



Cadets on the Field Geology AIAD investigate an "earth crack" on the edge of Halemaumau Crater at Volcanoes National Park in Hawaii, May 2007.



Cadet Krishel Taylor participated in the Army Environmental Command Center's Submerged Aquatic Vegetation Project in the Chesapeake Bay watershed.



Cadets on the Geomorphology/Geology AIAD enjoy spring break at Death Valley, March 2007.

DEPARTMENT FACULTY

PERMANENT MILITARY FACULTY

COLONEL EUGENE J. PALKA

Professor and Head, Department of
Geography and Environmental Engineering

Ph.D., University of North Carolina at Chapel Hill,
1995

M.A., Ohio University, 1986

B.S., USMA, West Point, 1978

Deputy Head, D/G&EnE, USMA, 2002 – 2006
C-5, 10th Mountain Division, CJTF-Afghanistan,
2002

Geography Program Director, D/G&EnE, USMA,
1998-2002

Deputy Commander, 16th Cavalry Regiment, FT
Knox, KY, 1997-98

Battalion Commander, 1-46th Infantry Regiment, FT
Knox, KY, 1995-97

Battalion XO, 5-9th Infantry Regiment, FT Wainwright, AK, 1991-92

G3, Chief of Opns, 6th Infantry Division (Light), FT Wainwright, AK, 1990-91

Battalion S3, 1-501st Infantry, 101st ABN Division, FT Campbell, KY, 1983-84

Company Commander, A/1-501st IN, 101st ABN Division, FT Campbell, KY, 1981-83

Company XO, A/1-501st IN, 101st ABN Division, FT Campbell, KY, 1980-81

Aide de Camp, HHC, 101st ABN Division, FT Campbell, KY, 1979-80

Platoon Leader, B/2-502nd IN, 101st ABN Div., FT Campbell, KY, 1978-79



COL Palka is an Infantryman, whose military assignments include nearly six years with the 101st Airborne Division, and more than two years with the 6th Infantry Division (Light) in Alaska. More recently, COL Palka commanded the 1st Battalion, 46th Infantry Regiment at Fort Knox, and subsequently served as the Deputy Commander of the 16th Cavalry Regiment. From February to April 2002, he was assigned to the 10th Mountain Division and deployed to Afghanistan to serve as the C-5, Future Plans Officer, for the Coalition Joint Task Force, CJTF-Afghanistan. COL Palka is an environmental geographer, with expertise in military and human geography, and regional expertise in North America and Latin America. He has authored or co-authored 10 books, numerous book chapters, and dozens of professional articles on a wide range of military and geographic topics. He has taught many of the geography courses offered in the department. He currently rotates his teaching assignments between Geography of North America, Urban Geography, Geography of Latin America, and Geography of Global Cultures. ★

COLONEL JOE D. MANOUS, Jr.
Academy Professor, and Deputy Head,
Department of Geography and
Environmental Engineering

Ph.D., University of Minnesota (Environmental
Engineering), 2000
M.S.S., US Army War College, 2003
M.S., University of Illinois (Civil Engineering),
1989
B.CE., Georgia Institute of Technology (Civil
Engineering), 1980
B.S., North Georgia College (Physics), 1980
P.E., Commonwealth of Virginia, 1984



Special Asst (Engineer Projects) to Deputy
Commanding General, FT Bragg, NC, 1996-97
Battalion XO, 27th Engineer Battalion (Cbt)(Abn), FT Bragg, NC, 1995-96
Area Commander (Central America), Mobile District, USACE, Tegucigalpa, Honduras, 1993-94
Asst Dean for Policy, USMA, West Point, NY, 1992-93
Company Commander, B/94 Engineer Battalion (Cbt)(Hvy), Darmstadt, FRG, 1985-87
Asst S3, B/94 Engineer Battalion (Cbt)(Hvy), Darmstadt, FRG, 1984-85
Platoon Leader, Company XO, 307th Engineer Battalion (Cbt)(Abn), 82d Airborne Division, FT
Bragg, NC, 1980-1983

COL Manous is an engineer officer with experience in airborne and military construction units as well as engineering duties associated with civil construction and operations on military installations. As a member of the USMA faculty, COL Manous has taught EV203 (Physical Geography), SE381 (Engineering Economy), EV385 (Introduction to Environmental Engineering), EV390A (Environmental Science), EV481 (Water Resources Planning and Design), EV487 (Environmental Security), EV488 (Solid and Hazardous Waste Management and Remediation), and EV490 (Advanced Environmental Processes Design). COL Manous's research interests concern water availability, quality, and reuse; environmental factors that affect economic development and regional security; public policy associated with infrastructure construction and sustainment; and infrastructure assessment in developing regions. ★

COL LAUREL J. HUMMEL

Associate Professor and Program Director,
Geography

Ph.D., University of Colorado, 2002
M.S.S., US Army War College, 2006
M.Ed., University of Alaska Anchorage, 1999
M.S., Pennsylvania State University, 1991
B.S., United States Military Academy, 1982

Chief, Operations Intelligence Division and
Joint Intelligence Support Element,
Intelligence Directorate, Alaskan Command,
PACOM, Elmendorf Air Force Base, Alaska,
1996-2000

S-3, 102d Military Intelligence Battalion, 2d
Infantry Division, ROK, 1995-1996

Instructor and Assistant Professor, Department of
Geography and Environmental Engineering,
USMA, 1991-1994

Company Commander, S-1, and S-2, 224th Military Intelligence Battalion (Aerial Exploitation),
525th Military Intelligence Brigade (ABN), Hunter Army Airfield, Georgia, 1986-1989
Chief, Intelligence Plans and Production, and Tactical Intelligence Officer, 24th Infantry Division
G-2, Fort Stewart, Georgia, 1985-1986
Platoon Leader and Company XO, 124th Military Intelligence Battalion, 24th Infantry Division,
Fort Stewart, Georgia, 1983-1985



COL Hummel has spent the majority of her military career in the fields of tactical, imagery, and strategic intelligence, in Army field units and the joint arena. She is a graduate of the US Army War College, the US Army Command and General Staff College and is a Joint Service Officer. As a member of the USMA faculty, she has taught Physical Geography, Geography of Global Cultures, Geomorphology, Geography of North America, and the Honors Seminar in Geography. COL Hummel is primarily a human geographer with interests in landscape studies, geography in higher education, and environmental security and the formulation of national security policy. She has conducted research, lectured, and published across a diverse spectrum of interests, including: the US military's influence upon the cultural and environmental landscape, infusing geography in K-12 public education, population increase and regional instability in sub-Saharan Africa, gendered aspects of transformational leadership, and the patterns of decline and resurgence among small towns in Appalachia. As an Alaskan, COL Hummel maintains a regional interest in the geography of Alaska, and specifically the many effects of the militarization of Alaska on Alaskan demographics, development, and culture. ★

COL JASON C. LYNCH

Academy Professor and Program Director,
Environmental Engineering

Ph.D., University of Florida (Environmental
Engineering Sciences) 2002

M.E., University of Florida (Environmental
Engineering Sciences) 1993

B.S., United States Military Academy (Chemistry
Concentration) 1984

P.E., Commonwealth of Virginia 1996

DEE, American Academy of Environmental Engineers
2004



Environmental Program Academy Professor,
D/G&EnE, USMA, 2002-2006

Deputy Regimental Rear Commander, 2nd ACR,
FT Polk, LA 1997-98

Regimental Chemical Officer, S1, XO, & LNO, 2nd ACR, FT Polk, LA 1996-97

Instructor & Assistant Professor, D/G7EnE, USMA 1993-96

System Manager, Program Management NBC Defense Systems, Aberdeen Proving Grounds, MD
1990-91

Company Commander, 164th Chemical Company (Smoke Generator), I Corps, FT Lewis, WA
1988-89

Division Chemical NBC Element Director, 9th Infantry Division, FT Lewis, WA 1987-88

Brigade Chemical Officer, 9th Cavalry Brigade, Air Attack, 9th Infantry Division, FT Lewis, WA
1986-87

Platoon Leader and Executive Officer, 4th Chemical Company (Dual Purpose), 2nd Infantry
Division, Camp Casey, Korea 1985-86

COL Lynch is a Chemical Corps officer who has served in various command and staff positions in predominantly light infantry and cavalry units. He has been fortunate in the amount of time he was able to spend actually in Chemical Corps units with experience in reconnaissance, smoke generation, and decontamination. He also served an acquisition corps assignment working radiac instrument research, development, and testing. COL Lynch is an environmental engineer with research interests in field investigation and remediation of hazardous materials as well as environmental policy and management. He is currently involved in national level service with the Accreditation Board of Engineering and Technology (ABET) and the National Council of Examiners for Engineering and Surveying (NCEES). He has taught most of the environmental courses offered in the department. This year he will teach EV394, Hydrogeology, EV450, Environmental Decision-Making, EV397 Air Pollution Engineering, and EV488, Solid & Hazardous Waste Treatment & Remediation. ★

LTC STEVEN D. FLEMING

Academy Professor, Geospatial Information
Science

Ph.D., University of Georgia, 2004
M.A., Naval War College, 1999
M.A., University of Georgia, 1995
B.S., USMA, 1985

Academy Professor, Department of Geography and
Environmental Engineering, USMA, 2005-
Present

Advisor, National Military Academy - Afghanistan,
CFC-A, Kabul, Afghanistan, 2005

Academy Professor, Department of Geography and
Environmental Engineering, USMA, 2004-
2005

Assistant Division Air Defense Officer, 4th Infantry Division, Fort Hood, Texas 2000-2001

Battalion S-3, 1-44 ADA, 4th Infantry Division, Fort Hood, Texas 1999-2000

Aide-de-Camp to the Superintendent, USMA, 1997-1998

Instructor/Assistant Professor, Department of Geography and Environmental Engineering,
USMA, 1995-1998

Battery Commander, A/1-62 ADA, 25th Infantry Division, Schofield Barracks, Hawaii, 1992-
1993

Assistant Battalion S-3/Brigade Liaison Officer, 1-62 ADA, 25th Infantry Division, Schofield
Barracks, Hawaii, 1990-1992

Battalion S-1, 5-62 ADA, 11th ADA Brigade, Fort Bliss, Texas, 1988-1990

Assistant Battalion S-3, 5-62 ADA, 11th ADA Brigade, Fort Bliss, Texas, 1988

Platoon Leader, 5-62 ADA, 11th ADA Brigade, Fort Bliss, Texas, 1986-1988

Platoon Leader, 4-1 ADA, 11th ADA Brigade, Fort Bliss, Texas, 1985-1986



LTC Fleming is an Air Defense officer with command and staff experience in short-range air defense operations at the battalion, brigade and division levels. Academically, LTC Fleming specializes in geospatial information sciences with particular interest in large-scale mapping of coastal regions. He has taught EV203 (Physical Geography), EV377 (Remote Sensing), EV379 (Photogrammetry), EV380 (Surveying), EV485 (Advanced Topics in Geography and the Environment) and EV489B (Advanced Independent Study in GIS). LTC Fleming currently teaches EV203 (Physical Geography), EV377 (Remote Sensing) and EV478 (Military Geospatial Operations). ★

LTC MICHAEL D. HENDRICKS

Academy Professor, Geospatial Information
Science

Ph. D., University of Maine – Orono, 2004

M.S., University of South Carolina, 1994

B.S., University of Delaware, 1986

Battalion XO, 29th Engineer Battalion
(Topographic), Fort Shafter, HI 2000-2001

Geospatial Operations Officer & Detachment
Commander, 5th Planning and Control, U.S.
Army Pacific (USARPAC), Fort Shafter, HI
1999-2000

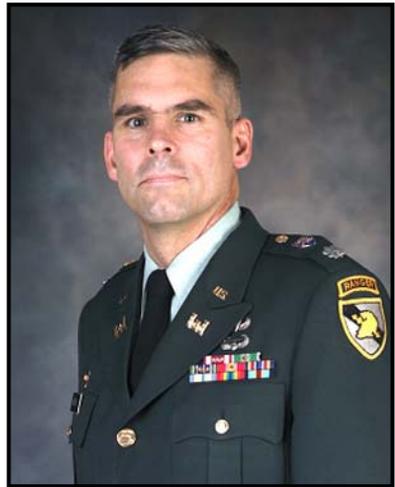
Instructor and Assistant Professor, Department of
Geography and Environmental Engineering
USMA, 1995-1998

Company Commander, A Co, 13th Engineer Battalion (Light), Fort Ord, CA, 1992-1993

Asst Operations Officer, 13th Engineer Battalion (Light), Fort Ord, CA, 1991-1992

Company XO, HQ Co, 317th Engineer Battalion (Mech), Germany, 1989-1990

Platoon Leader, A Co, 317th Engineer Battalion (Mech), Germany 1987-1989



LTC Hendricks is an Engineer Officer specializing in Geospatial Information Operations. His recent military experience was with the 29th Engineer Battalion (Topographic) supporting PACOM, USARPAC, and numerous other organizations in the pacific region with mapping and geospatial intelligence. His research interests include; GIS education, supporting navigation and mobility analysis in dynamic and uncertain settings, and mobile mapping. In addition, he is involved in producing large-scale topographic maps for the sport of Orienteering. LTC Hendricks teaches EV398 (Geographic Information Systems) and EV498 (Advanced Geographic Information Systems). ★

LTC MARK A. SMITH

Assistant Professor, Environmental Science

Ph.D., University of Wisconsin, Madison, 2002

M.S., University of Wisconsin, Madison, 1989

B.S., Oregon State University, 1985

Theater Missile Defense Officer and Balkans

Reserve Force Desk Officer, Joint Force

Command, Naples, Italy, 2002-2005

S-3, 5-7 ADA, Hanau Germany, 2001-2002

Operations and Training Officer, Extended Air

Defense Task Force, Giessen, Germany, 1999-
2001

Team Leader, 432nd Civil Affairs Battalion, Green

Bay, WI, 1998-1999

Detachment Commander, 2/335th Bn, 4 Bde,

Madison, WI, 1997-1998

OIC, Observer Controller Lanes Team, 2/335th Bn, 4
Bde, Madison, WI, 1996-1997

Platoon Leader, Observer Controller Lanes Team, 2/335th Bn, 4 Bde, Madison, WI, 1994-1996

Force Air Defense Officer, Allied Command Europe Mobile Force Land and S-5, Wackernheim,
GE, 1991-1994

Platoon Leader, 5/3 ADA, Wackernheim, GE, 1990-1991

Platoon Leader, 3/5 ADA, Buedingen, GE, 1990



LTC Smith is an Air Defense officer with experience in a wide variety of assignments, to include joint and combined tours with NATO and European Union forces. LTC Smith has also served two combat tours to Iraq (Platoon Leader during DESERT STORM, and NATO LNO to Multi-National Corps Iraq in support of the NATO training Mission in Iraq). LTC Smith holds a joint PhD in Wildlife Ecology and Zoology from the University of Wisconsin-Madison. His dissertation research and interests are about integrating military training and wildlife on military lands. He teaches EV 203 (Physical Geography), EV 300 (Environmental Science), EV 301 (Environmental Science for Engineers and Scientists), and EV471 (Ecology). ★

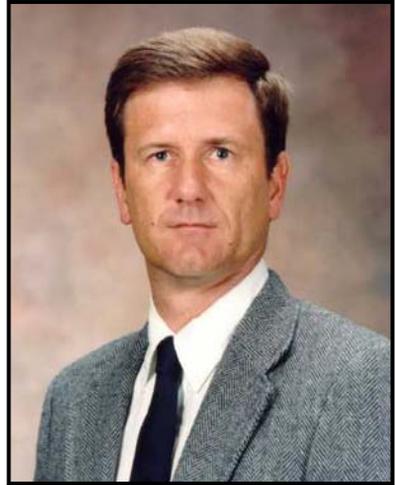
CIVILIAN FACULTY

Dr. JOHN A. BROCKHAUS

Professor and Program Director,
Geospatial Information Science

Ph.D., University of Idaho, 1987
M.S., California Polytechnic State University, 1980
B.S., California Polytechnic State University, 1978

Research Associate, NCS University, 1984-94
Instructor, University of Idaho, 1982-84
Systems Analyst, Humboldt State University, 1981-82
Instructor, California Polytechnic State University, 1978-80



Dr. Brockhaus is an environmental scientist with teaching and research interests in aerial photo interpretation, remote sensing, and geographic information systems. He has expertise in the application of remote sensing and geographic information systems in the study of landscape characterization, spatial modeling of ecological processes, site degradation monitoring, and land cover change analysis. He has published several articles in professional journals and has presented over 30 papers at national and international conferences. His research interests include site degradation monitoring with remotely sensed data, detection and mapping of invasive plant species using hyperspectral imagery, and the use of ground penetrating radar in archeological studies. He teaches EV377 (Remote Sensing), EV378 (Cartography), EV379 (Photogrammetry), EV398 (Geographic Information Systems) and EV477 (Advanced Remote Sensing). ★

Dr. MARIE C. JOHNSON

Professor of Geology, Environmental Engineering

Ph.D., Brown University, 1990

AB, *magna cum laude*, Harvard College, 1985

Associate Research Scientist, Lamont-Doherty
Earth Observatory of Columbia University,
1992-95

Lamont-Doherty Postdoctoral Fellow, Lamont-
Doherty Earth Observatory of Columbia
University, 1990-92

Research Assistant, Brown University, 1986-90



Dr. Johnson is a Geologist who applies the skills and techniques of physical chemistry to understanding geological processes. Her specific research interests include understanding fluid behavior at high pressures and temperatures inside the Earth, deducing physical conditions inside a volcano just prior to eruption, and hazardous waste disposal. She is the author of many articles in professional journals, and often presents papers at national conferences. She is course director for EV301 (Environmental Science for Engineers and Scientists), EV391B (Environmental Geology), EV399A (Geology Field Course), EV471 (Ecology), and EV388A (Physical Geology). ★

Dr. JON C. MALINOWSKI

Professor, Geography

Ph.D., Geography, University of North Carolina at
Chapel Hill, 1995

M.S., Geography, University of North Carolina at
Chapel Hill, 1993

B.S. Foreign Service, Georgetown University,
1991, *magna cum laude*, Phi Beta Kappa

Teaching Fellow, UNC-Chapel Hill, 1993-95



Dr. Malinowski is a Geographer with teaching and research interests in environmental perception, spatial ability, children's geographies, summer camps, and the geography of Asia. He is the published author of two books, several academic journal articles and book chapters. He currently serves as the Human Geography Director. Dr. Malinowski serves as the course director for EV303 (Foundations in Geography) and EV372 (Geography of Asia). ★

Dr. MICHAEL A. BUTKUS

Associate Professor, Environmental Engineering

Ph.D., The University of Connecticut, 1997

M.S., The University of Connecticut, 1995

B.S., The United States Merchant Marine Academy,
1989

P.E., State of Connecticut, 1997

Research Associate and Teaching Fellow, UCONN,
1994-97

Nuclear Plant Engineer, Knolls Atomic Power
Laboratory,
1990-93



Dr. Butkus is an Environmental Engineer with research focuses on water, wastewater, and hazardous waste treatment system design. He has conducted environmental research for both the military and civilian sectors. His current research interests include remediation of lead on firing ranges, disinfection, and the development of small-scale water treatment devices for the Army. Dr. Butkus has been the course director for EV396 (Environmental Biological Systems) and XS391 (Principles and Applications of Environmental Chemistry). He also teaches EV385B (Introduction to Environmental Engineering), EV300/EV390A (Environmental Science), EV401 (Physical and Chemical Treatment), and EV402 (Biochemical Treatment). ★

Dr. PETER P. SISKA

Associate Professor, Geography

Ph.D. Forestry/GIS, Texas A&M University,
College Station, TX 1995

Ph.D. Regional Geography, Comenius University,
Bratislava, Slovakia 1984

MS. Regional Geography, Comenius University,
Bratislava, Slovakia 1978

BS. Physical Geography, Comenius University,
Bratislava, Slovakia 1974

Associate Professor Austin Peay State University
Clarksville, TN 2004-2007

Assistant Professor Stephen F. Austin University,
Nacogdoches, TX, 1999 - 2004

Research Scientist Texas A&M University, 1997-
1999

Assistant Professor Constantine Philosopher University, Nitra, Slovakia, 1995 – 1997

Assistant Professor Comenius University, Bratislava, Slovakia, 1979 – 1984



Dr. Peter Siska has a diverse background in the natural resource management, spatial analysis, geostatistics and geographic information systems. He participated in the regional planning project in Slovakia and in the research projects in Texas including volumetric analysis of the total tree stem volume of the east Texas forest ecosystem, natural resource and inventory border zone project between Texas and Mexico and developing karst hazard prediction model in Pennyroyal Plane and Western Kentucky Highlands. Dr. Siska was also director of the School of Agriculture and Geosciences and published several papers in international scientific journals, presented scientific papers in the United States and Europe and is active on the board of directors for Applied Geography Conferences. He is a member of Slovak Academy of Sciences and currently serves on the editorial board for *Geografický Časopis* (Journal of Geography) published by Slovak Academy of Sciences. He teaches EV 365 course, Geography of Global Cultures and taught previously Regional Geography of Europe, the Americas and Australia, Regional Geography of Africa, Asia and Oceania, Introduction to GIS, Political Geography and graduate courses in Geospatial Analysis. ★

Dr. AMY K. RICHMOND
Assistant Professor, Geography

PhD., Geography, Boston University, 2005
M.A., Energy and Environmental Analysis, 2002
B.S., Environmental Studies, 2000, *magna cum laude*

Research fellow, Boston University, 2002-2005
Teaching fellow, Boston University, 2001



Dr. Richmond is a Geographer who applies her skills to understanding the interactions between environmental resources and economic systems. Specifically she uses statistical models, GIS, remote sensing data, and economic data to research the interactions between marketed and non-marketed environmental resources and the economy. She is the author of several articles in professional journals and often presents papers at national conferences. Dr. Richmond teaches EV203 (Physical Geography) and EV486 (Environmental Geography). ★

Dr. RICHARD L. WOLFEL

Assistant Professor, Geography
Center for Languages, Cultures and Regional
Studies

Ph.D, Indiana University, Bloomington, 2001
M.A., University of Cincinnati, 1997
BSED, West Chester University of Pennsylvania,
1995

Assistant Professor, Southern Illinois University
Edwardsville, 2003-07
Assistant Professor, Salem State College, 2001-03
Associate Instructor, Indiana University, 1997-2001



Dr. Wolfel is a cultural and political geographer with regional interests in Central Asia and Germany. His specific research interests focus on nationalism and the urban built environment, post-Soviet political development and the influence of nationalism on tourism. He is the author of several books, journal articles, reviews and book chapters. Dr. Wolfel will be teaching EV365 (Geography of World Cultures) and supports the Cultural Awareness Initiative as part of the new Center for Languages, Cultures and Regional Studies. ★

ROTATING MILITARY FACULTY

LTC JOSEPH P. HENDERSON

Assistant Professor, Geography

Ph.D., University of Tennessee, 2006
M.S., University of Tennessee, 1997
B.S., USMA, 1987

Aviation Plans and Operations Officer, Eighth U.S.
Army, ROK, 2002

S-3, 3rd MI Bn, 501st MI Bde, ROK, 2001

Bde Aviation Officer, 501st MI Bde, ROK, 2000

Instructor/Assistant Professor, D/G&EnE, USMA,
1997-2000

Commander, Aviation Detachment, 751st MI Bn,
ROK, 1994

Bde S-2, Operational Support Airlift Command
(OSAC), Ft. Belvoir, VA 1992

Operations Officer and XO, Fixed Wing PAT, OSAC, Ft. Belvoir, VA 1990

Air Assault Commandant, Davison Aviation Command, Ft. Belvoir, VA 1990

Aeroscout Platoon Leader, C/4-501st Attack Bn, ROK, 1988-1989



LTC Henderson is an Aviation officer with command and staff experience in both fixed and rotary wing units including aeroscout, utility helicopter, fixed-wing airlift, and fixed-wing reconnaissance. His most recent operational experience ranged from battalion to army level in the Republic of Korea. LTC Henderson is a physical geographer with expertise in geomorphology and climatology. His graduate-level research included creating landslide hazard maps using GIS and the study of climate and fire ecology using tree-ring data. LTC Henderson is the course director for EV203 (Physical Geography). ★

LTC STEVEN OLUIC

Assistant Professor, Geography

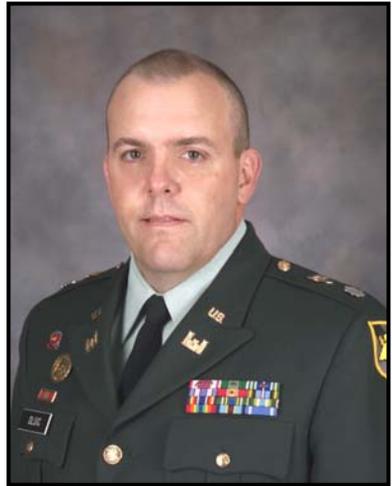
Ph.D., Kent State University, 2005
M.S., University of Cincinnati, 1991
B.A., Case Western Reserve University, 1983

Professor of Military Science, Kent State
University, 2000-02

Student, German Armed Forces Staff College,
Hamburg, Germany, 1998-2000
Brigade S4, Engineer Bde, 1st Infantry Division,
Germany, 1997-98

XO, 54th Engineer Bn, 130th En Bde, Germany,
1997
S3, 54th Engineer Bn, 130th En Bde, Germany, 1996
Senior Engineer Observer/Controller, Combat

Maneuver Training Center, Hohenfels, Germany, 1995-96
Project Engineer, Baltimore District, Corps of Engineers, 1992-95
Company Commander, 16th Engineer Bn, 1st Armored Division, Germany, 1989-90
Adjutant, 16th Engineer Bn, 1st Armored Division, Germany, 1988-89
Liaison Officer, 16th Engineer Bn, 1st Armored Division, Germany, 1987
XO/Platoon Leader, 802nd Engineer Bn, Republic of Korea, 1986-87
XO, HHC, Engineer School Brigade, Ft Belvoir, Va., 1985-86
XO/Platoon Leader, 11th Engineer Bn, Ft. Belvoir, Va. 1984-85



LTC Oluic is an Engineer officer with command and staff experience in combat and construction units at battalion, brigade and division level. The majority of his operational experience has been overseas. LTC Oluic is a human geographer with expertise in nationalism, ethnic identity and Balkan area studies. Of special interest is his overseas research on radical Islam in the states of the former Yugoslavia. His academic background spans geology, environmental science and geography. LTC Oluic's dissertation research focused on the concept of national identity and nationalist landscapes in Bosnia and their impact on the future of the Bosnian state. He has had one book published, authored several articles/reviews and was the recipient of the 2004 Association of American Geographers Hoffman Award. He has been invited to speak at numerous academic and government agencies. LTC Oluic has taught EV203 (Physical Geography) and is currently the course director for EV365 (Geography of Global Cultures), EV371 (Geography of Russia and the Former Soviet Union), EV386 (Geography of Europe), and EV390B (Urban Geography). ★

LTC LUIS A. RIOS, US Air Force

Assistant Professor, Geography

M.S., Texas A&M University, 1995

B.S., Rutgers University, 1989

Chief, Current Ops Division, Offutt AFB, 2003-2004

Chief, Standards & Eval Branch, Offutt AFB, 2001-2003

Cdr, Weather Flight, Charleston AFB, 1997-2001

Leader, Atmospheric Analysis Models, Offutt AFB, 1995-1997

Satellite Coordinator, Lajes AB, The Azores, 1992-1993

Wing Weather Officer, Nellis AFB, 1989-1992



LTC Rios is an Air Force weather officer who has served in weather flights, weather squadrons and the Air Force Weather Agency (AFWA) in support of classified national programs, standardization and evaluation (Stan/Eval), Army aviation, tactical air forces and mobility air forces. His contingency/deployment history includes DESERT STORM in 1992, Operation RESTORE HOPE in 1993, and Operation ALLIED FORCE in 1999. While serving as a combat weather flight commander, he helped certify the employment of C-17A cargo aircraft for use by Army paratroopers. LTC Rios received a Masters Degree in meteorology with emphasis on analysis and forecasting. His academic interests include tropical meteorology, climatology, lightning meteorology and the operational applicability of meteorological and climatic techniques. LTC Rios teaches EV203 (Physical Geography) and serves as course director for EV389B (Climatology) and EV387 (Meteorology). ★

MAJ JON BUSHMAN

Instructor, Geography

M.S., Geography, University of Wisconsin - Madison, 2006
B.S., Geography, University of Wisconsin – La Crosse, 1995

Tank Company Cmdr, B Co., 2nd Bn., 34th Armor, Ft. Riley
S4, 1st Bn., 34th Armor, Fort Riley
Assistant S4, 1st Brigade, 1st Infantry Division, Fort Riley
S4, 3rd Bn., 66th Armor, Fort Hood
Company XO, HHC 1st Brigade, 4th Infantry Division, Fort Hood
Tank Platoon Leader, D Co., 3rd Bn., 66th Armor, Fort Hood
Tank Driver, D Co., 4th Bn., 37th Armor, Fort Riley



MAJ Bushman is an Armor Officer who has held various command and staff positions in Tank units at battalion and brigade level. His master's research included an analysis of the complexities of creating the National World War II Memorial on the National Mall in Washington, DC, and its effects on and relationship to the existing open landscape. MAJ Bushman's academic interests include memorial landscapes, regional geography, and historical as well as cultural geography. He teaches EV203 (Physical Geography) and EV365 (Geography of Global Cultures). ★

MAJ JAMES F. CHASTAIN

Assistant Professor, Geography

M.A., University of South Carolina, 2005
B.A., Presbyterian College, 1996

Commander, B Co. 532d Military Intelligence Battalion (Theater
A.C.E.), Cp. Humphreys, Republic of Korea, 2002-2003
G-2 Operations Officer, 2d Infantry Division, Cp. Red Cloud,
Republic of Korea, 2001-2002
Commander, 1st Target Acquisition Detachment (Airborne), Ft
Bragg, N.C. 1999-2000
Ammunition Platoon Leader, 3d Battalion 27th Field Artillery
Regiment (MLRS), Ft Bragg, N.C. 1998-1999
Firing Platoon Leader, 3d BN 27th Field Artillery Regiment (MLRS), Ft Bragg, N.C. 1997-1998



Major Chastain is a Strategic Intelligence officer and a Political Geographer whose area of interest is globalization and international security. His thesis, "Where Did They Vote for Le Pen? Demographics, Globalization and Political Geography in the 2002 French Presidential Election," studied the socio-demographic correlates of support for the far-right French politician Jean-Marie Le Pen. Major Chastain has taught EV203 (Physical Geography), EV365 (Geography of Global Cultures), EV373 (Geography of Latin America), EV390B (Urban Geography) and will teach EV374 (Geography of the Middle East and Africa) and EV482 (Military Geography). Additionally, Major Chastain is an Associate Head Coach and Defensive Coordinator for Army Sprint Football. ★

MAJ WILLIAM CLARK

Instructor, Geography

M.S., University of Utah, 2007

M.S., University of Missouri at Rolla, 2001

B.S., University of Wyoming, 1996

Resident Office OIC, U.S. Army Corps of Engineers, Gulf Region
Central District, Iraq, 2005

Project Engineer, USACE, Alaska District, 2004

Company Commander, C/864th EN BN/Special Troops BN, Fort
Richardson, AK, 2003-2004

Company Commander, USAG HQ, Ft. Richardson, AK, 2001-2003

Company XO, HHC/307th EN BN, Fort Bragg, NC, 1999-2000

Assistant S4, HHC/307th EN BN, Fort Bragg, NC, 1999

Platoon Leader, 618th EN CO/307th EN BN, Fort Bragg, NC, 1997-1999



MAJ Clark is an Engineer officer who has served in a variety of command and staff positions at company, battalion and engineer district level. He has deployed to Iraq serving as the officer in charge for a resident engineer office located in east Baghdad. His master's research was an assessment on the use of remote sensing technologies and computer modeling to accurately predict future vegetation conditions for the purposes of better range management in the upper Colorado River basin. Other areas of academic interest are geomorphology, land use change and natural resource conservation. MAJ Clark is teaching EV203 (Physical Geography) and is the course director for EV388B (Geomorphology). ★

CPT(P) MATTHEW CUVIELLO

Instructor, Geography

M.A., University of North Carolina – Chapel Hill, 2007

B.S., United States Military Academy, 1998

Embedded Liaison, Center of Army Lessons Learned,
Afghanistan/Iraq

Assistant S3, 1st Armor Training BDE, Fort Knox

Company Commander, HHC 3-81 AR, Fort Knox

Company Commander, B Company, 3-81 AR, Fort Knox

Assistant S4, 1st BDE, 1st Armor Division, Friedberg, Germany

Company XO, C Company, 1st Battalion, 37th Armor, Friedberg, Germany

Tank Platoon Leader, B Company, 1st Battalion, 37th Armor, Friedberg Germany



CPT CuvIELLO is an armor officer who has held various command and staff positions in tank and training units at battalion and brigade level. He has deployed in support of the KFOR mission in Kosovo, and in support of Operations Enduring Freedom and Iraqi Freedom. While attending the University of North Carolina, his studies focused on a synoptic scale analysis of frozen precipitation in the Piedmont region of North Carolina and the creation of a revised tool for prediction of frozen precipitation type. CPT CuvIELLO's academic interests include climatology, winter weather, and military geography. CPT CuvIELLO teaches Physical Geography (EV203). ★

CPT(P) ADAM CZEKANSKI

Instructor, Environmental Engineering

M.S., University of Texas, 2007

B.S., Cornell University, 1998

EIT, Texas, 2006

Commander, Charlie Company, 44th Engineer Battalion, Camp Habbaniyah, Iraq, 2004-2005

Commander, Charlie Company, 44th Engineer Battalion, Camp Howze, Republic of Korea, 2003-2004

Battalion S-4, 44th Engineer Battalion, Camp Howze, Korea, 2003

Assistant Division Engineer, 10th Mountain Division (LI), Bagram Air Base, Afghanistan, 2002

Company XO, Bravo Company, 41st Engineer Battalion, Fort Drum, NY, 2001-2002

Platoon Leader, 642nd Engineer Company (CSE), 41st Engineer Battalion, Fort Drum, NY, 2001

Platoon Leader, Alpha Company, 41st Engineer Battalion, Fort Drum, NY, 2000-2001



CPT Czekanski is an Engineer officer who has served in light, mechanized and construction engineer units. Most recently, he led his company in Anbar Province, Iraq, where they conducted missions that included cache sweeps, ordnance destruction, and cordon and search. His academic interests are in water resources planning and management, and water/wastewater treatment. While at the University of Texas, he developed a technical manual to instruct government workers in Indonesia on the use of GIS technology to model alterations in the watersheds of Sumatra which occurred from the tsunami and resulting earthquakes. CPT Czekanski teaches EV300 (Environmental Science) and EV350 (Environmental Engineering Technologies). ★

MAJ GAYLE E. DAVIS

Instructor, Environmental Engineering

M.S., University of Maryland, 2006

B.S., Ohio University, 1994

EIT, Ohio, 1993

Chief, Environmental Training Team, U.S. Army Center for Health Promotion and Preventive Medicine, APG, MD '03-04

Theater Preventive Medicine Officer, NATO Stabilization Force (SFOR), Operation Joint Forge, Bosnia and Herzegovina, 2003

Commander, HHC, 30th Medical BDE, Heidelberg, Germany '00-02

Chief, Operations and Support Branch, G4, 30th Medical BDE, Heidelberg, Germany 1999-2000

Company Commander, HQ, U.S. Army Garrison-Fitzsimons, Aurora, CO 1998-1999

Chief, Base Realignment and Closure Operations, U.S. Army Garrison-Fitzsimons 1997-1998

Executive Officer, C Company, 703d Main Support Battalion, Fort Stewart, GA 1997

Division Medical Supply Officer, 3d Infantry Division, Fort Stewart, GA 1996-1997

Facilities Management Officer, Winn Army Community Hospital, Fort Stewart, GA 1994-1996



MAJ Davis is a Medical Service Corps officer who has served in a variety of assignments that include positions at the division, corps and garrison level. She has deployed to Mauritania, Africa as a medical logistics officer and to Sarajevo, Bosnia as the Theater Preventive Medicine Officer. MAJ Davis holds a masters degree in environmental engineering with special interest in bioremediation. MAJ Davis teaches EV300 (Environmental Science) and EV350 (Environmental Technologies). ★

MAJ ALLISON L. DAY

Assistant Professor, Geospatial Information Science

M.S., University of Wisconsin, 2005

B.S., University of Missouri, 1995

Engineer Team Chief, 1/338th Regiment, 2d Brigade, 85th Training Support Division, Fort McCoy, Wisconsin, 2002-2004

Company Commander, HHC, 70th Engineer Battalion (M), 3d Brigade, 1st Armor Division, Fort Riley, Kansas, 2003-2004

Assistant S-3, 70th Engineer Battalion (M), 3d Brigade, 1st Armor Division, Fort Riley, Kansas, 2003

S-4, 29th Engineer Battalion (T), 45th Corps Support Group, Fort Shafter, Hawaii, 1998-1999

Terrain Analysis and Print Platoon Leader, 70th Engineer Company, 29th Engineer Battalion, 45th CSG, Fort Shafter, Hawaii, 1996-1997



MAJ Day enlisted in the Missouri National Guard as a unit level communications maintainer. After earning a B.S. in forestry, she entered active duty as an engineer officer. MAJ Day has command and staff experience in mechanized and topographic engineer battalions. Her most recent field assignment was in an AC/RC position, assisting engineer units to train and mobilize in support of Operation Iraqi Freedom. She then attended the University of Wisconsin and earned a masters degree in Environmental Monitoring: Remotely Sensed Imagery and Geospatial Information Management. MAJ Day is the course director for EV379 (Photogrammetry), EV380 (Principles of Surveying) and teaches EV203 (Physical Geography). ★

MAJ HANNON DIDIER

Instructor, Geospatial Information Science

M.S., Louisiana State University, 2007

B.S., United States Military Academy, 1997

Company Commander, Bravo Troop, 3-6 Cavalry Squadron, Camp Humphreys, Korea, 2004-2005

Brigade Plans Officer, 6th Cavalry Brigade, Camp Humphreys, Korea, 2003

Battalion S-4, 3-101 Aviation Regiment, Kandahar/Bagram, Afghanistan, 2002

Battalion S-4, 3-101 Aviation Regiment., Fort Campbell, KY, 2001-2002

Platoon Leader, Bravo Company 3-101 Aviation Regiment, Fort Campbell, KY, 1999-2001



MAJ Didier is an Attack Aviation officer who has served with the 101st Airborne Division and the 6th U.S. Cavalry Brigade. He deployed to Afghanistan in early 2002 with 3-101 Aviation Regiment where he flew combat escort and air assault security missions, and provided logistical and movement support to the attack battalion. His academic interests are in remote sensing, surveying, and wetlands planning and management. Most recently, he surveyed and sampled a series of subsiding maritime beach ridges in southern Louisiana using RTK GPS technology in order to present options for coastal restoration. MAJ Didier teaches EV203 (Physical Geography). ★

MAJ BRIAN DUNMIRE

Instructor, Geography

ABD, Old Dominion University

M.S., National Defense Intelligence College, 2005

M.M.A.S., U.S. Army Command and General Staff College, 2004

M.A., St. Mary's University of San Antonio, 1998

B.A., Pennsylvania State University, 1992

Strategic Intelligence (FA34) Career Manager, U.S. Army Human Resources Command, Alexandria, VA, 2005-2007

Deputy J2/JISE Director, TF Dagger (5th SFG), Karshi-Khanabad, UZ, 2001

J3/J7 Intelligence Plans and Exercise Officer, Special Operations Command Joint Forces Command, Norfolk, VA 2000-2003

Commander, D Co., 102nd Military Intelligence Bn., Cp. Essayons, South Korea, 1999-2000

Ground Component Intelligence Collection Mgr., 532nd MI Bn, Cp. Humphreys, S. Korea, 1999

Division Intelligence Collection Manager, 104th MI Battalion, Fort Hood, TX, 1997-1998

Cavalry Squadron S-2, 1st Squadron, 10th Cavalry, Ft. Hood, TX 1996-1997

Brigade S-2, 3rd Brigade, 4th Infantry Division, Ft. Hood, TX 1996

Brigade S-2, 256th Infantry Brigade, 4th Infantry Division, Ft. Hood, TX 1996

Executive Officer, D Co., 104th Military Intelligence Bn, Ft. Hood, TX, 1996

Platoon Leader, D Co., 104th Military Intelligence Bn, Ft. Hood, TX, 1995

Brigade S-2, 1st Brigade, 2nd Armored Division, Ft. Hood, TX, 1994

Assistant Brigade S-2, 1st Brigade, 2nd Armored Division, Ft. Hood, TX 1993-1995



MAJ Dunmire is a Strategic Intelligence Officer that has served in conventional tactical, operational intelligence, and joint special operations units. He deployed to Uzbekistan in 2001 with TF Dagger/5th Special Forces Group in support of Operation Enduring Freedom, and 2002 with Special Operations Command Central in preparation for Operation Iraqi Freedom. MAJ Dunmire is a human geographer whose interest is in South Asia and Latin American concepts of spatial security. MAJ Dunmire teaches EV203 (Physical Geography). ★

MAJ IAN IRMISCHER

Instructor, Geospatial Information Science

BS Tulane University Chemical Engineering
MS University of Missouri Rolla Engineering Management
MA University of California Santa Barbara Geography

Platoon Leader, C/40th Engineer Battalion, Baumholder GE
XO, B/40th Engineer Battalion, Bosnia
BMO 2-8 IN, Baumholder GE
Commander, 610th Engineer Detachment, Fort Hood TX
Commander, B/588 Engineer Battalion, Baqubah, Iraq



Major Ian Irmischer is a Combat Engineer Officer who was commissioned in 1996. After a deployment to Bosnia, Herzegovina, he Commanded the 610th Digital Terrain Detachment at Fort Hood, TX and B/588th Combat Engineer Company in Baqubah, Iraq. Major Irmischer has earned a BS in Chemical Engineering from Tulane University, a MS in Engineering Management from the University of Missouri, Rolla and most recently a MA in Geography from the University of California, Santa Barbara. His research interests include the applications of Geographic Information Systems for tactical military planning and the creation of digital elevation models. Major Irmischer teaches EV203 (Physical Geography), EV378 (Cartography), EV398 (Geographic Information Systems). ★

MAJ MINDY A. KIMBALL

Assistant Professor, Environmental Engineering

M.S., California State University Hayward, 2005
B.S., United States Military Academy, 1996

Personnel Operations Officer, 3rd SSB, Fort Stewart, GA, 2002-2003
Battalion S-3, 3rd SSB, Fort Stewart, GA, 2002
Commander, B/509th PSB, Camp Stanley, Korea, 2000-2001
Strength Manager, MND(N), SFOR6, Bosnia-Herzegovina, 1999-2000
Officer Strength Manager, G1, 10th Mtn Div (LI), Fort Drum, NY, 1998-1999
Assistant Personnel Operations Officer, G1, 10th Mtn Div (LI), Fort Drum, NY, 1996-1997



MAJ Kimball is a Space Operations (FA40) and former AG officer with experience supporting three different divisions, serving both battalion and division staffs. She deployed to Bosnia-Herzegovina in 1999 as part of SFOR6 in support of Operation Joint Forge. In Korea she commanded a multifunctional personnel detachment, servicing soldiers of the 2nd ID stationed from Camp Stanley up to the DMZ. Her research interests include geophysics, tectonics, tectonophysics, paleoseismology, and geologic mapping. Her graduate thesis involved using geophysics on active strike-slip fault zones in order to detect subsurface fault planes at depths as deep as 15 meters. MAJ Kimball teaches EV388A (Physical Geology), EV300 (Environmental Science), EV203 (Physical Geography), and the Geology Field Study AIAD. ★

MAJ ERIC P. McALLISTER

Instructor, Environmental Engineering

M.S.E., Johns Hopkins University, 2006
B.S., United States Military Academy, 1996

Troop Commander, C Troop, 1st Squadron, 14th Cavalry Regiment,
Fort Lewis

S4, 1st Squadron, 14th Cavalry Regiment, Fort Lewis
XO, E Troop, 5th Squadron, 15th Cavalry Regiment, Fort Knox
XO, Headquarters and Headquarters Troop, 3d Squadron, 3d
Armored Cavalry Regiment, Fort Carson

Scout Platoon Leader, I Troop, 3d Squadron, 3d Armored Cavalry Regiment, Fort Carson
Tank Platoon Leader, I Troop, 3d Squadron, 3d Armored Cavalry Regiment, Fort Carson



MAJ McAllister is an armor officer who has held primarily leadership positions in Cavalry units at Squadron level and below. He deployed his troop in support of Operation Iraqi Freedom as a member of the Army's first Stryker Brigade (3d Brigade, 2nd ID). His environmental engineering experience and research included the remediation and the secondary and tertiary treatment of explosives in groundwater and wastewater, respectively. His academic interests are in biological processes of water and wastewater treatment, as well as, environmental systems optimization. MAJ McAllister teaches EV450 (Environmental Decision Making) and is course director for EV396 (Environmental Biological Systems). ★

MAJ JASON R. RIDGEWAY

Instructor, Geography

M.A., University of Georgia, 2006
B.S., Texas A&M University, 1996

Company Commander, 2d Battalion, 503d Infantry Regt. (Airborne)
Brigade Assistant S-3, 173d Airborne Brigade
Brigade Adjutant, 187th Infantry Regt., 101st Airborne Division
Battalion Adjutant, 3rd Bn, 187th Infantry Regt., 101st Airborne
Division

Mortar Platoon Leader, 3rd Bn., 187th Infantry Regt., 101st Airborne
Division

Rifle Platoon Leader, 3rd Bn., 187th Infantry Regt., 101st Airborne Division



MAJ Ridgeway is an Infantry Officer who has held command and staff positions in Infantry units at company, battalion, and brigade level. His masters research included the use of object-oriented image analysis to map geomorphic habitat units on the Lower Congo River. His academic interests include cultural identity and human territoriality. MAJ Ridgeway teaches EV203 (Physical Geography), and he is course director for EV373 (Geography of Latin America). ★

MAJ DAVID P. ROUX

Instructor, Environmental Engineering

B.S., Civil Engineering, University of Virginia, 1998

M.S.E., Environmental Engineering, Johns Hopkins University, 2007
EIT, Virginia, 1998

Commander, A Btry., 6th Bn. (MLRS), 37th FA Regt., 2d Inf. Div.,
Camp Casey and Camp Stanley, Korea, 2004-2005

Fire Direction Officer, 6th Bn. (MLRS), 37th FA Regt., 2d Inf. Div.,
Camp Stanley, Korea, 2003-2004

Assistant S3/Operations Officer, 6th Bn. (MLRS), 37th FA Regt.,
Camp Stanley, Korea, 2003

S4, 3d Bn., 319th Abn. FA Regt., 82d Abn. Div., Ft. Bragg, NC, 2002

Executive Officer, C Btry., 3d Bn., 319th Abn. FA Regt., 82d Abn. Div., Ft. Bragg, NC, 2000-
2002

Adjutant, 3d Bn., 319th Abn. FA Regt., 82d Abn. Div., Ft. Bragg, NC, 2000

Fire Support Officer, C Co., 3d Bn., 504th Parachute Inf. Regt., 82d Abn. Div., Ft. Bragg, NC,
1999-2000



MAJ Roux is a field artilleryman who served in a wide range of battery and battalion leadership positions for airborne artillery (105 mm, towed howitzer) and multiple-launch rocket system (MLRS) battalions. As a graduate student at the Johns Hopkins University, MAJ Roux researched the effectiveness of potassium permanganate and aluminum oxide in oxidizing low-molecular weight organic compounds as surrogates for natural organic matter (NOM) in drinking water treatment. MAJ Roux's research interests include physicochemical treatment processes in drinking water treatment, bioremediation techniques, and biological processes in wastewater treatment. MAJ Roux teaches EV300 (Environmental Science) and EV350 (Environmental Technologies). ★

MAJ BENEFISHEH D. VERELL

Instructor, Geography

M.A., University of Maryland, 2006

M.A., Webster University, 2001

B.S., United States Military Academy, 1997

Deputy Provost Marshal, Fort Myer, Virginia

Company Commander, U.S. Army Security Force, Fort Detrick,
Maryland

Platoon Leader, 545th Military Police Company, 1st Cavalry
Division, Fort Hood, Texas



MAJ Verell's basic branch is Military Police and her career field designation is Information Operations. Her master's research included studying the neighborhood development of Spring Valley in Washington DC, the changing demographics, and the environmental effects of changing land use from 1900-2000. MAJ Verell's academic interests include land cover and land use change and energy distribution and consumption. She will be teaching Physical Geography and the Principles of Land Use Planning and Management. ★

MAJ BENJAMIN M. WALLEN

Instructor, Environmental Engineering

M.S., University of Texas at Austin, 2005

M.S., University of Missouri at Rolla, 2000

B.S., United States Military Academy, 1996

E.I.T., State of Delaware, 1996



Commander, A/70th Engineer Battalion, Ft Riley, KS, 2001 – 2003

Assistant Brigade Engineer, 3rd BDE, 1st AD, Ft Riley, KS, 2001

XO, B/588th Engineer Battalion, Ft Hood, TX, 1999 – 2000

Battalion S-1, 588th Engineer Battalion, Ft Hood, TX, 1998 – 1999

Assault & Obstacle Platoon Leader, A/588th Engineer Battalion, Ft Hood, TX, 1998

Support Platoon Leader, 588th Engineer Battalion, Ft Hood, TX, 1997 – 1998

Platoon Leader, C/588th Engineer Battalion, Ft Hood, TX, 1997

MAJ Wallen is an engineer officer who has served in both mechanized and armored units. Most recently, he led his company in Iraq, where he served as the Director of Public Works (water, sewage, fire, trash, electricity) for the Kadhimiyah District in Baghdad, focusing on unexploded ordnance removal. He has deployed to the National Training Center five times, and to Korea in support of FOAL EAGLE. His academic interests include water and wastewater treatment, as well as indoor air pollution control. He assisted with research at the University of Texas at Austin dealing with heterogeneous (surface) reactions that occur in buildings during disinfection for biological warfare agents such as Anthrax. MAJ Wallen teaches EV450 (Environmental Decision-Making) and EV350 (Environmental Engineering Technologies). ★

CDT Jennifer Hanby receives a coin from the USACE district commander, during the last day of her USACE AIAD in Charleston, SC.



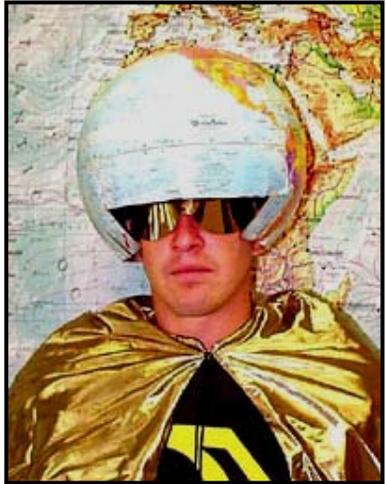
CDT Zach Landis enjoying some downtime on a Tel Aviv beach during the Israel AIAD.

EMERITUS FACULTY

DIRTMAN

Professor of Physical Geography and The Spirit of
the Department of G&EnE

Ph.D., United States Military Academy, 1959
M.S., United States Air Force Academy, 1959 (top
graduate)
M.S., United States Naval Academy, 1845 (top
graduate)
B.S., United States Military Academy, 1802 (goat)
P.E., Commonwealth of Virginia, 1802



DIRTMAN is a retired Department faculty member currently residing on the rooftop of Washington Hall (near the Weather Station) and is known to spontaneously rally cadets enrolled in EV203, "Dirt", to support Army athletic teams on the fields of friendly strife. As a former Army officer, he has served in every climatic regime known to man. He is an expert in geomorphology with special interest in plate tectonics. He is currently involved in advance studies of weather systems and enjoys the passage of wave cyclones and occluded fronts. He has personally experienced all known environmental hazards including tornadoes, hurricanes, earthquakes, tsunamis, volcanic eruptions, and williwaws. Of particular note, his volcanic encounter in 1980 in Washington State occurred shortly after he was subducted under the North American plate. As an emeritus faculty member, he is in charge of the morale and welfare of the Department faculty and all cadets in EV203. ★



Legendary DIRTMAN and superhero sidekick, DIRTWOMAN, fire up the yearlings as they lead the run back from Camp Buckner.



Department-led Army Orienteering Club members.



CDT Mary O'Rourke (geography major) goes hard to goal during Army Women's Lacrosse 2006 championship 13-1 season. The team is coached by Dr. Johnson. Photo by Dr. Malinowski.

FIRST REGIMENT MAJORS

Company A1

09 DREW, JOHNATHON	Hum Geo
09 HESS, WESLEY	Env Eng
09 HICKEY, MATTHEW	Hum Geo
09 HORAN, TIMOTHY	GIS
09 SHAFFER, MATTHEW	Env Eng

Company B1

09 SIMPSON, WILLIAM	Env Geo
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Company C1

08 BAKSHI, VIKAS	Env Sci
08 HARTMAN, JERALEE	GIS
08 HINDRICH, Wolf-Ekkehard	Hum Geo
08 LEWIS, NICHOLAS	GIS
08 LOBOSCHEFSKY, PAUL	Env Eng
08 RUSINKO, PAMELA	Env Eng

Company D1

08 FAUSTMANN, ANTON	Env Sci
08 KEARNEY, MARY	Hum Geo
09 RITCHEY, BRANDON	Hum Geo

Company E1

08 BOUKNIGHT, ROBERT	Hum Geo
08 LIN, LIUSHUNG	Hum Geo
08 SMITH, DANIEL	GIS
09 AMAN, CRAIG	Env Sci
09 KNUDSEN, PAUL	Hum Geo
09 LYTLE, DARRELL	GIS
09 MC CONAUGHEY, ERIN	Hum Geo
09 MODLIN, DANIEL	Hum Geo
09 PULLIAM, KATHLEEN	Hum Geo
09 WHIPPLE, NATHANIEL	Env Eng

Company F1

08 HODGSON, RYAN	Hum Geo
08 LESSNER, HAROLD	Env Geo
09 COFFIE, JOSHUA	Env Geo
09 ROWAN, BRIAN	Hum Geo

Company G1

08 BAER, CRAIG	Hum Geo
08 LAWRENCE, CONNOR	Env Geo
09 BROWN, JACOB	Env Geo
09 DICKENSON, BRIANNA	Hum Geo
09 DUNNING, WHITT	Env Geo
09 RAMOS- DIAZ, RAMON	GIS

Company H1

08 FUSCO, ANTHONY	Hum Geo
08 MARTINEZ, FERNANDO	Hum Geo
08 MICKOWSKI, JOHN	Hum Geo
08 POWERS, THOMAS	Env Geo
08 WILSON, ANNA	Hum Geo
09 CLARK, JAMIE	Env Sci
09 MCBRIDE, LON	Env Sci
09 TIMM, ASHLEY	Env Eng
09 TRUMP, NEAL	Hum Geo/GIS



SECOND REGIMENT MAJORS

Company A2

08 BORKOWSKI, BRIAN	GIS
08 BURRIS, DAVID	Hum Geo
08 SULLIVAN, JAMES	GIS
08 SYLVESTER, BENJAMIN	Hum Geo
09 SWOOPE, WARREN	Hum Geo
09 WHEELER, KENNETH	Env Geo

Company B2

08 RUSSELL, ASHLEY	Hum Geo
09 EASON, CHARLES	GIS
09 CAVALIER, OMAR	Hum Geo

Company C2

08 FEATHERSTONE, TRAVIS	Hum Geo
08 DYER, NATHAN	GIS
08 HEWKO, BRIAN	Hum Geo
08 MURRAY, HALEY	Env Sci
09 LEWIS, FREDDIE	GIS
09 FICHTNER, KATHERINE	Env Geo
09 LOPEZ, JUSTIN	Env Eng
09 POMEROY, JASON	Env Geo
09 VASS, WILLIAM	Env Eng

Company D2

08 BANDI, SETH	Hum Geo
08 CURLEY, NATHANIEL	Env Eng
08 DYER, JONATHAN	GIS
08 FARRELL, HANNAH	Hum Geo
08 MILLER, DANIEL	Env Geo
08 YOUNG, BRADLEY	Hum Geo
09 DIETER, NICHOLAS	GIS
09 SCARLATO, SARAH	Hum Geo

Company E2

08 HOWELL, MEGAN	Hum Geo
08 KILGORE, GEORGE	Hum Geo
08 SHEYKMAN, DMITRIY	GIS
09 ALLISON, HENRY	Env Geo
09 HABERTHUR, LAUREN	Env Sci
09 O'CONNOR, RODERIC	Hum Geo
09 VIGIL, CHRISTOPHER	GIS

Company F2

08 DRANE, SARA	Hum Geo
08 MARIETTA, MICHAEL	Hum Geo
08 MORKES, THOMAS	Hum Geo
09 DEBRUHL, DEREK	Hum Geo
09 GALLOW, MICHAEL	Env Sci
09 GILES-MADDEN, SARAH	Hum Geo
09 GROB, JACOB	Hum Geo
09 KENNER, MAURICE	Hum Geo
09 LINDSEY, ROBERT	Hum Geo
09 NIFONG, RICHARD	Hum Geo

Company G2

08 LIVIERATOS, COLE	Hum Geo
08 SEELEN, MARK	Hum Geo
08 WOMACK, JAMES	Hum Geo
09 PEEPLES, WALTER	Env Sci
09 WARDYNSKI, JENNIFER	Env Sci

Company H2

09 BROWNE, CRISTIN	Hum Geo
09 BURKE, BRIDIE	Hum Geo
09 CHO, LINDA	Env Sci
09 GEIB, DANIEL	GIS
09 JONES, COLIN	Env Eng
09 MOODY, KELCEE	Env Eng
09 RATHBUN, ERIC	Hum Geo
09 TIMME, REED	Hum Geo
09 TISDELL, MITCHEL	Hum Geo
09 WALSH, JACOB	GIS



THIRD REGIMENT MAJORS

Company A3

08 COSMAS, NICHOLAS	Hum Geo
08 COWARD, JONATHAN	Hum Geo
08 FERGUSON, SCOTT	Hum Geo
08 HUNT, DANIEL	GIS
08 WEART, DAVID	Env Sci
09 CHOATE, LARRY	Env Geo
09 COHAN, CARY	Hum Geo
09 LEWIS, MADELINE	Env Eng
09 TAYLOR, KRISHEL	Env Eng

Company B3

08 FRITZ, DANIEL	Env Geo
09 BAZEMORE, THOMAS	GIS
09 JONES, ORRY	Hum Geo
09 KOHTZ, SHANE	Hum Geo
09 KEARNES, MICHAEL	Env Eng
09 RUETH, GREGORY	Hum Geo

Company C3

08 ABALO, CHRISTOPHER	GIS
08 GRANT, KATELIN	Env Sci
08 JACKSON, ASHLEY	Env Sci
09 COMSTOCK, DEANNA	Hum Geo
09 FRIEDWALD, PETER	GIS
09 NEASHAM, RACHEL	Hum Geo
09 OCHOCKI, RYAN	GIS

Company D3

08 O'ROURKE, Mary Katherine	Hum Geo
08 ROWE, DENNIS	Hum Geo
08 SMITH, ROBERT	Hum Geo
09 MORGAN, JAMES	GIS
09 PHILLIPS, ERIK	Env Sci
09 REYES, DAVID	Env Sci
09 VANDAM, NICHOLAS	Env Sci

Company E3

08 MARKELL, TYLER	Hum Geo
09 BRAMLAGE, JUSTIN	GIS
09 DEPPA, ROBERT	Hum Geo
09 ETCHELLS, PAO MEI	Env Geo
09 FLOWERS, ERIC	GIS
09 HOOD, JOHN-PAUL	GIS
09 NAYLOR, MICHAEL	Env Geo
09 OLSON, EDWARD	Hum Geo
09 WRIEDEN, KRISTOPHER	Hum Geo

Company F3

08 JOHN, CODY	Env Geo
08 MADURO, GREGORY	Hum Geo
08 PLANTE, LUKE	Env Eng
08 SHIRK, TREVOR	Env Eng
08 SOLAJA, STEVEN	Hum Geo
09 HEIMEL, NATALIE	Env Geo
09 PARTIN, WILLIAM	Env Geo
09 THURMAN, BRANDON	Hum Geo

Company G3

08 MCDONALD, LUCAS	Hum Geo
08 SMITH, ELITHA	Env Sci
09 LEWIS, ROBERT	Hum Geo
09 MAYER, AMY	Env Geo
09 POTTER, JAMES	Env Geo
09 ROVERO, PATRICK	Hum Geo

Company H3

08 DAMALOUJI, JONATHAN	Env Sci
08 LANDIS, ZACHARY	Env Geo
08 NICHOLS, JEFFREY	Hum Geo
09 HERRICK, MARK	GIS

Cadets from the Department enjoy a little home cooking.



FOURTH REGIMENT MAJORS

Company A4

09 ABRAHAM, TAMARA	Hum Geo
09 COUNTS, BRANDON	Hum Geo
09 DILLER, DESIREE	Env Eng

Company B4

08 BULLOCK, MARIO	Hum Geo
09 MCINTOSH, MEGAN	Hum Geo/GIS
09 ROBINSON, JAMAL	Hum Geo
09 TOMSEN, ERIK	GIS

Company C4

09 KORVIN, MICHAEL	GIS
09 LUBBA, NATHAN	Hum Geo
09 WOOD, JONATHAN	Env Geo

Company D4

08 BLACKWELL, JAMES	Env Geo
09 CHASTEN, RANDALL	Hum Geo
09 AGNOR, BENJAMIN	GIS
09 CHRISTIE, ROBERT	GIS
09 JACOBSEN, CHRISTOPHER	Env Eng
09 MOSCHEL, REBECCA	GIS
09 PLUMSTEAD, JOHN	Env Geo
09 WEGMAN, ROXANNE	Env Geo

Company E4

08 GARBERSON, CRYSTAL	Hum Geo
08 GILLIGAN, SEAN	Env Sci
08 KELLER, LUKE	Hum Geo
08 RAINES, RUSSELL	Env Eng
08 SHOMAN, ANDREW	Hum Geo
08 TEAL, LAUREN	Env Geo
09 BOTT, TYLOR	Env Eng
09 KOLLER, HEIDI	Env Geo
09 MCCOLLUM, CALEB	Env Geo
09 QUINK, TYSON	GIS
09 XIE, YINCHAO	Hum Geo

Company F4

08 CARLSON, BRIAN	Hum Geo
08 HANBY, JENNIFER	Env Eng
08 HUGHES, JOHN	GIS
09 CASLEN, JEFFREY	Env Geo
09 TURNER, CHRISTOPHER	Env Sci
09 VAUGHAN, LOGAN	Env Sci

Company G4

08 YANG, SCOTT	Env Sci
09 DUKE, DIANA	Env Geo
09 LEAHY, WILLIAM	Env Geo
09 TAVEL, AMANDA	Env Geo

Company H4

08 SANDERS, CHRISTOPHER	Env Sci
09 DOUGLAS, JONATHAN	GIS

Dirtman and Dirtwoman provide encouragement and guidance to cadets preparing to conduct Site 2 land navigation training.



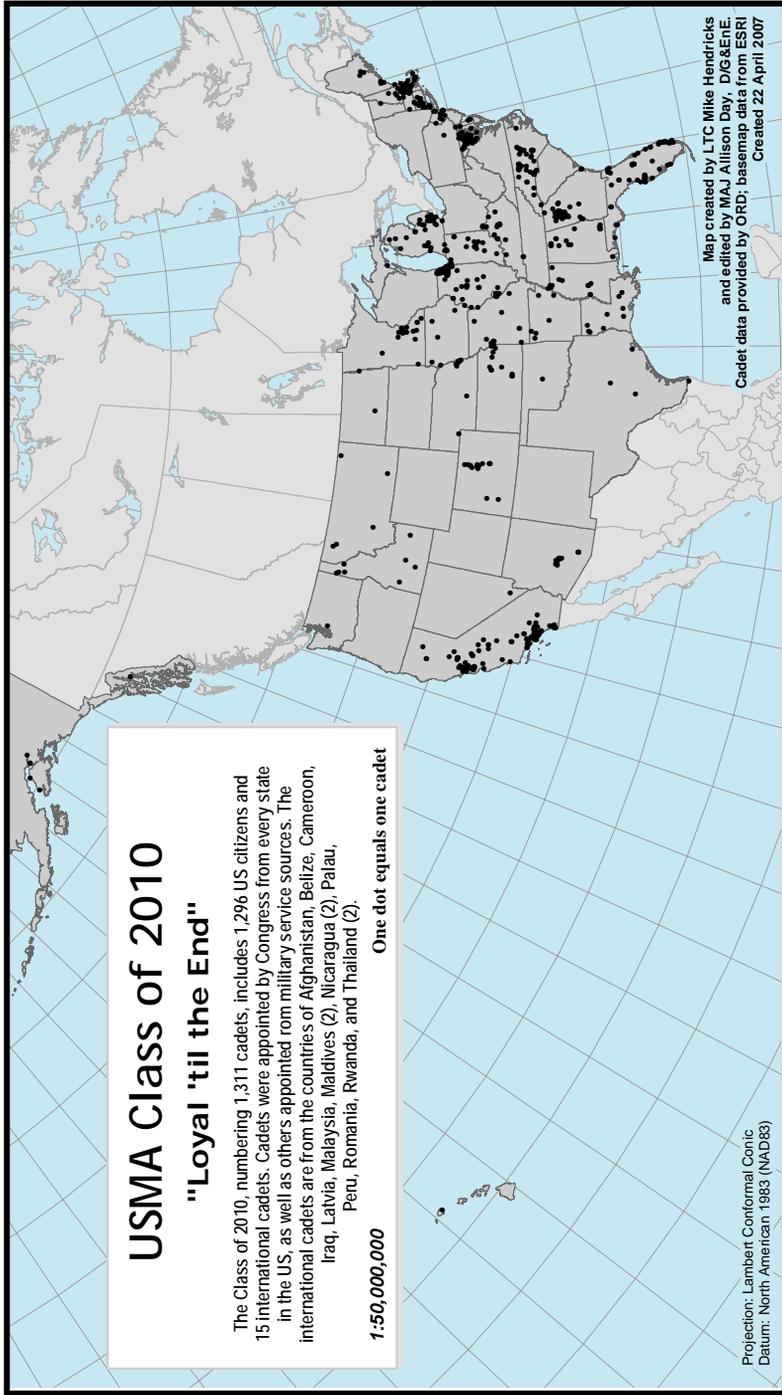
USMA Class of 2010

"Loyal 'til the End"

The Class of 2010, numbering 1,311 cadets, includes 1,296 US citizens and 15 international cadets. Cadets were appointed by Congress from every state in the US, as well as others appointed from military service sources. The international cadets are from the countries of Afghanistan, Belize, Cameroon, Iraq, Latvia, Malaysia, Maldives (2), Nicaragua (2), Palau, Peru, Romania, Rwanda, and Thailand (2).

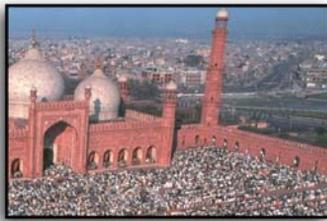
1:50,000,000

One dot equals one cadet



Map created by LTC Mike Hendricks
and edited by MAJ Allison Day, D/G&E/IE.
Cadet data provided by ORD; basemap data from ESRI
Created 22 April 2007

Projection: Lambert Conformal Conic
Datum: North American 1983 (NAD83)



Department of Geography and Environmental Engineering



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