Writing a Goal-centered Syllabus

Rebecca Ericson

George Mason University College of Science

Department of Physics and Astronomy

Some guiding questions

What is the purpose of a syllabus?

Who is it for?

How can it improve the process of learning?

What is the purpose of a syllabus?

What kind of imagery comes to mind? Is it like a work of art? An architecture’s drawing?

Who is it for: Consider the audience

In a core course the audiences include:

- Students – of widely diverse background and preparation
- Instructors (GTAs are likely in a science lab) – including contingent faculty
- Evaluators – including those evaluating the course for transfer
- Administrators

Three Threads

My concerns:

- Lack of understanding of what university expects from core courses
- Need to communicate with instructors about these goals
- Making syllabus learner-centered

Parks & Harris (2002)- Syllabus as:

- Contract
- Permanent record
- Aid to student learning

Content or deep learning

Dissertation

No evidence of transmission of university goals for general education science to either instructors or students.

Few could articulate any of the goals for natural science at Mason. Few instructors could point to specific activities, assignments or lectures that directly addressed learning goals.

Students questioned reasons for these being required, and while they felt ‘broadening’ was the reason, could not list specific university goals.

Boiler plate goals, copied and pasted into the syllabus are not particularly effective.

Some issues

- Multiple section syllabi
- General education goals (set by the university)

The Big Question

What will students take away from your course?

- Preparation for the next step in their education
- Lifelong learning
- Critical thinking skills
- Overview of a field of study

Write down one key thing your course should do for students

- Learner-centered goal

Your big question

On the note card, write down several learning goals for a course you teach or expect to teach.

See if you can select at least one big idea, something you hope will stick with students long after they have forgotten details from your course.

Goal-centered syllabus – Where big ideas “live”

Course overview

Course goals

Activities and assessments

Essential elements

Course description

Course goals

Helpful connectors to university services

Grading policies

Schedule

Due dates

Rubrics

Course overview

How did the solar system, all the planets, asteroids, comets, and moons, come to be? How is our understanding of the process challenged or changed by the discovery of hundreds of planetary systems orbiting other stars?

General education (core) science labs have a primary goal of asking students to participate in the process of scientific inquiry.

In this course you will examine the theory of the formation of the solar system and consider how exoplanet discoveries both challenge and deepen our understanding of how our own solar system came to be.

This is the laboratory portion of the introductory course, Solar System astronomy and is designed to pair with the Astronomy 111 lecture course. The main focus is on looking at how astronomers learn about bodies in the solar system and test the current theory of solar system formation.

Starting at the center - Putting goals first

What are the goals for your course?

Where does this fit in the bigger context of their education?

How might they benefit from the course?

Where will the main learning take place?

Setting goals

Core courses

- Goals for categories are at university level
- Course level goals – specific content and concepts

Content goals – what does course need to include?

Instructor-centered goals – how can what needs to be taught be fit into schedule?

Learner-centered goals – what will students learn and how will we and they know they learned it?

NATURAL SCIENCE GOALS (GMU):

The general education natural sciences courses engage students in scientific exploration; foster their curiosity; enhance their enthusiasm for science; and enable them to apply scientific knowledge and reasoning to personal, professional and public decision-making.

To achieve these goals, students will:

1. Understand how scientific inquiry is based on investigation of evidence from the natural world, and that scientific knowledge and understanding:
   - *evolves based on new evidence*
   - *differs from personal and cultural beliefs*
2. Recognize the scope and limits of science.
3. Recognize and articulate the relationship between the natural sciences and society and the application of science to societal challenges (e.g., health, conservation, sustainability, energy, natural disasters, etc.).
4. Evaluate scientific information (e.g., distinguish primary and secondary sources, assess credibility and validity of information).
5. Participate in scientific inquiry and communicate the elements of the process, including:
   - *Making careful and systematic observations*
   - *Developing and testing a hypothesis*
   - *Analyzing evidence*
   - *Interpreting results*

How would this look as a learner-centered goal?

Participate in scientific inquiry and communicate the elements of the process, including:

- *Making careful and systematic observations*
- *Developing and testing a hypothesis*
- *Analyzing evidence*
- *Interpreting results*

Students will:

- *Demonstrate that they can make careful and systematic observations*
- *Develop and test a hypothesis*
- *Analyze evidence (or data) with respect to whether or not it supports a hypothesis*
- *Interpret the results of an investigation and explain the reasons behind their inerpretation*
- *Evaluate the hypothesis in light of the collected evidence*

Where will this happen in the course?

1. *Demonstrate that they can make careful and systematic observations*
2. *Develop and test a hypothesis*
3. *Analyze evidence (or data) with respect to the hypothesis*
4. *Interpret the results*
5. *Evaluate the hypothesis in light of the collected evidence*

1,2 Lab 3 Planetary motion

3,4,5 Lab 5 Solar system formation

1,2,3,4 Lab 7 Reflectance spectroscopy

1,2,3,4 Lab 8 Cratering on Mars

1,2,3,4,5 Lab 10 Explore an exoplanet

Final project presentation involves communicating the results

What about the other labs?

Orientation to the solar system its size and scale and how we see the sky.

Lab 1 Solar system walk

Lab 2 Celestial sphere

Basic principles of physics and, in particular, of light and how it behaves

Lab 4 Fundamental properties of matter

Lab 6 Properties of light

Lab 9 – a citizen science project - is devoted to helping students see that at some level anyone can contribute to the science process by gathering (and in some sense) interpreting data. Whether it is identifying plumes of gas and dust erupting from the south pole of Mars, or classifying galaxies by shape, there is room for the non-scientist to contribute in a meaningful way.

Writing learning goals - Noyd

- Describe what students will learn and will be able to do
- Are actionable, visible, and measurable
- Are clear and understandable to students as well as instrutors
- Have an appropriate level of generality
- Require high levels of thinking and learning
- Are developmentally appropriate
- Lead to authentic, motivating tasks

Solar system formation lab goals

Student learning outcomes–

Students will be able to list events in the timeline for solar system formation in order

Students will analyze characteristics of planets and their motion and categorize them by whether they support the theory of solar system formation or not.

Students will participate in the process of scientific inquiry – analyze evidence and interpret results

Skills needed –	Skills developed by	Skills assessed by
Students will be able to order events in the formation for the solar system (pre-lab reading and quiz)	Reading prelab material	Pre-lab quiz
Students will compare data for solar system bodies to a list of observations of expected characteristics that fit the basic theory of solar system formation	Adding data to table in lab report – including whether or not the object aligns with expected observations.	Lab report: Answer key for particular objects Rubric for question responses

Due before lab	Pre-lab for week of October 16		Pre-lab readings and video on Solar System formation	Quiz – Solar system formation on Blackboard
October 16	Lab 5 – Solar System Formation	SLO 5 introduction to full formation theory which our investigations would be directed toward CLO 3 how scientists are learning about these objects	Discussion of the main things a theory of formation has to account for, and also of the things it has to explain aside from the basics of the theory Introduction to the on-line resources students will be using as they explore the large variety of solar system objects Visions and Voages excerpts about varioius missions and goals for specific planets	Short written report, graded by rubric Slide or short writing submitted on group page

Creative examples

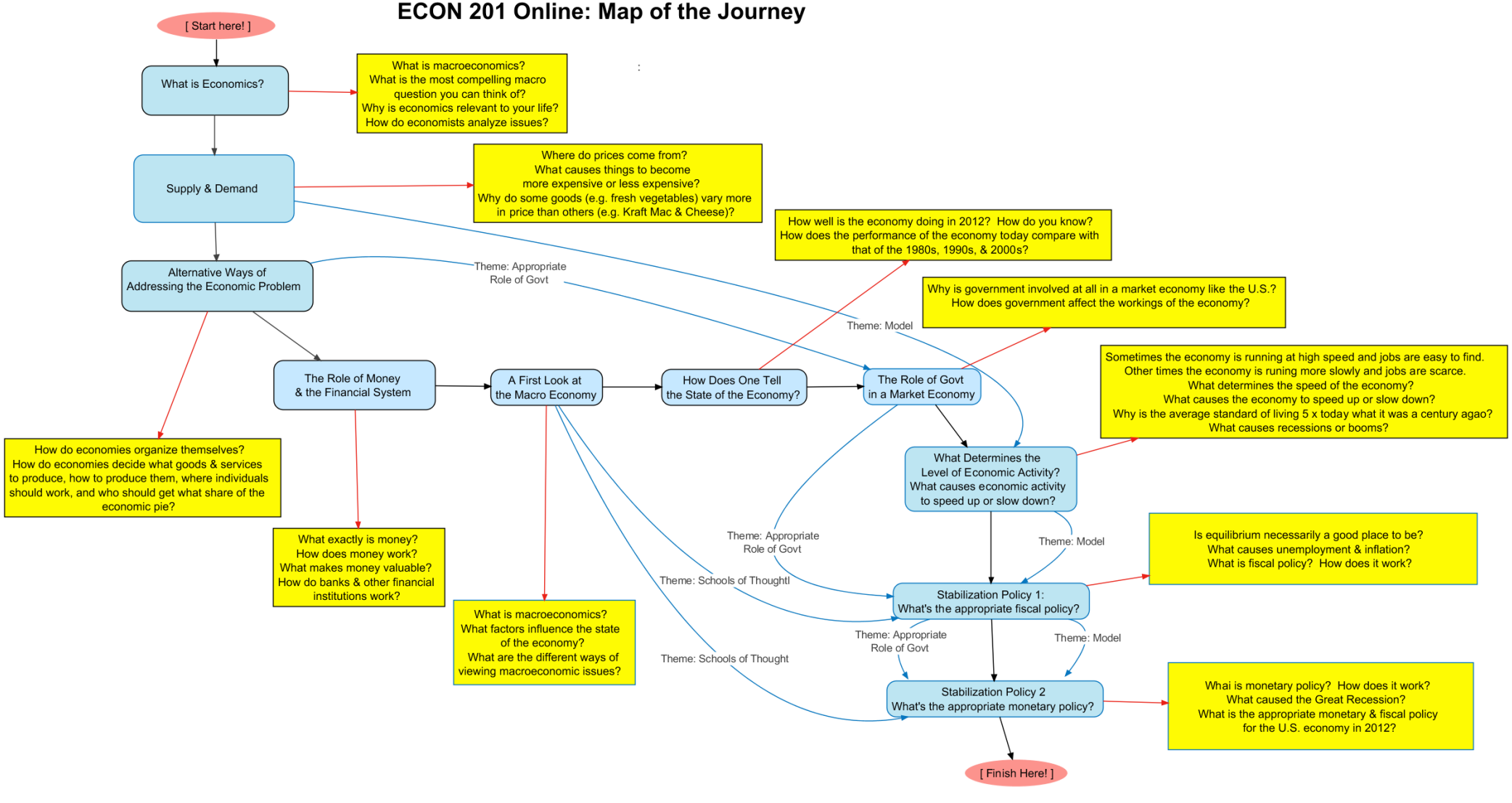
The promising syllabus (Hirsch, The Promising Syllabus Enacted: One Teacher's experience in Communication Teacher)-

What this course promises you

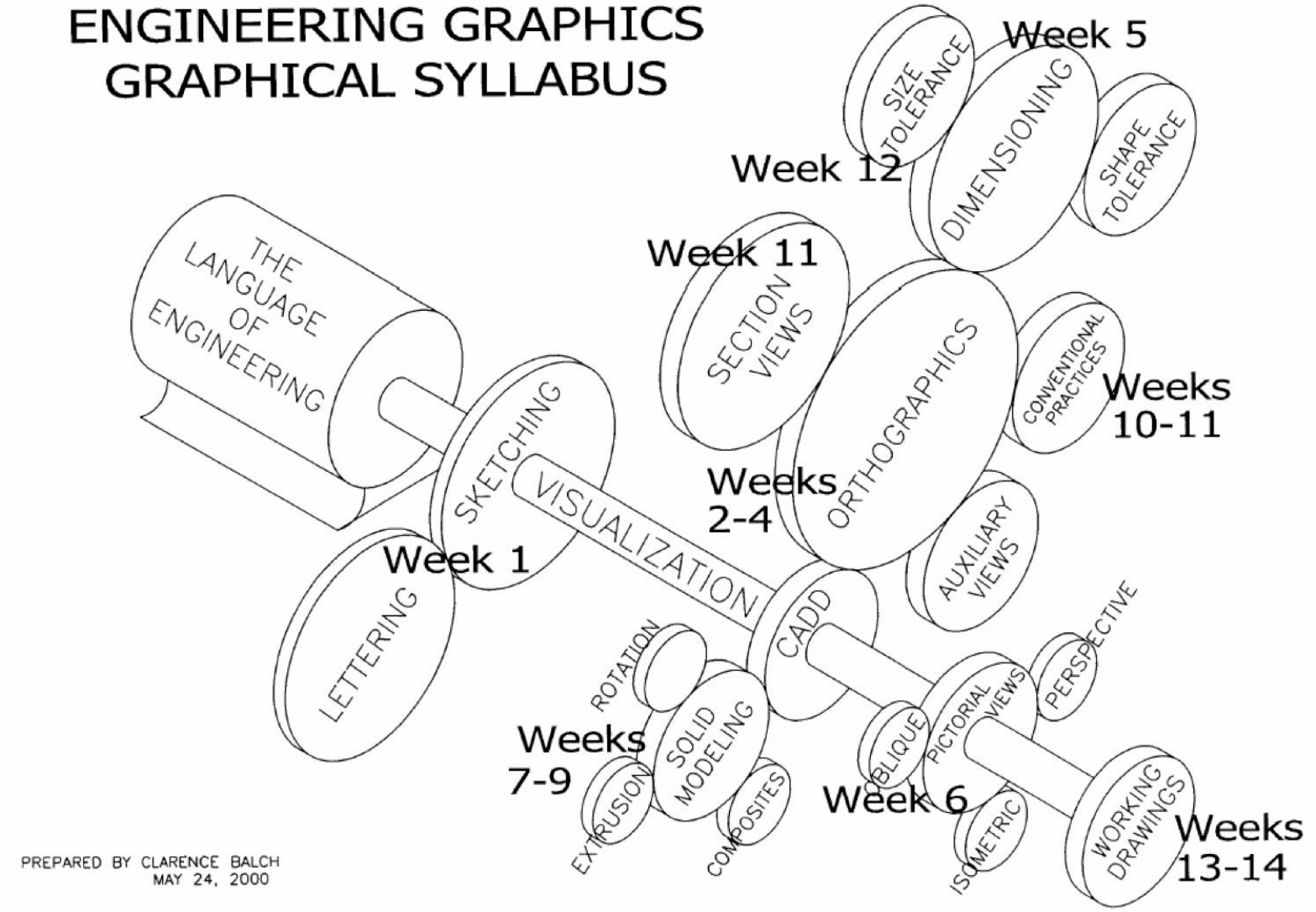
How will you fulfill those promises

Conversation about how student and teacher will understand nature and progress of student's learning

ECON 201 Online: Map of the Journey



EG 209
ENGINEERING GRAPHICS
GRAPHICAL SYLLABUS



PREPARED BY CLARENCE BALCH
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