

The World at Home:
Planning for the Future in a Complex World

The College One Core Course
UC Merced

(Historical) Background

Gregg Herken

Historical background -1-

From GE Draft by UCM Asheville Institute Team (7/2003):

“A team-taught two-semester, signature core course will be organized through College One...It will involve strong participation of a faculty team throughout the year...The course will introduce students to the major domains of knowledge...”

From UCM College One Handbook [3/21/2005):

“The College One Core Course is future-oriented and focused upon devising solutions to real-life problems...In the first semester, Core 1 will introduce students to the issues facing informed citizens in the 21st-century and the tools needed to address them. Core 100, taken in the spring semester of the junior year, will be an opportunity for these now more-advanced students to propose answers to the questions introduced in Core 1.”

Historical background -2-

Planning steps to date:

7/17-18/2003: UC Merced GE workshop—concept of a common GE core course enthusiastically adopted

7/28/2003: Senate Task Force approves UC Merced GE Program including Core Course

9/2003: Pre-planning committee formed—meets every 1-2 months through the present

12/4/2003: Core Course presentation to joint NS/Eng meeting

1/8/2004: Proposed Core Course theme presented to UC Merced Task Force and very favorably received

Core Course Planning Committee 2004-5

Committee Members:

Henry Forman, NS

Gregg Herken, SSHA [co-chair]

Valerie Leppert, Eng

Dunya Ramicova, SSHA

Wil Van Breugel, NS

Christopher Viney, Eng [co-chair]

Ex-officio Members:

Karen Merritt

James Ortez

Foundations for the Core Course

- Provide a foundation in the skills and ideals articulated in the UCM Guiding Principles for General Education:
 - Scientific literacy
 - Decision-making
 - Communication
 - Self and Society
 - Ethics and Responsibility
 - Leadership and Teamwork
 - Aesthetic Understanding and Creativity
 - Development of Personal Potential
- Provide a common intellectual experience for all UC Merced students
- Convey the academic standards and expectations of UC Merced
- Provide a context for knowledge to be taught in majors
- Fulfill a portion of the writing/quantitative reasoning requirement
- Be the signature course for College One
- Act as a vehicle to build bridges between Schools and Faculty
- Inform students about different educational choices at UC Merced

Delivery of the Core Course

- Deliver large lectures + small discussions
- Organize Core Course into thematically linked modules
- Make every module multidisciplinary
- Have high-profile outside lecturers on specific topics
- Emphasize experiential learning to intellectually engage the students
- Use advanced technologies—simulations, WWW, etc.
- Emphasize team assignments and activities
- Where possible have the projects involve the community (e.g. develop WWW projects on local topics)
- “Core Friday” events

“The Two Cultures”

“The results of the lack of communication between scientists and nonscientists is worth examining. A good deal of the future may spring from it.” --C.P. Snow

“unionized”

A Robust Course Framework

Christopher Viney

UC Merced Planning for CORE 1, Semester 1, Fall 2005

Background considerations

Opportunities for students

CORE 1 will provide an educational experience in which students

- learn to think analytically and communicate effectively in a context of issues that will affect their lives as world citizens;
- broaden their intellectual horizons;
- acquire useful, transferable skills that equip them for a lifetime of learning;
- learn different ways of looking at the world and its problems;
- develop a trans-disciplinary understanding of what is involved in research, substantiation and proof.

Background considerations, ctd

Opportunities for faculty

- Faculty have a forum in which to stimulate student interest in their majors.
- Faculty are not restricted to contributing material from within their specialty, but can explore new connections and directions by interacting with any or all colleagues involved in teaching this course.

Background considerations, ctd

Hallmarks of the proposed course structure and content

- Unlike its typical counterparts in other universities, the course is **not a procession of unrelated talks** given by faculty in isolation of their colleagues.
- Likewise, the course is **not structured around a contrived or archaic theme**, but instead is driven by contemporary issues that an informed citizen ought to be able to consider in a culturally, technologically, ethically, morally and aesthetically literate manner.
- **Students are engaged from the outset with questions that are relevant to them.** The course structure offers a flow of ideas that makes it easy for students to know why they are being asked to learn something, how they arrived at that point, and where the discussion is headed.
- Material near the beginning of the course can be **easily cross-referenced** to material that will follow, and material near the end of the course can be cross-referenced to material that went before.
- The course **doesn't favor any one academic theme / subject / specialty.**
- The course takes account of the **eight Guiding Principles** that have been adopted for General Education at UC Merced.

UC Merced Planning for CORE 1, Semester 1, Fall 2005

Course Outline

- The proposed course will **engage and motivate** students by raising several major issues that have recently featured on the ballot in California, or are likely to appear on the ballot in the near future.
- Students will be introduced to some of the skills, tools and rules that pertain to the acquisition, analysis and dissemination of relevant knowledge.
- The motivating issues lead us to examine our physical and cultural origins; life and the purpose of life; human needs, rights and responsibilities; how we assess various types of risk; the causes of conflict; and the extent to which our understanding of the past and the present can help us to influence the future.

This material will be organized according to the following low-resolution outline:

Course Outline, ctd

(1) **Points of Engagement and Orientation** (1 week)

Introduction to some major themes, and the study skills needed to address them

(2) **Origins of the Universe** (2 weeks)

(3) **Origins of Life** (2 weeks)

(4) **Origins of Societies, Cultures and Social Responsibility** (2 weeks)

(5) **Origins of Language and Communication** (2 weeks)

(6) **Needs** of individuals and societies (2 weeks)

Tradition, religion, natural resources, engineering & technology, morals, ethics, health, the arts

(7) **Conflicts** between individuals, between individuals and societies, and between societies (2 weeks)

(8) What does the **Future** hold? (2 weeks)

Study skills, analytical skills, communication skills, ethics training, plagiarism awareness, risk assessment, intellectual property issues and professionalism to be integrated throughout the 15 weeks.

Course Outline, ctd

(1) Points of Engagement and Orientation (1 week)

Introduction to some major themes, and the study skills needed to address them

- Demonstrate the relevance of knowledge, analysis, and communication skills to informed decision making.

“Other people will be successful in competing for your vote, your money, your conscience and your time based on your knowledge and analytical skills or lack thereof.”

- *Introduce some challenging ballot / election issues, e.g.*

funding of stem cell research; ban on smoking in public places; repeal of “three strikes and you’re out”; local measures relating to land use, water use, air quality; abortion laws; homeland security; social security; the military draft; genetically engineered crops; genetic fingerprinting and health insurance

“These issues directly affect your quality of life and your future.”

- How to learn (study skills; resources) and not to learn (plagiarism).
- Disciplines approach issues in different ways. Benefits of a multifaceted view.
- Significance of creativity, creative expression, artistic pursuits and aesthetics to *all* areas of human endeavor.

Origins of the Universe (Illustrating Depth)

Wil van Breugel

Origins of the Universe

General Education, CORE 1

2 weeks, 4 lectures + 2 Friday activities

- **Who are we, in California?**
 - Social Sciences, Humanities & Arts:
Origins of Societies & Cultures, Religion, Art
- **How did we get here, in California?**
 - Natural Sciences & Engineering:
Origins of the Universe & Life

Origins of the Universe

From the Big Bang to California

- **Our place in the Universe**
Not at the center of anything
- **The Big Bang**
Evidence & scientific method
Elementary particles & forces
Nuclear fusion & radiation
- **Galaxies & Black Holes**
Gravity rules
Our Milky-Way galaxy
Evolution of galaxies and black holes

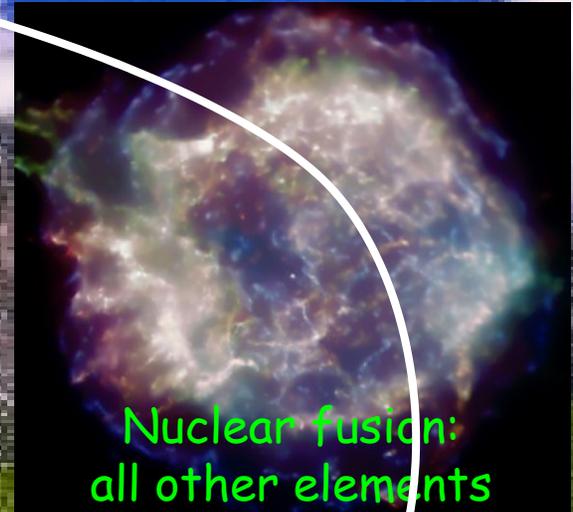
- **Stars & Planets**
We are stardust
How planets form
Extra-solar planets
- **Astro-Biology**
Organic material in Space
Habitable zones around stars
Water from heaven
Radiation and life
- **The Future**
Solar System exploration
Fine tuning the Universe?
Are we alone?
Climate change?

From the Big Bang to California: Observations of the Universe

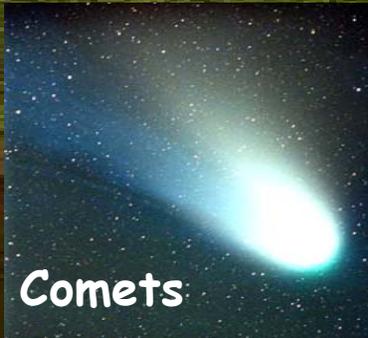
BIG BANG:
Cosmology



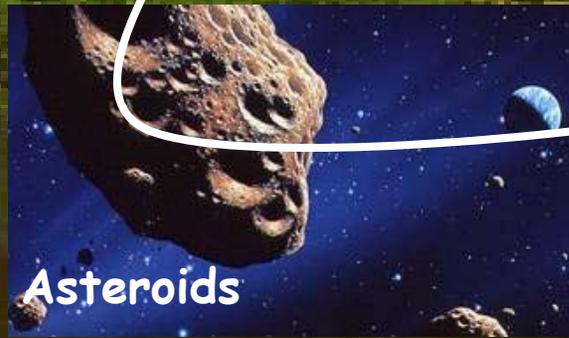
EXPLODING STARS:
Astro-physics



NEW STARS AND PLANETS
Planetary physics & Astro-biology



Comets



Asteroids

INTERSTELLAR MEDIUM:
Astro-chemistry

H₂O



Dust



Ice mantles



Molecules:
H₂O, CO, Amino acids

Origins of the Universe

Physical science discoveries that changed our lives

- **The atom**
Nuclear physics & nuclear weapons
Magnetic-resonance imaging
- **Continental drift**
Earth quakes, the Sierras
- **Climate change**
Evidence, economy & politics

- **The transistor**
Radio & TV, computers
- **Lasers**
Industry, science & health care
- **Chaos!**
Everything is connected: the 'butterfly effect'

Origins of the Universe

Suggested references and Core/Friday activities

- **Book** - **Big Bang: The Origin of the Universe**, by Simon Singh
- **Film** - **Powers of Ten**, by Charles and Ray James
- **Talk** - **Science and Religion**, by Prof. C. Townes, emeritus UC Berkeley (Nobel laureate)
- **Star party** - **NS and Engineering Faculty**

Science Everywhere (Illustrating Breadth)

Henry Forman

(3) Origins of Life

- What is life?
- What conditions are needed to sustain life (here or anywhere else?)
- What are the “building blocks” of life?

(4) Origins of Societies, Cultures and Social Responsibility

- From hunting/gathering to agriculture and farming - the biology of plants and animals.
- From selective breeding, to Mendel and peas, to GMOs.

(5) Origins of Language and Communication

- Organization of information. Periodic table, formulation of fundamental laws of nature.

(6) Needs of individuals and societies

- Who funds research at a research university, and why?
- Ethical choices in research.
- Medicine – needs of the individual.
- Public health – needs of society.

(7) Conflicts

- Make war not love – the chemistry of steel and gun powder.
- Biological threats – natural and man made.

(8) What does the future hold?

- How can we maintain the conditions needed to sustain life? Resource management.
- How will life and lifestyle be determined by technology?
- Implications of the biological revolution – the human genome; biomimicry.

Core 100

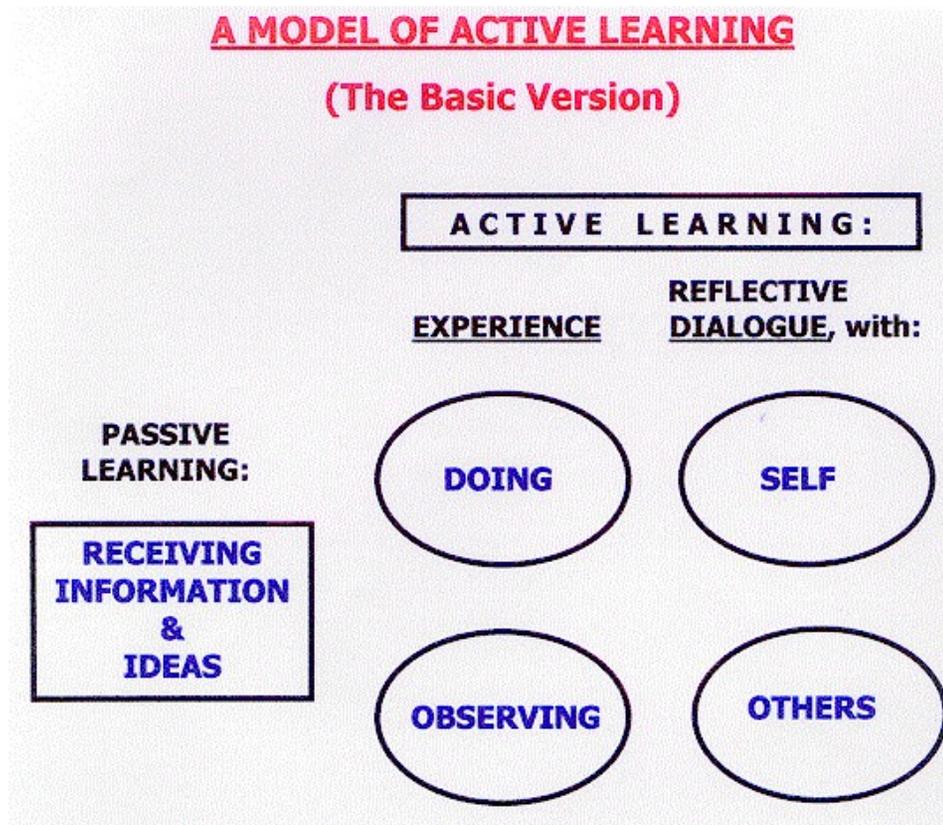
- Case studies
 - Faculty presentations of what is needed to make a case study
 - Selection of student groups and projects
 - Planning meetings and work sessions
 - Presentations: oral and written
 - Must include principles

Active Learning

Valerie Leppert

Active Learning – *Increasing Teaching Effectiveness*

[Students] must read, write, discuss, or be engaged in solving problems. Most important, to be actively involved, students must engage in such higher-order thinking tasks as analysis, synthesis, and evaluation. [*Active Learning: Creating Excitement in the Classroom*”, Charles C. Bonwell and James A. Eison]



From “Active Learning” by L. Dee Fink

Active Learning – *The need for it*

“Critical thinking is rooted in the student’s engagement with a problem.” - John Dewey, 1916

- Active learning comparable to lectures in promoting mastery of content but superior in promoting the development of students' skills in thinking and writing
- Student preference is for active learning modes over lecture format
- Many individuals have learning styles best served by pedagogical techniques other than lecturing
- Need to personalize the large lecture experience

*From “Active Learning: Creating Excitement in the Classroom”,
Charles C. Bonwell and James A. Eison*

Active Learning – *Methods*

Multiple Kinds Of Activities To Promote: ACTIVE LEARNING

	GETTING INFORMATION & IDEAS	EXPERIENCE		REFLECTIVE DIALOGUE, with:	
		"Doing"	"Observing"	Self	Others
DIRECT	<ul style="list-style-type: none"> • Original data • Original sources 	<ul style="list-style-type: none"> • Real Doing, in authentic settings 	<ul style="list-style-type: none"> • Direct observation of phenomena 	<ul style="list-style-type: none"> • Reflective thinking • Journaling 	<ul style="list-style-type: none"> • Live dialogue (in or out of class)
INDIRECT, VICARIOUS	<ul style="list-style-type: none"> • Secondary data and sources • Lectures, textbooks 	<ul style="list-style-type: none"> • Case studies • Gaming, Simulations • Role play 	<ul style="list-style-type: none"> • Stories (can be accessed via: film, literature, oral history) 		
ONLINE	<ul style="list-style-type: none"> • Course website • Internet 	<ul style="list-style-type: none"> • Teacher can assign students to "directly experience" ... • Students can engage in "indirect" kinds of experience online 		<ul style="list-style-type: none"> • Students can reflect, and then engage in various kinds of dialogue online. 	

From "Active Learning" by L. Dee Fink

Active Learning – *The connection with writing*

Writing is both a process and a product of the critical thinking skills called upon in active learning.

(“Engaging Ideas”, J.C. Bean)

- Problem-based writing assignments
- Question of the day journal task
- Writing tasks that link course concepts to personal experience
- Assign a controversial thesis for student to defend or attack
- Data-provided assignments (hypothesis testing, discovery)
- Role-playing
- Argumentative scripts

Active Learning – *Example Tools*



Foodweb Kerplunk an Ecosystem Game

Foodweb Kerplunk is a game about species relationships. Playing as a town councilmember in suburban California, you try to preserve the wildlife in a patch of native chaparral, against the pressures of town growth.

We teach Environmental Studies at Yale University. Adults are motivated by our subject--we all care about the quality of our environment, the future of our planet. But the demands on an adult's attention are legion. The hope is that, with a game, we can catch and hold that attention.

Kerplunk is the first piece of an online mini-course, *Mortal Stakes: Populations in the 21st Century*. Further games and materials will explore other aspects of human population growth, and maintaining species diversity under the onslaught. A second piece, [Aid Game](#), has been completed so far.



[Launch Game](#)
[Problems](#)



Oceanview chaparral
near San Diego.

[What is this game?](#)

[How to Play](#)

[The Chaparral Foodweb](#)

[Credits](#)

<http://www.cbc.yale.edu/courseware/ms/index.html>

Active Learning – *Example Tools*



The National Budget Simulation



[ABOUT NBS](#) * [BUDGET WEBLOG](#) * [BUDGET LINKS](#) * [NATHANNEWMAN.ORG](#)

Welcome to the National Budget Simulation!

This simple simulation should give you a better feel of the trade-offs which policy makers need to make in creating federal budgets and dealing with deficits.

The National Budget Simulation, originally a project of UC-Berkeley's Center for Community Economic Research, is now hosted at NathanNewman.org. It was created by Nathan Newman and Anders Schneiderman.

This simulation asks you to adjust spending and tax expenditures in the the 2004 budget proposed by the White House in order to achieve either a balanced budget or any other target deficit. In order to make the choices we face in the budget clearer, we assume that you make the adjustments all in one year. According to the White House, the 2004 fiscal deficit is projected to be \$307 billion. This does not include the costs of the Iraq War, so it has been increased by a base estimate of \$50 billion for those costs in this simulation

(which can be increased, lowered or eliminated depending on

Playing the Game

[The Short Version:](#)

**If You Only Want
to Worry About
the Basics**

[The Long Version:](#)

**Getting into the
Nitty-Gritty
Details**

“Core Friday”

Dunya Ramicova