ARIZONA STATE UNIVERSITY

GENERAL STUDIES PROGRAM COURSE PROPOSAL COVER FORM

Courses submitted to the GSC between 2/1 and 4/30 if approved, will be effective the following Spring.
Courses submitted between 5/1 and 1/31 if approved, will be effective the following Fall.
(SUBMISSION VIA ADOBE.PDF FILES IS PREFERRED)

DATE 11/8/10

1. ACADEMIC UNIT: Department of Engineering, College of Technology and Innovation

2. COURSE PROPOSED: EGR 104 Critical Inquiry in Engineering 3 Hours

   (prefix)  (number)  (title)  (semester hours)

3. CONTACT PERSON: Name: Darryl Morrell Phone: 7-1123

   Mail Code: 0180  E-Mail: morrell@asu.edu

4. ELIGIBILITY: New courses must be approved by the Tempe Campus Curriculum Subcommittee and must have a regular course number. For the rules governing approval of omnibus courses, contact the General Studies Program Office at 965-0739.

5. AREA(S) PROPOSED COURSE WILL SERVE. A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study. (Please submit one designation per proposal)

   Core Areas
   - Literacy and Critical Inquiry—L
   - Mathematical Studies—MA
   - Humanities, Fine Arts and Design—HU
   - Social and Behavioral Sciences—SB
   - Natural Sciences—SQ

   Awareness Areas
   - Global Awareness—G
   - Historical Awareness—H
   - Cultural Diversity in the United States—C

6. DOCUMENTATION REQUIRED.
   (1) Course Description
   (2) Course Syllabus
   (3) Criteria Checklist for the area
   (4) Table of Contents from the textbook used, if available

7. In the space provided below (or on a separate sheet), please also provide a description of how the course meets the specific criteria in the area for which the course is being proposed.

   The purpose of this course is to help students learn to think critically in a technical setting, which involves systematic evaluation of information as input to a well-informed decision making process as well as close reading and substantive writing. EGR 104 is nominally taken in the second semester of the freshman year by all students enrolled in the Engineering Program. It involves a significant amount of guided classroom discussion to introduce students to the practices necessary to support critical thinking. This is accompanied by written homework assignments as well as a Term Paper, a Written Self-Assessment Take Home Assignment, and an End-of-Semester Oral Interview. Thus, the course includes significant writing as well as collection, interpretation, and evaluation of evidence.

Rev. 1/94, 4/95, 7/98, 4/00, 1/02, 10/08
Rationale and Objectives

Literacy is here defined broadly as communicative competence in written and oral discourse. Critical inquiry involves the gathering, interpretation, and evaluation of evidence. Any field of university study may require unique critical skills which have little to do with language in the usual sense (words), but the analysis of spoken and written evidence pervades university study and everyday life. Thus, the General Studies requirements assume that all undergraduates should develop the ability to reason critically and communicate using the medium of language.

The requirement in Literacy and Critical Inquiry presumes, first, that training in literacy and critical inquiry must be sustained beyond traditional First Year English in order to create a habitual skill in every student; and, second, that the skills become more expert, as well as more secure, as the student learns challenging subject matter. Thus, the Literacy and Critical Inquiry requirement stipulates two courses beyond First Year English.

Most lower-level [L] courses are devoted primarily to the further development of critical skills in reading, writing, listening, speaking, or analysis of discourse. Upper-division [L] courses generally are courses in a particular discipline into which writing and critical thinking have been fully integrated as means of learning the content and, in most cases, demonstrating that it has been learned.

Students must complete six credit hours from courses designated as [L], at least three credit hours of which must be chosen from approved upper-division courses, preferably in their major. Students must have completed ENG 101, 107, or 105 to take an [L] course.

Notes:

1. ENG 101, 107 or ENG 105 must be prerequisites
2. Honors theses, XXX 493 meet [L] requirements
3. The list of criteria that must be satisfied for designation as a Literacy and Critical Inquiry [L] course is presented on the following page. This list will help you determine whether the current version of your course meets all of these requirements. If you decide to apply, please attach a current syllabus, or handouts, or other documentation that will provide sufficient information for the General Studies Council to make an informed decision regarding the status of your proposal.
Proposer: Please complete the following section and attach appropriate documentation.

**ASU - [L] CRITERIA**

**TO QUALIFY FOR [L] DESIGNATION, THE COURSE DESIGN MUST PLACE A MAJOR EMPHASIS ON COMPLETING CRITICAL DISCOURSE--AS EVIDENCED BY THE FOLLOWING CRITERIA:**

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Identify Documentation Submitted</th>
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</thead>
<tbody>
<tr>
<td>☒</td>
<td>☐</td>
<td>C-1 EGR104 Spring 2010 Syllabus</td>
</tr>
</tbody>
</table>

**CRITERION 1:**
At least 50 percent of the grade in the course should depend upon writing, including prepared essays, speeches, or in-class essay examinations. *Group projects are acceptable only if each student gathers, interprets, and evaluates evidence, and prepares a summary report.*

1. Please describe the assignments that are considered in the computation of course grades—and indicate the proportion of the final grade that is determined by each assignment.

2. Also:

   Please circle, underline, or otherwise mark the information presented in the most recent course syllabus (or other material you have submitted) that verifies this description of the grading process—and label this information "C-1".

| ☒   | ☐  | C-2 EGR104 Spring 2010 Syllabus |

**CRITERION 2:**
The composition tasks involve the gathering, interpretation, and evaluation of evidence

1. Please describe the way(s) in which this criterion is addressed in the course design.

2. Also:

   Please circle, underline, or otherwise mark the information presented in the most recent course syllabus (or other material you have submitted) that verifies this description of the grading process—and label this information "C-2".

| ☒   | ☐  | C-3 EGR104 Spring 2010 Syllabus |

**CRITERION 3:**
The syllabus should include a minimum of two substantial writing or speaking tasks, other than or in addition to in-class essay exams

1. Please provide relatively detailed descriptions of two or more substantial writing or speaking tasks that are included in the course requirements

2. Also:

   Please circle, underline, or otherwise mark the information presented in the most recent course syllabus (or other material you have submitted) that verifies this description of the grading process—and label this information "C-3".
<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Identify Documentation Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>□</td>
<td>EGR104 Spring 2010 Syllabus</td>
</tr>
</tbody>
</table>

**CRITERION 4:** These substantial writing or speaking assignments should be arranged so that the students will get timely feedback from the instructor on each assignment in time to help them do better on subsequent assignments. *Intervention at earlier stages in the writing process is especially welcomed.*

1. Please describe the sequence of course assignments—and the nature of the feedback the current (or most recent) course instructor provides to help students do better on subsequent assignments.

2. Also:

   Please circle, underline, or otherwise mark the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process—and label this information "C-4".
<table>
<thead>
<tr>
<th>Criteria (from checksheet)</th>
<th>How course meets spirit (contextualize specific examples in next column)</th>
<th>Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion 1</td>
<td>EGR 104 is nominally taken in the second semester of the freshman year by all students enrolled in the Engineering Program. It involves a significant amount of guided classroom discussion to introduce students to the practices necessary to support critical thinking. It also involves group classroom activities such as a formal debate of a proposition. This is accompanied by written homework assignments as well as more substantial writing assignments. In particular, the following assignments are written: the Term Paper, the Course Notes Binder, many of the homework assignments, and the Written Self-Assessment Take Home Assignment. Together, these assignments are worth a minimum of 56 points out of a total of 108 possible, which is 52%.</td>
<td>See the “Grading” and “Major Assignments” sections of the syllabus.</td>
</tr>
<tr>
<td>Criterion 2</td>
<td>The primary purpose of the Term Paper is for students to think critically about an issue of interest to them. In order to do this, they must gather evidence both for and against their position, interpret this evidence, and evaluate this evidence relative to their position. The primary purpose of the Written Self Assessment Take Home Assignment is for students to provide and interpret evidence relative to their progress throughout the course. Students also provide and evaluate evidence in many of the questions in the End-of-Semester interview, in class discussions, and the homework</td>
<td>See the “Major Assignments” section of the syllabus.</td>
</tr>
<tr>
<td>Criterion 3</td>
<td>The Term Paper and the Written Assessment Take Home Assignment are substantial writing tasks. They are described in more detail in the &quot;Major Assignments&quot; section of the syllabus.</td>
<td>See the &quot;Major Assignments&quot; section of the syllabus.</td>
</tr>
</tbody>
</table>

| Criterion 4 | Please circle, underline, or otherwise mark the information presented in the most recent course syllabus (or other material you have submitted) that verifies this description of the grading process—and label this information "C-4". | Paper for review and are giving substantial feedback, especially on the strength of their arguments for their position. This feedback occurs two weeks before the paper is due. They have the opportunity to incorporate this feedback into the paper before the final draft is due. Students receive feedback on the Written Self-Assessment Take-Home Assignment during the End-of-Semester Interview. This feedback is used during the interview to help students strengthen their evaluation of the evidence they present. |
CRITICAL INQUIRY IN ENGINEERING
EGR194 (104)
SPRING 2010
Class Numbers:
13962, T, Th, 9:00-10:15AM
25628, T, Th, 12 NOON-1:15PM

INSTRUCTOR: Dr. Robert Hinks
Office: Santan Hall 235C, (480) 727-1063
Office Hours: Mondays: 2-4 PM, Wednesdays, 10 AM-12 noon & 7-8 PM, or by appointment.
E-mail: robert.hinks@asu.edu


PREREQUISITES: ENG101, 105 or 107

WEBPAGE: http://myasucourses.asu.edu (Blackboard)

Catalog Description of EGR104

Critical thinking. Systematic evaluation of information as input to well-informed decision making. Close reading and substantive writing in a technical setting.

Course Objectives

_Everything we do in life is determined by the quality of our thinking_. This course is about becoming a better thinker, with emphasis on how to do this from the perspective of student, and later, professional engineer. You will learn how to properly assess matters of fact, matters of opinion, and matters of judgment. You will learn a model of _engineering reasoning_ that will help to maximize your potential to become a highly-skilled engineer. You will learn how to approach - in a way that optimizes the fruits of your labor and maximizes your satisfaction - the creation of a good, defensible design and the reports and presentations that allow you to succinctly and completely communicate your work to others. You will develop an ability to read and write with _skill and insight_, going beyond mere superficial reading to _close reading_. Close reading gives you the ability to report _accurately and precisely_ what is said in a written text. You will also develop and come to value writing skills that go beyond mere style or fluency to writing that is _substantive_ - that is, written communication that says something important.

Engineering Program Outcomes and Development Levels

By the conclusion of the course students must have demonstrated achievement in the following Engineering Program outcomes and developmental levels:

**Communication - Level 2:** The student uses a process to develop appropriately structured communications

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1 The 7 – 8 PM office hour on Wednesdays will be in the freshman studio (Studio 90)
Critical Thinking and Decision Making - Level 2: The student is able to identify assumptions, criteria, and evidence to make informed decisions

Perspective – Level 2: the student is able to identify and evaluate the assumptions made by others in their description of the role and impact of engineering on the world

Note that level 1 proficiency in these outcomes is assumed. English courses ENG101 and ENG102 include level 1--related topics.

Grading

The standard ASU grading options will be used in this course: “A” (excellent), “B” (good), “C” (average), “D” (passing), and “E” (failing). In addition, “A+”, “A-”, “B+”, “B-”, and “C+”, grades will be used as justified based on an individual student’s performance. Note that the grade of Incomplete (“I”) can be given “only when a student who is otherwise doing acceptable work is unable to complete a course because of illness or other conditions beyond the student’s control” (See the ASU Student Services Manual at http://www.asu.edu/aad/manuals/ssm/ssm203-09.html)

108 points are available to be earned in the course. You may also earn bonus points that will count toward your point total; Bonus points can be awarded for outstanding term paper and course binder submittals (see Table 1).

To earn the grade of A+ a student must earn between 96 and 108 of the total number of points available in the course. Students who leave the course with an A+ will have achieved a consistently superior record in all components of the grading plan.

Students who achieve an A or A- grade will have earned between 86 and 96 of the total available points. This range of points constitutes an excellent record of achievement.

The grades of “B+”, “B”, and “B-” will be given for a total cumulative score in the range 72 to 86 points. This is performance in the course that can be characterized as “good”.

The grades of “C” and “C+” will be given when a student’s cumulative score is between 62 and 72 of the total available points. A grade of C represents “average” performance.

The grade of “D” will be given when a student’s cumulative score is between 52 and 62 points. This grade represents an overall “passing” performance.

The grade of “E” will be given when a student’s cumulative score is 52 or lower.

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2 Communication – Level 1: The student is able to recognize, describe and assess own processes used in various modes of communication
Critical Thinking & Decision-Making – Level 1: The student is able to articulate the Critical Thinking process.
Perspective – Level 1: The student understands that technological change and development have both positive and negative effects.
Table 1 – Grading Plan

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term paper</td>
<td>22^3</td>
</tr>
<tr>
<td>Contributions to In-Class</td>
<td>22</td>
</tr>
<tr>
<td>Discussions</td>
<td></td>
</tr>
<tr>
<td>Course Notes Binder</td>
<td>18^3</td>
</tr>
<tr>
<td>Assignments/Quizzes/Spot Challenges</td>
<td>12</td>
</tr>
<tr>
<td>Self-Assessment Take-Home Assignment</td>
<td>12</td>
</tr>
<tr>
<td>End-of-Semester Interview</td>
<td>12</td>
</tr>
<tr>
<td>Individual Student Initiatives</td>
<td>10</td>
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</tbody>
</table>

Major Assignments

Term Paper—this paper is a critical inquiry into a topic of interest to the student. The inquiry includes:
- Introduction and background to the topic.
- Facts that support the student's position on the topic.
- Facts that support one or more opposing viewpoints.
- Arguments as to why the student’s position on the topic is better supported by the facts.

Students are given feedback at the time they select their topic and position on their topic; this feedback assesses the suitability of the topic as a subject for critical inquiry. Students also submit a draft of their paper for review and are giving substantial feedback, especially on the strength of their arguments for their position. They have the opportunity to incorporate this feedback into the paper before the final draft is due. This paper is assigned in mid-February and is due on April 20.

Written Self Assessment Take Home Assignment—in this assignment, students reflect on their progress throughout the course, providing evidence to support their reflections. In particular, they describe how their perspective on the professional world of engineering has changed and which of the eight Engineering Program outcomes is the most challenging to them personally; they also explain why the challenging outcome is professionally important and their plan to improve in this outcome. This assignment is given out in the last week of April and is due on May 3.

End-of-Semester Interview—students have a one-on-one interview with the instructor covering the course content. Several questions cover concepts and activities undertaken during the semester, while other questions ask students to provide critical analysis of articles read during the semester. Students receive feedback during the interview and, if necessary, the interview is scaffolded to help students demonstrate their critical analysis skills. This interview occurs after Reading Day and before the end of the semester.

Other Items

- By the end of the course, all students must present evidence that they have satisfied level 2 in the three course outcomes shown on page 2. For the most

^3 Bonus points available
part, written evidence of this will be found in a student’s notes binder, self-assessment document, and orally in the individual interview.

- Keep a copy of all work handed in for grading (exception: quizzes) and any e-mails concerning submitted work that you send to the instructor. If an assignment “goes missing”, for whatever reason, the copy you keep will be used for grading. If no copy is available, a score of zero will be given. Submittals rarely are lost but if it happens this is the rule we will follow.

- Assignment submittal dates are generally firm, and submittals are due at the beginning of class. However, I appreciate that at times during the semester work in all your courses can “pile up”. If this happens then do not hesitate to request a deadline extension. The latest time to do this physically in my office is at least 30 minutes before the start of class on a submittal Tuesday or Thursday. Do not request an extension when I am collecting submittals at the beginning of class, as it will be denied.

- All assignments must be word-processed and contain all of the template information shown on the posted first day PowerPoint.

- Appropriate classroom behavioral norms must be followed throughout the course. They include the following: (1) laptop computers must be closed unless directed otherwise; (2) during times a laptop is on, there must be no emailing, texting, games or surfing that is unrelated to the class; (3) cell phones must be off and Bluetooth sets stowed; (4) iPods and headphones must be stowed at all times.

- No food or drinks are to be brought into the classroom. The only exception to this is bottled water.

- All students should be familiar with, and must adhere to, the Student Academic Integrity Policy which can be found at [http://provost.asu.edu/academicintegrity](http://provost.asu.edu/academicintegrity). In the event of violations of the required high standards of academic integrity, the conditions, procedures, and sanctions provided by this Policy will guide the process taken to resolve the issue.

- The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. One element of this legislation requires that all qualified students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation please contact the Disability Resource Center at ASU Polytechnic located Sutton hall Suite 240 or e-mail DRC at PolyDRC@asu.edu, or call 480-727-1039 / TTY: 480-727-1009. Eligibility and documentation policies are online at: [http://www.asu.edu/studentaffairs/ed/drc/qualification.htm](http://www.asu.edu/studentaffairs/ed/drc/qualification.htm), and [http://www.asu.edu/aad/manuals/ssm/ssm01-02.html](http://www.asu.edu/aad/manuals/ssm/ssm01-02.html)

- There are lots of valuable resources at ASU to help you achieve success both personally and academically. Don’t hesitate to use them! A few of these are:

  a. Student Success Centers – [http://studentsuccess.asu.edu](http://studentsuccess.asu.edu)
  b. Counseling Services - [http://students.asu.edu/counseling](http://students.asu.edu/counseling)
  c. Career Services - [http://students.asu.edu/career](http://students.asu.edu/career)
Introduction

Why A Mini-Guide to Engineering Reasoning

This thinker's guide is designed for administrators, faculty, and students of engineering reasoning concepts and tools. For faculty concept and vocabulary. For students it is a thinking supplement to engineering courses. Faculty can use it to design engineering instruction. Students can use it to improve their perspective in any course.

Generic engineering thinking skills apply to all technologic disciplines. Engineering thinkers are clear in the purpose and the question, information, conclusions, and points of view. They seek to think beneath the surface, to be logical. They apply these skills to their reading and writing as well as to their professional and personal life.

When this guide is used as a supplement to the engineering courses, students begin to perceive applications of engineering in their lives. In addition, if their instructors provide examples of engineering thinking to life, students begin to see good thinking as quality of their lives.

If you are a student using this guide, get in the habit of carrying a scientific class. Consult it frequently in analyzing and synthesizing learning. Aim for deep internalization of the principles you find, and become second nature.

While this guide has much in common with A Miniature Guide to Engineering Thinking and engineers have much in common with scientists, engineers serve different fundamental purposes and are engaged in distinctively different kinds of work. This should become apparent as you read this guide.