Course Curriculum and Discipline Based Research [1]

Characteristics of Highly Effective Teaching

The President's Teaching Scholars are highly effective in designing and re-designing their courses. Deep learning and rapport with their students is foremost in their minds. We invite you to read this section and to use the Teaching Scholars Directory on this website to converse with any of the Scholars. We know from the research literature on teaching that having conversations with colleagues about teaching assists us in getting over not only immediate stumbling blocks in one's students but in the delightful discussions about the broader intellectual issues in teaching.

Dan Barth - Psychology Department

PSYC 4052 (Behavioral Neuroscience) Course Description:

This course is designed to provide an intensive introduction to the principles of neuroscience. It initially covers the detailed neuroanatomy of human forebrain, hindbrain and spinal cord. This is followed by neurophysiology with a concentration on the electrophysiology of neural systems. The basics of neuroanatomy and neurophysiology are then applied to an examination of the structure and function of visual, auditory, and sensorimotor systems in animal and man.

Diane Conlin - Art and Art History Department and Classics Department

CLAS/ARTH 2019 Course Description:

I first taught the art and archaeology of Pompeii to a small group of senior Classics majors for the department's capstone undergraduate seminar in 2006. Since the study of Pompeii involves exploring a wide range of primary sources (literary, epigraphic, numismatic, artistic and architectural), I believed this topic perfect for a capstone experience for our majors. I also decided to include a lengthy exposition on the modern history of archaeology in the Naples region and soon realized that the vast majority of the seminar students had no background in the history of modern Italy or the evolution of excavation methods as they pertain to the unique disposition of strata and artifacts preserved by the eruption. I also included readings and discussions on volcanoes and volcanology in order to introduce them (and myself) to the morphological phases of Plinian eruptions as they relate to the preservation of ancient material evidence. The reading load was heavy and dense, so I required students to keep
reading journals that I collected and graded regularly throughout the semester. The seminar went very well, especially since we all learned much together in the comfort of a small seminar environment.

Since many CU students visit Pompeii with their families at some point in their life, in 2008 I decided to try to offer the topic as a sophomore level lecture-style class. My primary goal was to introduce undergraduates from across the university to the complexities and misconceptions that surround our understanding of this unique archaeological classroom and tourist hub. Unfortunately, due to an administrative enrollment misunderstanding that term, the course wound up enrolled at 200 instead of the original 100 seats; the classroom had to be changed and I was assigned a grader?disruption and chaos characterized that course from the start. Moreover, the class was scheduled for two 75 minutes sessions at 8:00 in the morning. In addition to these logistical problems, I quickly discovered that my seminar content was not easily transferable to a lecture style class; students could not master the readings independently and the relatively limited individualized instruction contact impeded overall student learning and engagement with the course material. Pompeii was no longer a fascinating topic but a hard class with filled with overwhelmed students.

Fast forward to 2010. This semester I am trying the course as a sophomore level class once again but with major structure and content revisions. I have redesigned the lectures, assignments and readings to better suit an introductory course, now filled to capacity at 283 students, most of whom are freshman and sophomores. The course has been redesigned to include weekly recitation section discussions that are led by five graduate teaching instructors, most of whom are trained in classical art & archaeology. Emphasis in sections is on discussing and assessing reading assignments and introducing topics related to the material covered in lecture. My role too has expanded. In addition to delivering the twice-weekly lectures, I am teaching the Honors section for a small group of students. For this group, I have reintroduced the reading journal requirement and a substantial research paper. If this goes well, I plan to apply these teaching and assessment assignments to all sections. The pedagogical goals for 2010 have shifted?rather than bombard students with excessive amounts of disconnected information, instead we focus on improving reading, essay writing and note-taking skills as students grapple with difficult concepts and unfamiliar Latin terms and archaeological vocabulary. I completely changed the required to textbooks and much of the supplementary reading materials. I have eliminated nonessential, specialized jargon on volcanic geology and historiography and increased discussion of more inherently interesting and ultimately informative subjects such as forensics, food, slavery and sex. Most of all, I have tried to put more emphasis on the big ideas?societal constructs and values, poverty and elitism, diverse populations, politics and religion, archaeological ethics, environmental disasters and urban planning. I hope these changes will improve student engagement with and mastery of this fascinating but complex topic.

Mike Cummings - Political Science Department

PSCI 1001 (Introduction to Political Science) Course Description:

My UCD course PSCI 1001, Introduction to Political Science, introduces students to the study of people, power, and the public good. We begin by acknowledging the negative associations
most Americans (including most of the students) have with the words "politics," "political," and "politician." The course delves into the reasons for this "bummer" view of politics and presents students with two stark alternatives: avoid politics because it is negative or engage in it to make it better. The key course themes are (1) the relevance of power and public policy to the students' lives, and (2) the possibility for the students to empower themselves to make a difference in public policy. Through diverse readings, media coverage of current events, videos, guest lectures, and small-group activities, students encounter a wide variety of political topics and viewpoints, culminating in their researching and writing term papers in which they use course materials to develop their own policy recommendations in three issue areas of their own choosing. The interactive course pedagogy is intended to create a 60-person community of learning over the semester.

Stan Deetz - Communication Department

COMM 4600/5600 (Seminar in Organizational Communication: Collaborative Decision Making) Course Description:

Increasingly organizations and communities have turned to the use of project teams and other forms of direct stakeholder and employee participation in decision making. Further, some companies are beginning to involve community groups and other stakeholders in environmental and other kinds of decisions. Communication is core to the quality of all participatory decision making. This course will explore why these changes are taking place, the various types and models of participation, individual skill needs, and the discussion and collaboration processes that facilitate and limit the success of these programs. As a result of the course, class members should have a better understanding of the changing workplace and its connection to the wider society, an increased capacity to participate in collaborative decision making in organizations and communities, and the ability to aid organizations in improving their decision making processes.

Transformation of COMM 1600 Group Processes into a Laboratory in Dialogue and Participatory Democracy

The course is described as follows in the catalog: Covers basic theories, concepts, and characteristics that underlie face-to-face interactions in interpersonal, small group, and organizational settings. Activities stress the development of both task and relational skills in these settings.

As might be expected, the course has succeeded in introducing students to basic discipline-based theories and concepts?especially regarding interaction in small groups?and in providing a generic set of interaction skills focused mostly on effective functioning in groups and their interpersonal relationships. When everyday events have been considered in the course, however, the focus has mostly been on ?having a discussion,? with little attention to?or direct engagement with?larger deliberative and decision making processes that are central to organizations and civic communities.

Stated in the most general way, I wish to transform the course such that, instead of the class and class discussions being used to illustrate and learn concepts and skills, the class instead
focuses on decision making and problem solving in communities and organizations, where
concepts and skills are seen as tools to achieve that. This revision directs student learning
and growth towards interactional processes as civic engagement and highlights how things
like stakeholder collaboration, public deliberation, and community dialogue do/can/should
function in communities and in organizations making decisions.

Mike Eisenberg - Computer Science Department

GEEN 1440 (General Engineering) Course Description:

During the current semester, I have been teaching a section of GEEN (General Engineering)
1400, a course primarily for first-year and incoming engineering students. My section of the
course, offered for the first time this year, focuses on the engineering of Leonardo da Vinci;
the students explore da Vinci's notebooks and then use a variety of novel fabrication tools in
our lab to recreate his brilliant designs. For the students, this curriculum provides an
counter with the (often-neglected) historical and biographical elements of engineering-
Leonardo is an irresistibly fascinating personality and the Renaissance, a golden era of early
engineering. At the same time, however, the students employ state-of-the-art devices and
computational techniques as a means of rethinking this beautiful tradition of engineering. Our
lab is equipped with both a computer-controlled 3D prototyper and laser cutter, as well as a
variety of traditional machine tools. It should be mentioned that the GEEN 1400 students are
currently, as of this writing, working on their still-unfinished larger-scale final projects.

I would like to extend the basic theme behind this course in several potentially exciting
directions. One possibility would be to design a more general course in the history of
engineering, integrating elements of design and historical study. Such a course could involve
students in the recreation of important ideas in the history of technology - e.g., in the use of
waterpower, the design of clockwork, the manufacture of textiles and paper, and so forth. (I
have recently submitted a proposal to the National Science Foundation suggesting course
development of this sort of engineering.) Other possibilities might incorporate design and
fabrication into the study of science and mathematics: for example, a curriculum in the design
and recreation of important historical scientific instruments, or a course focused on the
creation of small-scale scientific instruments for home or amateur use; or a course on the
design of mathematical puzzles and games (e.g., topological puzzles), or mathematical
artwork more generally. One particularly interesting avenue that I would like to pursue, would
be a collaboration with students or faculty in psychology and the fine arts, focusing on the
design and creation of physical artifacts that creatively represent optical illusions and other
interesting visual phenomena.

Essentially, then, the larger agenda that I would like to pursue is one in which engineering and
design are integrated with more traditionally "theoretical" study. Indeed, the time is right for
this sort of integration, given the advent of powerful new design software and computer-
controlled fabrication tools. Rather than viewing computers as abstract desktop devices, we
can instead begin to view them as the centerpieces of a new sort of "shop"; and I believe that
this new view of computers can have tremendously innovative and important education
consequences.
John Falconer - Chemical and Biological Engineering Department

CHEN3320 (Chemical Engineering Thermodynamics) Course Description:

I am teaching Chemical Engineering Thermodynamics, CHEN 3320, a 3-credit hour course that prepares students to master topics including thermodynamic principles in non-ideal systems, phase equilibrium, chemical equilibrium, power generation, refrigeration and chemical processes. By attending lecture students are given the opportunity to engage in active and innovative learning techniques. In this course we assess student’s understanding with ConceptTests and use clickers to get feedback. Outside of lecture, students have the opportunity to view screencasts. Screencasts are designed to further explain concepts covered in the lecture but in much greater detail. The Department of Chemical Engineering has already made a number of screencasts and is currently making them available to faculty at other universities. This course is a prerequisite for all senior level Chemical Engineering courses and this next fall will have around 115 students enrolled.

Michael Grant - EPO Biology Department

EPOB 4410/5410 (Biometry) Course Descriptions:

Biometry is designed as a hands-on, methods-oriented course in (mostly) univariate statistical inference designed for professional-biologists-in-waiting with deficient or non-existent backgrounds in statistics. In particular, the course focuses on developing a frame of mind in which uncertainty is an ever-present element. The course contains an introduction to classic, basic and fundamental data analysis concepts such as point and interval estimators, sampling, inference, effect sizes, graphical data interpretation and presentation, formal hypothesis testing, experimental design and practical methodological considerations of biological data analysis. It aims to show how statistical analysis can be a very useful tool—not a panacea—in biological investigation and also in being an educated citizen. The course does not provide a thorough background in probability theory nor will it be oriented toward the mathematical bases of the various statistical methodologies except as minimally necessary for proper application of those methodologies. It should be thought of and labeled as a first course in data analysis? rather than as a true mathematical statistics course.

Mitch Handelsman - Psychology Department

Psy 8200 (Teaching Skills Workshop) Course Description:

Last summer I co-created and co-taught (with Allison Bashe, a senior instructor in Psychology) a new doctoral-level course called ?Teaching Skills Seminar? (in the future it will be called ?Teaching Skills Workshop?). We taught the 2-credit-hour course during Maymester—a three-week term. One of the innovations we’re most proud of was the reflective time out? (RTO), which was this offer?made during the first class: ?Any time,
during any class period, any of us can call an RTO. That is, you can stop us and ask us why we're doing what we're doing.?

**Psy 1005 (Introduction to Psychology II) Course Description:**

In the fall of 2009, mostly as a result of the teaching skills course I taught in May, I re-designed my introductory psychology course to be more active and engaging for students. Before last fall, 10 of my 25 class periods were ?active learning? sessions; the rest were relatively traditional lectures. Last fall, all 25 class periods were active learning sessions. As part of this re-design, I developed a new writing assignment, which I call ?PROPS,? or ?Processing and Reflecting on Psychology.? These are short (a few sentences to 1 page) written pieces over the assigned reading that show some processing of the information students read over and above summarizing or questioning. They were due on the date the reading is due. Students needed to hand in 15 props (out of the 25 days that reading was due); they could choose when.

**Paul Harvey - History Department**

**HIST 300 (Race, War and Genocide in the U.S. and Germany, 1865-1965) Course Description:**

My colleague Robert Sackett (a German historian) and I have designed a new course, which we're currently teaching in the History Department at UCCS: Race, War and Genocide in the U.S. and Germany, 1865-1965." In the course we're trying to broaden students' approaches most especially to studying war and genocide in the 19th and 20th centuries, by incorporating experiences of blacks and Indians in the U.S. to the more familiar stories of European Jews. We're also comparing literature about "coming to the terms with the past" in the post-WW II U.S. South and Germany. We have 45 students in the course and it seems to be going very well. This new course has been the result of years of conversations between Professor Sackett and myself, focused on the question of how the racial terrorism practiced against blacks did not devolve into a larger-scale genocide, while the relatively hopeful situation of Jews in Germany around 1900 descended into the Holocaust.

**Andrea Herrera - Women's and Ethnic Studies Department**

**WEST 3020 (Autobiography and the Creation of the Self) Course Description:**

I am currently teaching a course I created titled Autobiography and the Creation of the Self. I have taught this course on several occasions, and rethink and consequently revise it every time it is offered.

The course is designed to introduce students to the concept of identity formation, and the manner in which this term has been conceptualized through a wide range of art forms including painting, film, literature and various written and oral testimonial expressions. Students are asked to consider the manner in which the various authors and artists present the self (in terms of delivery and form), and pay special attention to the role that race or
ethnicity, class, gender, sexuality, cultural heritage and the idea of nationhood play in their works. More specifically, we consider the ways in which authors and artists from various backgrounds have used their autobiographical writing and art work to position themselves as subjects within, and engage in a dialogue with, both their own communities and within dominant society.

In addition to writing 2 critical essays, which focus on and compare and contrast at least 2 works or texts treated in class, students have a mid-term examination, and they are asked to develop a final presentation that is autobiographical in its focus. Students are given the opportunity to submit critical questions for the exam; and they are given the opportunity to focus on a single work in their first critical essay, and then build upon this work in their second essay. Those who choose to develop their first essay not only capitalize on the work they have already done for the course?something that many choose to do given their incredibly complex schedules?but they simultaneously benefit from my comments, etc., which they receive on their first essay.

At the most fundamental level, this course overturns traditional approached to autobiography and challenges students to consider the manner in which identity and self can become performative. This final presentation is perhaps the most challenging and complex of all of the course requirements, for it calls on students to contemplate the representation of the self. In this sense, I am implementing what many scholars refer to as an embodied pedagogy.

For my part, the most difficult aspect of the course is calibrating how to present what more often than not proves to be poignant and painful narratives (such as Elie Wiesel?s Night or Harriet Jacobs Incidents in the Life of a Slave Girl) from an intellectual perspective without losing sight of the human experience?the agony and the suffering?that is at the core of many of these narratives.

Although I receive feedback from students at the end of the course in the form of FCQ?s, I ask students for specific oral feedback following the mid-term and again at the end of the semester. Nearly all of the changes/alterations I have made in my syllabus or in my approach to teaching the course are based on this very important feedback.

**Don Kleier - School of Dentistry**

**DSSD 7712 (Dental Pain and Emergencies) Course Description:**

This course covers the diagnostic and treatment considerations for managing the patient in pain and other emergency problems encountered in general dentistry. It will examine dental conditions that cause pain. The skills achieved will enable the student to formulate a differential diagnosis of acute pain situations encountered in dental practice and describe an appropriate plan to treat those conditions. The knowledge base achieved during this course will be expanded during clinical patient care.

**DISP 8120 (Endodontics III) Course Description:**
The purpose of this course is to consider advanced concepts in the diagnosis and clinical management of endodontic disease. This course provides a continued foundation for the discussion of clinical events occurring in the student's clinical practice of dentistry and endodontics.

Clayton Lewis - Computer Science Department

CSCI 1300 (Computer Science 1: Programming) Course Description:

Computer Science 1: Programming teaches techniques for writing computer programs in higher level programming languages to solve problems of interest in a range of application domains.

In my recent offerings, I've presented two different programming languages, a practice that helps students see that the concepts and techniques they are learning are not limited to a particular language, but are of more general value. The course also includes an opportunity for students to work on a project of their own choosing, so that they can apply what they have learned to a problem of personal significance.

Over the years, we and other CS programs nationally found ourselves confronting two serious problems, frequent cheating and very low participation by women. These problems are not unrelated: the classroom climate created by cheating and the efforts to control it by ever more draconian policies was very unattractive to many women students. Beginning last year, I developed a new version of CS1300 which eliminated these problems, and created an atmosphere in which students are encouraged, and indeed required, to work constructively together. At the same time, in response to research done here and nationally on the interests of women students, I have created new exercises for the class which make clearer the potential social benefits of computer technology. The result is a course whose appeal reaches beyond those students who are fascinated by technology for its own sake (a group that includes few women) to students whose interest is more in what technology can contribute to life. This year, CS1300 students will develop software which can be used to match the interests of students and faculty in the department, making a positive contribution to our department's culture. Thanks to a curriculum grant from Microsoft, students will be able to deploy their programs on the Web, giving them experience in their first semester with real-world software delivery.

Steve Medema - Economics Department

UNHL 3820 (Economics of Life) Course Description:

This course, titled "The Economics of Life," will build on the ideas behind my PTS research project and the principles of microeconomics course that impressed the selection committee when I was nominated as a Teaching Scholar. UHL courses are all multidisciplinary, and what I will be doing in "The Economics of Life" is introducing the students to applications of the economic approach to human behavior across the social spectrum. As such, the course will treat the application of economic analysis (and, in particular, the rational actor model and the theory of markets) to areas including politics, law, religion, and family life. Students will engage with primary source readings in these areas from the economics literature and from the literatures in these other social sciences in order to get a sense for how economics might help us to better understand these traditionally "non-economic" phenomena, how the other social sciences have traditionally gone about analyzing those same phenomena (and thus how those approaches differ from the economic approach), and, where available, critiques of the economic approach by scholars in the other social sciences. I also intend to give the students some exposure to the history of economic
ideas as prelude to this, paying attention to how the definition and practice of the subject has evolved over time from
the study of the wealth creation process to the study of market activity to the contemporary study of behavior under
conditions of scarcity, and how this evolution in the definition of economics has facilitated the expansion of
economic analysis from its traditional, economy-oriented domain to the examination of all manner of social
phenomena.

As I noted above, the course will emphasize primary source readings. It will also be very writing intensive, building
on the notion reflected in my PTS project proposal that regular writing exercises in a variety of forms are important
for mastery of both the intuitive and the technical sides of economic analysis.

I fully expect that this course, which will be offered to sophomore and junior honors students, will push me in ways
that I have not previously been pushed as a professor. There is a great challenge in teaching a seminar class made
up of 15-20 honors students?students who are on average better placed to deal with sophisticated literature and
analysis than students one would encounter in one?s introductory economics courses, but yet who are not steeped
in economic analysis because they are not economics majors.

Wes Morriston - Philosophy Department

PHIL 4830 (Senior Seminar: Life, Death and Meaning) Course Description:

At some point, many people fall into a certain kind of perplexity. They find themselves wondering whether, beyond
the particular projects and goals of everyday living, their lives have meaning. Without an overarching, transcendent
purpose, they worry that life may not be not worth living. It is far from easy, however, to see whether there is any
such purpose, or even what sort of purpose would make our lives fully meaningful. In some minds this produces a
profound sense of absurdity. Anxiety about the meaning (or absurdity) of life is often triggered by the thought of
death. According to some, the inevitability of death makes the kind of purpose that would give a satisfying meaning
to one?s life unattainable. According to others, life would be meaningless without death.

This semester, we will wrestle with a series of questions closely related to the above-mentioned concerns. What
would it take for a life to be fully meaningful, and what is the meaning of ?meaning? here? Must one?s life be
meaningful in some especially robust sense in order to be worth living? Would it help if there were a God, and if our
lives had an important role to play in God?s plans? Or would God make no real difference?

Is death a destroyer ? or is it perhaps an enhancer ? of meaning? Assuming optimal conditions, would it be good (or
bad?) for an individual to live forever? If death is an ?experiential blank,? how (if at all) can it be bad for the
individual who dies? Can the dead be harmed by events subsequent to their demise? Is it rational to worry so much
more about the nothingness that (we fear) comes after death, and not at all about the nothingness that precedes
our birth? And why is the thought of death so closely linked to worries about the meaning of life?

Our assigned readings give (sometimes eloquent) expression to a wide variety of perspectives on these (and
related) questions. Students are encouraged to develop their own views and to defend them both in class
discussion and in the papers they will be writing for the course.

Steven Pollock - Physics Department
PHYS 2020 (General Physics 2) Description of Course:

Physics 2020 (General Physics 2) is the second semester of an algebra-based sequence in college physics. We emphasize conceptual understanding and problem solving skills. We will cover topics in modern physics, including electricity, magnetism, light, optics, and more: the foundations of our technological society. Our goals are for students to continue developing knowledge and intuition about how the world works, to learn to approach physics problems on both qualitative and quantitative levels, to relate classroom physics to the real world they live in, and to develop a deeper appreciation of the scientific method. We want students to learn to understand everyday phenomena of electricity and magnetism in terms of just a few basic and understandable physical laws.

This material largely involves discoveries less than 150 years old. (Of course, even the ancients knew some things about magnetism and light). We are so comfortable with technologies like TV and computers, it's easy to forget just how recent these developments are: some of you may have relatives old enough to remember the days before radio (the first licensed broadcast station opened in 1920). We live radically more convenient and perhaps longer and more enjoyable lives due to the revolution in electric-based technology. Modern health-care, industrial, and home tools are based on the existence of electrical power and electronics. By the end of this course, students should have a base of knowledge to allow them to better understand how many modern electronic devices work.

PHYS 3220 (Quantum Mechanics1) Description of Course:

Physics 3220, Quantum Mechanics 1, is the first semester of our two-semester sequence of junior-level quantum mechanics (QM), the foundation and explanatory framework of much of modern physics. We will cover the basic ideas of QM, solutions of Schrodinger's equation in 1 dimension, formalism and postulates of QM, and solutions in 3-dimensions (the hydrogen atom) We have many learning goals in this course, which include content and mathematical skill mastery, high-level problem-solving skills, physical sense-making, deepened conceptual understanding, communication skills, and connection to other courses and to the real world. The bottom line is to teach students how to do some quantum mechanics this term.

Joan Ray - English Department

ENGL 252 (Survey of British Literature II, 17th and 18th centuries) Course Description:

The literature of 17th- and 18th-century Britain reflects the changes in English society from an aristocratic poetry written under patronage to a newly emerging literary genre appropriately called the "novel" addressed to a new and growing middle class. Our major texts with be the Norton Anthology of British Literature, volume 1, in which we will begin with John Donne and end with Thomas Gray with selected readings, and an early novel, which for the spring 10 semester will be Daniel Defoe's Robinson Crusoe. Students will write two in-class essays (including the final exam) and two out-of-class essays.

ENGL 498 (Major Author Senior Seminar: Jane Austen) Course Description:

One of the most popular, critically studied, and beloved novelists of all time, Jane Austen (1775 1817), left six novels, a few juvenile pieces, and two unfinished fragments of novels. This seminar will study her works in chronological order of composition as we share our insights about each text, in so doing, we will discover that while Austen wrote "courtship" novels, she also had much to say--not all of it complimentary--about the culture in which she lived and in which her fiction is set. Students will write a research paper proposal and a research paper; one in-class essay test; and one out-of-class paper. Students will also do an oral presentation to guide part of the
discussion on a specific novel. Please schedule an appointment with me to arrange this.

**Ed Rivers - English Department**

**ENGL 3856 / ATLAS 3519 (Multimedia Composition) Course Description:**

A computer-based course in how to combine writing with other media such as video, music, animation, and podcasting. The course includes a unit on web-site design and ends with each student creating his or her own website and posting on it the projects he or she created for the course. (Screen shots of some of these websites can be found in Appendix 1.) This course was the first English-ATLAS cross-listing and for two years the only one.

**ENGL 4116 / ATLAS 4519 (Multimedia Sound) Course Description:**

A computer-based course in the nature, history, and philosophy of sound (especially digital sound) and its relation to language and other media. In addition to studying the role of sound in history and across cultures, students create their own projects involving pure sound or combining sound with other media. The course includes advanced work with music composition, songwriting, podcasting, and field recording and includes work with experimental electronic instruments such as the theremin.

**ENGL 4116 (Advanced Topics in Media Studies) Course Description:**

An advanced topics course that introduces English majors to the history and nature of media without any limitation on the kinds of media. Sections of the course can focus on anything from the history of the book to the use of sound in media. I wrote the successful application to the College of Arts and Sciences for adding this topics course to the English curriculum. My course Multimedia Sound, described above and currently underway, is the first section of this new topics course to be taught.

**Harvey Segur and Mary Nelson - Applied Mathematics Department**

**APPM 1350 (Calculus 1 for Engineers) Course Description:**

Applied Mathematics? APPM 1350 course, Calculus I for Engineers, is a 4-credit course that offers students the opportunity to master the critical concepts of rate of change of functions, limits, derivatives, integration and their applications. Each week, students attend three lectures taught by a faculty member, plus one hour of recitation with a trained teaching assistant. Calculus I is a prerequisite for many courses in the Engineering curriculum, and about 500 students enroll in this class every fall semester. The department strives to be student-centered, particularly in their offer of oral assessments. Students can participate in oral reviews before each written unit exam. The orals are ungraded and voluntary. Facilitators ask groups of five students conceptual questions and give the students the opportunity to defend their thinking and negotiate meaning with their peers and the facilitator. Results suggest that students participating in orals deepen their understanding and pass Calculus I at higher rates.

**Improving First-Semester Calculus:**

Nationwide, 40 % of college students take some version of first-semester Calculus. But 40% of the students who take that course do not pass it: at CU/Boulder, that means that they get grades of D, F or W. (D is a failing grade in the sense that students who get D in Calculus I are not allowed to enter Calculus II, because history has shown that they will almost certainly fail Calculus II.) The numbers for the Department of Applied Math on the Boulder campus
are slightly better, but not much: year after year, 30-35% of the students in our Calculus I class in the fall semester get grades of D, F or W. Most of them do not go on to take Calculus II, which means at least that they drop out of majors in Engineering, Science or Math, and often means that they drop out of CU altogether.

Over the years, Applied Math has tried several things to improve this dismal situation. The relevant one for your list began in 2006, when Mary Nelson and I decided to implement her voluntary, ungraded "Oral Assessments" before each of the three exams during the semester in APPM 1350 - Calculus I for Engineers. Each Oral typically consists of 5 students and a facilitator, and they are given in the two days before a written exam, so after the students have had a chance to study the material in question. Each Oral is given in a room with lots of blackboards, so the students all stand at a blackboard, and they answer questions from the facilitator. The questions are somewhat more conceptual than those that appear on the written exams - so the students are not asked to calculate X, but rather why one would want to calculate X, how to use X once it's been calculated, why X is the right quantity for that situation, and why X needs to be calculated this way instead of that way.

About 500 students take APPM 1350 each fall semester, so the logistics of such an operation are nontrivial: reserving enough suitable rooms, lining up enough good facilitators, and getting the right students to the right rooms at the right time all require some work. Mary Nelson had already invented and refined her concept of how Orals should work, so my biggest contribution to this large-scale experiment was to make sure that the logistics were handled properly each fall semester. I did this in fall semesters of 2006, 2007 and 2008. After that, I made a point of not teaching the class again, so that other people in our department would get involved in the project.

Aside from running the experiment, there is also an issue of measuring in some objective way the value of Orals for the students. Participation by students is voluntary, so it has been important to figure out how to separate the effect of the Orals on the students from the possibility that the more motivated students signed up for the Orals, and of course the more motivated students do better on exams.

I'll skip the grimy details of how we do that. After carefully taking data for the last 4 years, we now have objective measures of the effect of Orals. The NSF has agreed that we are getting somewhere on this project: in 2008, the NSF awarded a $450,000 grant to CU to continue this project. Mary Nelson is PI of the grant, James Curry, Anne Dougherty and I are co-PIs and Gene Abrams (at UCCS) has a smaller parallel grant to continue his version of Orals at UCCS. The grant is called CCLI, for Course, Curriculum and Laboratory Improvement.

The work on this grant spills over from APPM 1350 in several ways. (Mary Nelson, not me, has been responsible for most of this spillage. I take credit only for keeping the train on the tracks in APPM 1350 for the first 3 years of the experiment.) Spillage:

- Applied Math now uses Orals regularly in both first and second semester Calculus classes.
- Gene Abrams at UCCS is using his version of Orals in a class that he has organized there.
- Daria Kotys-Schwarz in Mech. Eng. and Penny Axelrad in Aerospace have begin using Orals in courses in their departments.
- Mary has been working with a teacher at Centaurus High School to use Orals in that teacher's Algebra class (for 15 year olds).
- Monica Geist at Front Range Community College has been using Orals in some of the Math classes at Front Range.

Don Warrick - Business Department
MGMT 600 (Leading and Managing in Changing Times) Course Description:

The purpose of the course is to develop high impact leaders who are skilled at bringing out the best in people, teams, and organizations. The course is designed so that those who are eager to learn will have a wide variety of opportunities to learn as much as possible. Furthermore, this course aims to prepare, motivate, and challenge students to make a difference professionally and personally in times of dynamic change.

MGMT 620 (Managing Organization Development and Change) Course Description:

Next to skills in leadership, the most important skills leaders, managers, and key personnel throughout an organization will need to develop to be successful in these times of dynamic change will be skills in championing and managing change. The purpose of this course is to develop knowledgeable and capable Change Agents and Change Champions who have a strong commitment to making a difference in the lives of people and organizations and are skilled at improving the health and effectiveness of individuals, groups, and whole organizations and at managing organization change and transformation. The course draws primarily from the field of Organization Development and builds on the Leading and Managing in Changing Times course (MGMT 600/MGMT 609). Some material will be similar to MGMT 600 but will focus more on applications and designing successful changes.

Mimi Wesson - School of Law

LAWS 5503 (Criminal Law) Course Description:

This course will probably be a bit different from other first-year courses. After years of teaching from a traditional textbook, using fairly traditional methods, I concluded that these were not working as well as I wished. In particular, I have found that the customary use of two to five severely edited cases from various jurisdictions as the main material to be discussed in a class gives a misleading impression about what decisional law looks like, and conveys an inadequate sense of how to work with cases. I believe that the exclusive reliance of most casebooks on the Model Penal Code (which provides a useful example, but is nowhere in effect) is unfortunate, for every jurisdiction has its own code, and it forms just as important an object of study as the cases interpreting it. This course will use the Colorado Criminal Code.

This course will have some unusual features. First, there is no casebook for this class. Second, each student will be responsible for doing additional research for at least one class in the semester; students may be assigned a partner for this purpose. Third, there is a requirement that each student complete eight hours of courtroom observation in the course of the semester. Fourth we will have three or four guest speakers in the course of the semester, to talk about matters within their particular expertise.

The following are changes that have been made to this course:

- I compiled my own set of teaching materials for Criminal Law, and placed the course materials entirely online (eliminating the need for the students to purchase an expensive textbook). I?ve added other innovations to this class as well, to promote greater student engagement, and they seem to be working. I think that within a couple of years, I may able to dispense with the need for heavy, expensive, hard-copy textbooks in all of my classes.
- By throwing out the casebook I?ve eliminated the use of the severely edited decisions generally found in these teaching materials, instead requiring the students to both find and read unedited versions of the decisions that we discuss?better replication of what real lawyers do. Since we read only one (lengthy)
unedited case per class using this method, we can mine the cases for more material. Also, the students have
to learn how to spot the portion of a lengthy decision that really bears on the subject of interest, and learn to
scan the remainder without necessarily mastering every detail of it. Again, like real lawyers. I wish I?d
thought of this twenty years ago! The use of edited decisions and casebooks is so universal that it?s taken
me far too long to question their usefulness. But it?s also a matter of technology and access to data; until
recently, it was not practical to throw out the casebook unless I wanted to write one of my own (and I never
did).

- I?ve required each student to sign up to be our resource person or expert du jour for one class. Usually they
work in teams of two. This encourages collaboration, more intense preparation once in the semester, the
satisfaction of becoming a resource for others, and the habit of reliance on one?s peers for information and
insight?again, like what the best lawyers do.

- I?ve assigned a court observation task?eight hours of court observation recorded in a journal.

- I have an attendance and participation policy that rewards these activities.

- I?ve attached my syllabus, a representative handout for class discussion (it asks about Kansas because we
had read and analyzed a Kansas decision beforehand), and a memo explaining the journal/court observation
assignment. All materials are available to the students at a website.

Shelby Wolf - Education Department

EDUC 4311 (Children's Literature & Literary Engagement in Elementary Schools) Course Description:

This course is designed to heighten teacher education candidates? abilities to interpret literature with children [1.3
DP]. A generous portion of the course concentrates on five kinds of criticism that are most appropriate for
elementary children: (a) genetic criticism with a focus on the author, (b) formal criticism with highly specific attention
to the text itself, (c) text-to-text criticism with an emphasis on how one written text fits within the larger body of
literature, (d) transactional criticism with an eye on the reader?s interaction with the text, and (e) sociocultural
criticism with an emphasis on cultural, political, and social-historical perspectives. The central textbook?Children?s
Books in Children?s Hands?provides teacher education candidates with a thorough explanation of the history of
children?s literature, the narrative elements essential to excellent literature, as well as numerous examples of
quality tradebooks and the authors and illustrators who create them. Still, the study of literary forms, even with the
added zest of various types of criticism, would make a poor formula for the classroom if children?s intellectual,
emotional, and sociocultural lives weren?t invited into the mix. Indeed, who children are is inextricably blended with
how they will engage in literature, and it will affect their reading comprehension, their oral language development,
their writing, their drama, and their art as they construct meaning from text [6.1 DP, 1.4 DP].

In this class, teacher education candidates will read a wide range of classic and multicultural literature that gets
children talking?provocative, puzzling, and pleasurable books that encourage children?s reflection, critical
conversation, and creative expression. Supported by numerous examples from classroom teachers and children
engaged in standards-based instruction, teacher education candidates will plan and organize their own literary
instruction through read-alouds, independent reading, and literature discussion groups. They will base all their
instruction on progress monitoring assessments of the specific gifts and needs of the children they work with over
the course of the semester [1.1 DP, 1.5 DP, 4.2 DP].

EDUC 5255 (Processes in Literary Interpretation) Course Description:

This course will stress curiosity, observation, challenge, and insight into how children and adolescents become
literate beings. These processes have much to do with the work and play of oral language development, reading
comprehension, and literary engagement?for it is through analytic reading, substantive discussion, reflective writing,
visual representation, and dramatic enactment, that readers learn to take the words from the page to inform and transform their worlds [IRA 1.1A, 1.3A, 2.5A, 2.6A, 5.1A, 5.2A, 5.3A, 5.4A].

The purpose of this class is to expand your understanding of literary engagement [IRA 5.5A]. The conceptual frame builds on theory and research in literary criticism, with a generous portion devoted to the explicit instruction of genre and its impact on the other narrative components of character, setting, plot, theme, point of view, style, and tone [IRA 14.1A]. Each of these components shifts and changes depending on the critical perspective. But the study of literary forms, even with the added zest of the various types of criticism, would make a poor formula for the classroom if children’s highly diverse transactions with text weren’t invited into the mix, especially their views of culture, class, and gender [IRA 1.2A]. Indeed, who children are is inextricably blended with how they will engage in literature, and it will affect their talk, their writing, their drama, and their visual art as they construct meaning from text. Literature is important for children’s personal and social growth as well as a means for transmitting moral and cultural values [IRA 1.3A, 1.4A]. Still, it is essential to remember that children’s active and analytic construction of meaning is a transformative blend of their existing knowledge and environmental impact, the information and themes suggested by the written language of text, and the context of the reading situation [IRA 1.5A].

This class highlights three central objectives for your learning. First, learning about classic and contemporary children’s and young adult literature [IRA 2.12A], with a focus on multicultural texts, will help you become knowledgeable about the prose and poetry created to represent and celebrate the diverse student population in American schools and help you select high quality literature to meet your instructional goals [IRA 1.2A]. Second, learning about literary criticism will inform you of the many creative ways that children and adolescents respond to text and how you can best lead such response [IRA 5.5A]. Third, learning about theory in situated cognition will ask you to view mental processes in the context of activity as well as situate your own understandings in meaningful literary interactions with your students, planning universal, targeted, and intensive instruction based on ongoing assessment [IRA 1.6A].

These ways of thinking about literary engagement are all impacted by semiotic theory, which is the study of communicative behavior through signs and symbols. Current research on literary engagement places a central focus on talk?reminding teachers and their children of the power of expressive language as they engage in literary discussion and criticism [IRA 2.1A, 2.2A]. The emphasis on language is key for as Vygotsky (1986) reminds us ?thought does not express itself in words, but rather realizes itself in them? (p. 251). When given opportunities to talk about text in critical ways, children grow not only in understanding the text on the page but the texts of their lives. Still, Vygotsky and others suggest that verbal expression is only one of many ?languages? available to children as they interpret text. An emphasis on talk may actually silence children, particularly non-mainstream/non-native English speaking children since all cultures do not emphasize verbal displays of knowledge that school has come to see as ?normal? [IRA 2.3A]. The same may be said of mainstream children who are known for their dramatic and artistic interpretations of literature at home, but who lose opportunities for such expressive modes once they enter school. The focus on alternate modes of expression is not meant to eliminate verbal forms; rather, these artistic modes extend what can be accomplished verbally. The end result is a semiotic toolkit (Wertsch, 1991) that will allow children, young adults, teachers, and researchers to develop a wide range of tools for constructing their literary engagement [IRA 1.6A, 1.7A, 2.1A, 2.2A, 2.5A, 2.6A].

* The bracketed numbers have to do with the professional standards preservice and practicing teachers have to meet.

Index of Teaching Scholars’ Published Research: 2009-2013 [2]
Groups audience: President's Teaching Scholars Program

Source URL: https://www.cu.edu/ptsp/course-curriculum-and-discipline-based-research

Links: