

General Education Course Proposal

Proposed Course: GME 5 Critical Reasoning Units 3
Prefix No. Title

Department: Civil & Geomatics Engineering and Construction School: Engineering & Computer Science

GE Category (Indicate one category only):

Foundation: A1___; A2___; A3 x; B4___
Breadth: B1___; B2___; C1___; C2___; D___; E___
Integration: B___; C___; D___; International/Multicultural___

Existing Course x; Revised Course ___; New Course ___

Course Included in Current GE Program ___

New courses require the Undergraduate Course Proposal form in addition to this form.
Revised courses require the Undergraduate Course Change Request in addition to this form.

Proposed catalog description: Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

5. Critical Reasoning (3)
Fundamentals of analysis and evaluation in the context of technology.
Evaluating the viewpoints of experts. Patterns of deductive and inductive arguments. Common fallacies of reasoning. General Education AREA A, Critical Thinking


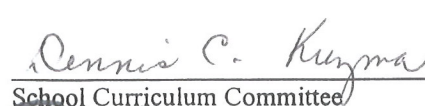
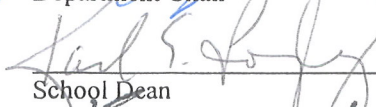
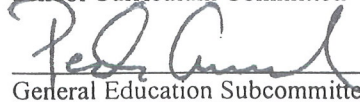
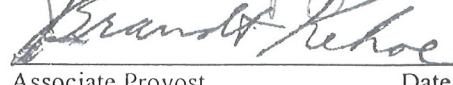
Enrollment limit per section: 25

Expected number of sections per semester – Year 1 2; Year 3 3

Attachments:

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

Approval for Inclusion in General Education

 Department Chair	<u>2/20/98</u> Date	 School Curriculum Committee	<u>2/23/98</u> Date
 School Dean	<u>2/27/98</u> Date	 General Education Subcommittee	<u>12/15/98</u> Date
 Associate Provost	<u>12/22/98</u> Date		

1/14/98

FEB 27 1998

COURSE PROPOSAL for AREA A, CRITICAL THINKING

COURSE NUMBER & TITLE:

GME 5 - Critical Reasoning

PROPOSED BY:

Fareed Nader

Department of Civil & Geomatics Engineering, and Construction
School of Engineering and Computer Science

INTRODUCTION:

"In times of change, learners inherit the earth,
while the learned find themselves beautifully
equipped to deal with a world that no longer
exists."

Eric Hoffer

In one sentence Eric Hoffer expressed critical reasoning as a fundamental part of each student's education. Many facts and techniques students learn in classes today will be outmoded within five years of their graduation from the university. Enduring fundamental concepts will be those which can be applied to many diverse disciplines.

Changes in American lifestyles and rapid advancements in technology have offered people a myriad of opportunities and choices. However, these opportunities and choices have also brought unparalleled life threatening consequences that may result from poor decisions (e.g., AIDS, use of pesticides). Critical reasoning is the most effective, efficient, and economical method for equipping people with the tools they will need to make wise choices amidst the plethora of technology and opportunities. When people learn to analyze and reason critically, they are more likely to adopt standards that are mutually beneficial to themselves and others.

MEETING SPECIFICATIONS:

The class GME 5 - Critical Reasoning provides students with fundamental tools of analysis and evaluation popularly called "critical thinking". The proposed outline below details a course that goes beyond the criteria established for such courses by the General Education Subcommittee. The course will emphasize the structure of good arguments and the evaluation of arguments made by experts, real and self-proclaimed.

Students will be required to write and orally present analyses and critiques of arguments encountered in daily living. Although technological applications will be emphasized; the methodology learned will be applicable to any subject matter. Students will write short evaluations of arguments taken from daily newspapers or magazines, and will be graded on two formal written evaluations of opposing viewpoints. Students must take part in classroom discussions, where they will be expected to make rapid evaluations of arguments presented to them in a variety of ways (e.g., oral, written, or visual).

The theory of critical thinking will be provided by reading a commonly used textbook and by listening to lectures. Students will be tested on their understanding of the theory with quizzes, a midterm examination, and a final examination.

Homework assignments will be specified after each class. These will include reading assignments, exercises within the textbook's chapters, class presentation, or argument evaluations.

PROPOSED OUTLINE for GME 5 - CRITICAL REASONING:

- A. The Role of Critical Reasoning in Society, Part I.
 - 1. What is reasoning?
 - 2. What critical reasoning is and is not.
 - 3. Good reasoning is a process.
 - 4. Factors which inhibit effective reasoning.
 - 5. Argument, discussion, disagreement, and fighting.
 - 6. Why develop critical reasoning skills?
 - 7. The role of criticism.
 - 8. An individual's obligations to society in presenting and evaluating arguments.
- B. The Structure of Good Arguments; Identifying Premises and Conclusions.
 - 1. Checking the support between premises and conclusion.
 - 2. The Principle of Charitable Interpretation.
 - 3. Patterns of argument.
 - 4. Indicator words.
 - 5. Claims.
- C. Language - The Limit of Our World.
 - 1. The interrelationship of language and logic.
 - 2. Definitions.
 - 3. The Rule of Common Usage.
 - 4. Functions of language.
 - 5. Recognizing bias in language use; slanters.
 - 6. Where does our news come from?
 - 7. Advertising.
- D. Making Reasonable Decisions as an Amateur in a World of Specialists.
 - 1. Should we leave all decisions to the experts?
 - 2. Identifying who is an expert.
 - 3. What if the experts disagree?
 - 4. How can the influence of experts be controlled?
 - 5. Relying on your background knowledge and common sense.
- E. Why Are Bad Arguments Deceptive?
 - 1. What is a fallacy of reasoning?
 - 2. Named versus unnamed fallacies.
 - 3. Fallacies that violate the relevance criterion.
 - 4. Fallacies that violate the acceptability criterion.
 - 5. Fallacies that violate the sufficient grounds criterion.
 - 6. Fallacies that violate the rebuttal criterion.
 - 7. Fallacies of numbers and graphs.

- F. Practicing Effective Reasoning Skills.
 - 1. Identifying and evaluating sources of information.
 - 2. Distinguishing relevant from irrelevant.
 - 3. Differentiating fact from opinion.
 - 4. Differentiating belief from knowledge.
 - 5. Separating logic from emotion.
 - 6. Identifying stereotypes, centrisms, and biases.
 - 7. Recognizing and identifying inconsistencies in an argument.
- G. Evaluating Arguments.
 - 1. Deductive and inductive arguments.
 - 2. Valid, sound, good, and strong arguments.
 - 3. Categorical claims.
 - 4. Categorical syllogisms.
 - 5. Testing for validity.
 - 6. Truth tables and truth-functional arguments.
 - 7. Analogical arguments.
 - 8. Inductive generalizations.
 - 9. Casual arguments.
- H. The Role of Critical Reasoning in Society, Part II.
 - 1. Exercising good judgement.
 - 2. Making choices.
 - 3. Seeking other points of view.
 - 4. Critical reasoning in the strong sense.
 - 5. Drawing the line - the need to make a decision, plan, and act.
 - 6. Making responsible decisions in a world of specialists and high technology.

ELEMENTS COMMON TO ALL SECTIONS OF THIS COURSE:

A. Content

- 1. See the proposed course outline above.

B. Course Objectives

- 1. Students will learn the fundamentals of critical thinking (e.g., the relationship of language and logic, distinguishing fact from judgement, elementary inductive and deductive processes, and the common fallacies of reasoning).
- 2. Students will learn how to structure good arguments and analyze those of others; the context will be technology studies.
- 3. Students will gain experience in deciding who and what to believe while evaluating the arguments of experts.
- 4. Students will learn to constructively (and respectfully) challenge faulty reasoning by others and themselves.
- 5. Students will gain experience in argumentative writing.

C. Required Student Activities

1. Students must attend all classes in order to participate in discussions.
2. Homework will be assigned for each succeeding class.
3. Selected homework exercises must be written and turned in for grading.
4. There will be two quizzes (20 minutes each), one midterm examination (75 minutes), and a final examination (2 hours).
5. Two written argument evaluations must be turned in.

D. Grading Policy

Grades will be assigned according to percentage of total points achieved on this scale:

A - 90% to 100%, B - 80% to 89%, C - 70% to 79%, D - 60% to 69%,
F - below 60%.

Points will be given for the following activities:

1. Participation in class discussions, worth 50 points.
2. One 75-minute midterm examination, worth 75 points.
3. One 2-hour final examination, worth 100 points.
4. Two 20-minute quizzes, worth 15 points each.
5. Two special argument evaluations, worth 25 points each.
6. Selected homework problems, worth 25 points total.

Total points = 330.

E. Representative Texts:

1. Moore, Brooke Noel, and Richard Parker, Critical Thinking, 5th Edition, Mayfield Publishing Company, Mountain View, California, 1998.
2. Damer, T. Edward, Attacking Faulty Reasoning, 3rd Edition, Wadsworth Publishing Company, Belmont, California, 1995.
3. Boyd, Robert, Critical Reasoning, (in press), 1998.

F. Approximate Schedule

For a 15-week semester the amount of time spent on the topic areas given in the outline will be:

- | | |
|---------|--|
| 1 week | The role of critical thinking in society, Part I, and Part II. |
| 2 weeks | The structure of good arguments; identifying premises and conclusions. |
| 1 week | Language - the limit of our world. |
| 1 week | Making reasonable decisions as an amateur in a world of specialists. |
| 4 weeks | Why are bad arguments deceptive? |
| 1 week | Practicing effective reasoning skills. |
| 4 weeks | Evaluating arguments. |
| 1 week | Quizzes and examinations. |

F. Special Cost Factors

None.

MEMO

TO: Pedro Amaral, Chair,
and members of the General Education Subcommittee

FROM: Fareed Nader, Professor of Geomatics Engineering

SUBJECT: Clarification of requirements in Area A3 course
GME-5 Critical Reasoning

The additional information you requested is provided herewith. Numbered items listed below are keyed to the "checklist" numbers on your memo of last semester.

Item 7. A new section will be included on the course outline headed **TOPICS TO BE COVERED** that has an estimated time distribution (in weeks) for each of the elements specified by the GE Guidelines for Subarea A3 - Critical Thinking. This is reproduced here.

TOPICS TO BE COVERED

1. The structure of arguments (2 weeks)
2. The interrelationship of language and logic (1 week)
3. Evaluation of arguments and explanations (3 weeks)
4. Effective thinking skills (1 week)
5. Common fallacies of reasoning (covered with topics 1, 2, 3, 6, 7)
6. Deductive arguments (3 weeks)
7. Inductive arguments (4 weeks)
8. The role of critical thinking in society (1 week)
9. Examinations, quizzes (1 week)

The time spans shown are not rigid and can overlap. Obviously the quizzes and examinations are not all lumped into the same week, but are distributed at appropriate times during the semester. Other topics such as "the role of critical thinking in society" are brought up recurrently when the lecture/discussion topic of the day can make the lesson most memorable. Specific fallacies of reasoning are introduced and discussed at the places given by the textbook, however some, such as *tu quoque*, are discussed even in the first week because of their frequency of appearance in student arguments.

In addition, the attached Course Calendar illustrates the reading assignments in the textbook as well as the distribution of course elements.

(over)

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Item 8. The GE requirement for 2000 words of writing will be fulfilled by having the students turn in four formal papers of at least 500 words each. These will consist of two evaluations of arguments created by other persons, and two arguments created by the student her/himself. A statement of how the writing will be evaluated is now included on the course outline, as shown below.

EVALUATION OF WRITING

The arguments and evaluations graded will contain a total of 2000 words in order to meet General Education requirements. A typical argument or evaluation will contain a minimum of 500 words. Each must be typed and double-spaced. Arguments will be graded on: good grammar and spelling, clarity of expression, effective structure of argument, number and diversity of premises, avoidance of fallacies of reasoning, advocacy of ideas, and ability of reaching factual or judgmental conclusions. Evaluations will be graded on: good grammar and spelling, clarity of expression, recognition of premises and fallacies of reasoning, quality of analysis and criticism, ability to separate opinion or judgment from matters of fact, and ability to recognize deductive or inductive processes.

In addition to the formal papers, students will write homework assignments that will be graded by the same criteria. Exams and quizzes are 95% essay. Multiple choice and true/false questions are not used.

Item 9. The Course Calendar attached is the plan for all sections of GME-5 and shows how the classwork will develop the appropriate competencies.

Homework "Exercises" are given in the chapters of the textbook and are practice of the topic of the chapter. Exercises and other homework will be discussed in class, with students expected to participate. Class size is limited to 25 students per section so that each student can be called on to discuss his/her homework every week.

Item 10. The course outline now includes a statement about the GE requirement for a "C" grade or better.

GENERAL EDUCATION REQUIREMENTS

This course fulfills the CSU General Education (GE) requirements for study in Critical Thinking. The student must earn a grade of "C" or better to receive GE credit. In conformance with GE policy, each student will be required to write a minimum of 2000 words in various assignments that contain properly structured arguments and explanations.

GME-5 COURSE CALENDAR

NOTE: Reading assignments are in the text Critical Thinking, 5th Edition, by Brooke Noel Moore and Richard Parker. See Table of Contents attached.

<u>Week</u>	<u>Date</u>	<u>Class Discussion and/or Activities</u>	<u>Assignment</u>
1	8-24	Class introduction. What is critical thinking? Role of critical thinking in society. What is an argument?	None
1	8-26	Claims. Bias. Opinions. Standard Form of an argument. What are premises? Reasoned conclusion. Inference.	Read Preface and Chapt.1
1	8-28	Practice identifying and evaluating arguments. Criteria for evaluating arguments: RASER.	Read Chap.2
2	8-31	Definitions. Claims that are vague or ambiguous. What are fallacies? Discuss homework. Evaluate letters.	Define words Evaluate letters.
2	9-2	Role of critical thinking in society. Relationship of language & logic. Ambiguity, vagueness, equivocation.	Exercises: 2-2, 2-4
2	9-4	Role of critical thinking in society. Identifying good arguments. Fallacies of composition and division.-Exercises.	Read Chap.3
3	9-7	Holiday. No class.	
3	9-9	QUIZ 1. Evaluating informative claims. Sources of information. Experts.	Study for Quiz 1.
3	9-11	More language and logic: nonargumentative persuasion. Slanters. News. Ads.	Read Chap 4
4	9-14	Elements of bad arguments. Role of critical thinking in society. Pseudoreasoning I: emotional appeals	Evaluation 1 due.
4	9-16	More on bad arguments; factual irrelevancies. Discuss exercises.	Exercises: 4-1, 4-2, 4-3
4	9-18	More on bad arguments; persuasive devices.	Read Chap 5
5	9-21	Informal logic fallacies and bad arguments. Pseudoreasoning II.	Exercises: 5-1, 5-2
5	9-23	More on informal logic fallacies Discussion of exercises.	Read Chap 6

5	9-25	More on informal logic fallacies. Discussion of exercises.	Exercises: 5-4, 6-1, 6-2
6	9-28	Explanations. Role of critical thinking in society.	Read Chap 7
6	9-30	Distinguishing explanations from arguments. Discussion of exercises.	Exercises: 6-10, 7-1
6	10-2	Criteria for evaluating explan- ations.	Argument 1 due.
7	10-5	Explanations and arguments in science. Scientific method. Discuss exercises.	Exercises: 7-6, 7-9
7	10-7	Explanations and arguments in engineering. The engineering method.	Evaluate explanation
7	10-9	Midterm exam.	Study!
8	10-12	Role of critical thinking in engineering design.	Read Hand- out 1.
8	10-14	Arguments and logic in engineering design.	Meet with design crew
8	10-16	Arguments and logic in engineering design.	Finalize design
9	10-19	Fallacies of reasoning with graphs and numbers.	Design due
9	10-21	Types of arguments: Good and Bad, Valid and Invalid, Strong and Weak.	Read Chap 8
9	10-23	Deductive and Inductive arguments Unstated premises.	Evaluate articles
10	10-26	Deductive and Inductive arguments.	Argument 2 due.
10	10-28	Diagramming arguments.	Exercises: 8-13
10	10-30	Diagramming arguments.	Exercises: 8-14
11	11-2	Quiz 2.	Study!
11	11-4	Deductive arguments I: Categorical logic; claims, standard form.	Read Chap 9

11	11-6	Deductive arguments I: Categorical operations.	Exercises 9-1, 9-2
12	11-9	Deductive arguments I: Categorical syllogisms.	Read Chap 10
12	11-11	Deductive arguments II: Truth tables.	Exercise 9-14 (1-11)
12	11-13	Inductive analogical arguments.	Exercises 10-1, 10-2
13	11-16	Inductive generalizations.	Evaluation 2 due.
13	11-18	Criteria and fallacies of inductive generalization.	Read Chap 11
13	11-20	Casual arguments; causation among specific events.	Exercises 11-1, 11-6
14	11-23	Quiz 3. Types of weak causal arguments: <i>post hoc, ergo propter hoc</i> .	Study!
14	11-25	Types of weak causal arguments: ignoring a possible common cause, assuming a common cause, reversing causation.	Read Chap 12
14	11-27	No class. Holiday: Thanksgiving.	
15	11-30	Causation in populations; controlled cause-to-effect experiments.	Exercises 11-13, 11-14
15	12-2	Causation in populations; nonexperimental cause-to-effect studies.	Exercises 12-1, 12-2
15	12-4	Causation in populations; nonexperimental effect-to-cause studies.	Exercises 12-3(2, 3, 6)
16	12-7	Anecdotal evidence.	Exercises 11-4, 12-5
16	12-9	Last day of class! Review. Role of critical thinking in society.	
17	12-14	Final exam. Time: 1315-1515	Study!

Fifth Edition

Critical Thinking

BROOKE NOEL MOORE ▲ RICHARD PARKER
California State University, Chico

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Course Outline
GME 5 - CRITICAL REASONING

CATALOG DESCRIPTION:

Fundamentals of analysis and evaluation in the context of technology. Evaluating the viewpoints of experts. Patterns of deductive and inductive arguments. Common fallacies of reasoning. General Education CORE, Area A3. [3 units, no prerequisites]

GENERAL EDUCATION REQUIREMENTS

This course fulfills the CSU General Education (GE) requirements for study in Critical Thinking. The student must earn a grade of "C" or better to receive GE credit. In conformance with GE policy, each student will be required to write a minimum of 2000 words in various assignments that contain properly structured arguments and explanations.

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COURSE OBJECTIVES

Students will learn the fundamentals of critical thinking, the relationship of language and logic, the structure of good arguments, the elementary inductive and deductive processes, and the common fallacies of reasoning. Students will learn to recognize and constructively challenge faulty reasoning by others, as well as themselves.

POLICY ON CHEATING AND PLAGIARISM

You are expected to do all your own thinking and work on the exams and evaluations. If you are found cheating, you will receive zero points for that exam or evaluation. If you are found cheating a second time, you will receive an "F" for the course. (See the definitions of Cheating and Plagiarism on pages 36 and 37 of the current Schedule of Courses.)

TOPIC TIME DISTRIBUTION (Approximate)

1. The structure of arguments (2 weeks)
2. The relationship of language and logic (1 week)
3. Evaluation of arguments and explanations (3 weeks)
4. Effective thinking skills (1 week)
5. Common fallacies of reasoning
(covered with topics 1, 2, 3, 6, 7)
6. Deductive arguments (3 weeks)
7. Inductive arguments (4 weeks)
8. The role of critical thinking in society (1 week)
9. Examinations, quizzes (1 week)

TEXTBOOK

Moore, Brooke N., and Richard Parker, CRITICAL THINKING,
5th edition, Mayfield Publishing Company, Mountain View,
California, 1998.

GRADING POLICY

Grades will be assigned according to percentage of total points achieved on this scale: A - 90% to 100%, B - 80% to 89%, C - 70% to 79%, D - 60% to 69%, F - below 60%

Points are given for the following:

1. One 50-minute midterm exam, worth 75 points.
2. One two-hour final exam, worth 100 points.
3. Two arguments, two evaluations, worth 100 points total.*
4. Participation in class discussions, worth 25 points.
5. Three Quizzes, worth 15 points each, 45 points total.
6. Selected homework assignments, 55 points total.

Total points = 400

*NOTE: All written arguments and evaluations must be turned in for course credit to be given.

EVALUATION OF WRITING

The arguments and evaluations graded will contain a total of 2000 words in order to meet General Education requirements. A typical argument or evaluation will contain a minimum of 500 words. Each must be typed and double-spaced. Arguments will be graded on: good grammar and spelling, clarity of expression, effective structure of argument, number and diversity of premises, avoidance of fallacies of reasoning, advocacy of ideas, and ability of reaching factual or judgmental conclusions. Evaluations will be graded on: good grammar and spelling, clarity of expression, recognition of premises and fallacies of reasoning, quality of analysis and criticism, ability to separate opinion or judgment from matters of fact, and ability to recognize deductive or inductive processes.

STUDENTS WITH DISABILITIES

Students with disabilities have a responsibility to identify themselves to the university and the instructor so reasonable accommodation for learning and evaluation within the course can be made.

NOTE:

The above schedule and procedures for this course are subject to change in the event of extenuating circumstances.