Preparing a Comprehensive Syllabus

Katie Tifft, Biology
Jane Greco, Chemistry
With help from Christov Roberson
Gary Gutting, “Why Do I Teach?”
New York Times 5/22/2013

College education is a proliferation of . . . possibilities: the beauty of mathematical discovery, the thrill of scientific understanding, the fascination of historical narrative, the mystery of theological speculation. We should judge teaching not by the amount of knowledge it passes on, but by the enduring excitement it generates. Knowledge, when it comes, is a later arrival, flaring up, when the time is right, from the sparks good teachers have implanted in their students’ souls.
Assessing attitudes

Do students beliefs about a discipline become more “expert-like” or “novice-like”?

Designing Your Own Course Using “Backward” Design
“Standard” Course Planning

Choose textbook/reading

↓

Write syllabus

↓

Write/Revise lectures
& prepare PowerPoints

↓

Write assessments
(exams/assignments)

“Standard” Course Planning

Choose textbook/reading
  ↓
Write syllabus
  ↓
Write/Revise lectures & prepare PowerPoints
  ↓
Write assessments (exams/assignments)

vs.

Backward Design

Formulate broad learning goals
  ↓
Define specific, measurable learning objectives
  ↓
Design/write assessments
  ↓
Develop class content and activities; choose readings

Learning Goals

- A simple syllabus tells students what you, the instructor, are going to talk about during your course.

- Learning goals tell students what they should be able to do after completing the course, and what level of understanding they should expect to gain.
Setting Learning Goals and Objectives

- Goals: What do you want students to get out of the course

- Learning Objectives: What specific skills do you want students to obtain? Be specific about what your course is covering
Objectives:

Expand on your previous knowledge of chemistry, focusing on problem solving skills and analytical thinking

learn current applications of the principles taught in introductory chemistry

learn analytical laboratory techniques and laboratory problem solving skills
Course Schedule:

Unit 1: The Analytical Process: Making Good Measurements
Laboratory Experiments:
  Introduction to laboratory glassware
  Quantification of riboflavin: Introduction to calibration curves, absorbance and fluorescence

Unit 2: Spectroscopy: What can we learn about the structure of atoms? How can we use spectroscopy to make good measurements?
Laboratory Experiments:
  Analysis of the Hydrogen Line Spectra
Atkins Chapter 1 and 2

Unit 3: The bonding and shapes of molecules. Intra and Intermolecular Forces
Laboratory Experiment:
  Introduction to Molecular orbitals
  Synthesis of Liquid Crystals (2 weeks)
Atkins Chapters 3, 4 and 6.
## Detailed Learning Objectives

### Unit 1: The Analytical Process Making Good Measurements

<table>
<thead>
<tr>
<th>Monday</th>
<th>30-Jan</th>
<th>Introduction to the course; Conversions between units and scientific notations</th>
<th>Introduction; A.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 30 &amp; 31</td>
<td>Safety Lecture and Check in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>1-Feb</td>
<td>Significant Figures and types of error</td>
<td>A1, Appendix 1B, 1C</td>
</tr>
<tr>
<td>Friday</td>
<td>3-Feb</td>
<td>Concentrations of Solutions</td>
<td>A1 G3, G4</td>
</tr>
<tr>
<td>Monday</td>
<td>6-Feb</td>
<td>Concentrations of Solutions and Calibration Curves</td>
<td>Handout</td>
</tr>
<tr>
<td>Feb 6 &amp; 7</td>
<td>Calibration Curves and Measurement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>8-Feb</td>
<td>Spectroscopy</td>
<td>Handout</td>
</tr>
</tbody>
</table>

**Conversions between units and scientific notations:** You should be able to convert between different types of units. You should memorize and be able to manipulate the SI unit prefixes $\mu$, m, c, and k.  
*Atkins A1, Appendix 1B. Practice Problems Set 1, Atkins A17, A19, A23, Sapling Homework Set 1, Problems 4-7*

**Significant Figures:** Why are significant figures important? You need to know how to determine the number of significant figures in ALL measurements. This includes not just the rules for
A Syllabus needs to include course content!

Chemistry 105aL Spring 2016  9 am lecture
http://chemmac1.usc.edu/chem105a/

Lecturer  Lab Coordinator  Course Coordinator
Prof. Thomas Bertolini  Dr. Catherine Skibo  All questions about course administration are handled via Electronic office
SGM 310  SGM 138  hours. Paperwork for Course Coordinator’s mailbox may be brought to
(213)740-3257  (213)740-8263  receptionist in SGM 418.
tbertolin@usc.edu  skibo@usc.edu  Csinai105a@chemmail.usc.edu
Office hours:  Electronic office hours: MW 1:30-3. Questions emailed during this time slot
M1-3, W2-4  will be processed first.

CHEM 105a introduces the basic chemical principles that underlie all of the molecular sciences (from materials and
to medicine and the machinery of biology). It will introduce good lab practice and how to make decisions
based on sound data. After this course students will be better prepared for their continuing studies and will have an
understanding of molecular principles coming up in everyday life.

Lectures:  9 MWF in SGM 124, quiz period in SGM 123
Textbooks:  *Chemistry* (2nd custom edition for USC, of the 3rd edition text) by Tro (required, no substitutes); package
from USC Bookstore includes for free the eText and Mastering Chemistry. *Solutions Manual* (optional).
*Calculations in Chemistry* by Dahm (optional, strongly suggested).

Calculator:  To have a level playing field, CHEM 105 requires everyone use the exact same calculator on exams, the
Casio FX-260 Solar, which is around $10. Sorry, this rule is strictly enforced: no other models or brands
of calculators or other electronic devices allowed. *Be sure to practice HW with it prior to exams.*

Pages page and the Frequently Asked Questions (FAQ page) on the class website.

**Dates to Remember**
- **First Day of Classes**
  - 5:00pm 5 pt bonus for setting up class PW
- **Mandatory Lab Orientation Lecture**
  - Labs begin with Check-in at your scheduled time. Be properly attired, bring lab manual.
  - Last day to drop with a "W" to avoid tuition charges
- **First Hour Exam**
  - Regrade deadline: 12 noon Mon Feb 15
- **Presidents Day**
- **Second Hour Exam**
  - Spring Break (Mon - Fri)
  - Midterm Grade Assigned
  - Regrade deadline: 12 noon Mon Mar 14
- **Third Hour Exam**
  - Written Lab Exam
  - Regrade deadline: 12 noon Mon May 02
  - Last day to drop with a "W" but still incurring tuition charges for this class (week 7)
- **Fourth Hour Exam**
  - Regrade deadline: 12 noon Mon Apr 11
  - Last day to drop without a "W"
- **Last Day of Class**

**Friday, May 6:**
- Final Exam 8:00 - 10:00 a.m.  Regrade deadline: 12 noon Mon May 09
Best Practices

More detailed/longer
Positive tone
Emphasizes collaboration
Student-centered
Policy for Absences and Missed Work

- Transparent
- Fair
- Set easily achievable bar
- Drop lowest scores
Assessments/Assignments

Due dates
Descriptions
Link to learning objectives
Variety
Clicker Policy

Credit for participation
Credit for correctness
Contribution to grade
Grades

Transparency
Diversity
Distribution
Revision/Redemption
Reduce competition
Grades: Grades in this course are based on four exam scores and weekly problem sets. Your top 4 exam scores will be used to determine final grade. Each exam will be worth 24% of the total and problem sets are worth 4%.

Grades will then be assigned according to the following scale:

\[ X = \text{average of 4 exams (0.96)} + \text{homework (0.04\%)} \]

<table>
<thead>
<tr>
<th>Grade</th>
<th>Formula</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>( X \geq 100 )</td>
<td>( 72 \geq X &gt; 66 )</td>
</tr>
<tr>
<td>A</td>
<td>( 100 \geq X &gt; 92 )</td>
<td>( 66 \geq X &gt; 60 )</td>
</tr>
<tr>
<td>A-</td>
<td>( 92 \geq X &gt; 88 )</td>
<td>( 60 \geq X &gt; 55 )</td>
</tr>
<tr>
<td>B+</td>
<td>( 88 \geq X &gt; 84 )</td>
<td>( 55 \geq X &gt; 50 )</td>
</tr>
<tr>
<td>B</td>
<td>( 84 \geq X &gt; 78 )</td>
<td>( 50 \geq X = F )</td>
</tr>
<tr>
<td>B-</td>
<td>( 78 \geq X &gt; 72 )</td>
<td></td>
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Sources of Help

Office hours
Teaching Assistants
Recitations
Learning Den
PILOT
Recommended Statements

Ethics Statement  Disabilities

Copyright Compliance

The information in the syllabus is subject to change at any time for any reason.
WHAT DID WE COVER IN CLASS LAST WEEK?
IT'S IN THE SYLLABUS.

WHAT'S YOUR LATE HOMEWORK POLICY?
IT'S IN THE SYLLABUS.

WHEN ARE YOUR OFFICE HOURS?
IT'S IN THE SYLLABUS.

HOW WILL MY GRADE BE COMPUTED?
IT'S IN THE SYLLABUS

IT'S IN THE SYLLABUS

This message brought to you by every instructor that ever lived.
WWW.PHDCOMICS.COM