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CHMY 501.01: Teaching University Chemistry

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UM Chemistry 501: Teaching University Chemistry Autumn 2021 Syllabus (Readings Subject to change)

- Instructor:** Prof. Mark S. Cracolice, Chemistry Building 101B, mark.cracolice@umontana.edu
- Office Hours:** MWF 9:30 AM–10:30 AM and by appointment. CHMY 501 students are welcome to drop by my office at any other time to discuss issues related to this course.
- Prerequisite:** Completion of a general chemistry sequence. We will use instruction in general chemistry as the basis of the course, so it is necessary to have an understanding of the concepts taught and experience as a student in the course.
- Course Purpose:** Preparation for teaching at the college level. An introduction to modern issues relevant to how students learn.
- Lecture:** R 4:00 PM–4:50 PM, Chemistry 204. Attendance is essential.
- Textbook:** No textbook is required. We will primarily utilize readings from the literature in chemical education, science education, educational psychology, and cognitive science.
- Optional:** Herron, J.D. (1996). *The Chemistry Classroom: Formulas for Successful Teaching*. Washington, DC: American Chemical Society.
I suggest this book because I hope that it will serve as a reference for you when you actually start teaching and begin to seek answers to the questions that will arise.
- Format:** Weekly 50-minute seminar/lecture/discussion. Weekly assignments each requiring approximately two-to-three hours outside of class.
- Schedule:**
- | <u>Date</u> | <u>Topic</u> |
|-----------------|---|
| R 02 Sep | I'm Teaching Inquiry Lab? A Survival Guide |
| R 09 Sep | General Chemistry at The University of Montana: Theory and Practice |
| R 16 Sep | Piaget's Theories and Their Implications |
| R 23 Sep | Vygotsky's Theories and Their Implications |
| R 30 Sep | Higher-Order Thinking Skills (HOTS) |
| R 07 Oct | Intelligence |
| R 14 Oct | Behaviorism and Information Processing Theory |
| R 21 Oct | Constructivism |
| R 28 Oct | Promoting Intellectual Development |
| R 04 Nov | Intellectual Development in the College Years |
| R 11 Nov | The Physiology of Brain Development |
| R 18 Nov | Algorithmic and Conceptual Problem Solving |
| R 25 Nov | Thanksgiving Holiday |
| R 02 Dec | Selected Content Issues in Teaching Chemistry |
| R 09 Dec | A Theory of Learning and the Teaching Philosophy that Comes From It |
- Grading:** Your course grade will be based on 14 equally weighted assignments:
- | <u>Due Date</u> | <u>Assignment (more details weekly)</u> |
|-----------------|---|
| R 09 Sep | Abraham, M. R. (2011). What can be learned from laboratory activities? Revisiting 32 years of research. <i>Journal of Chemical Education</i> , 88, 1020-1025. |
| R 16 Sep | Lewis, S. (2011). Retention and reform: An evaluation of peer-led team learning. <i>Journal of Chemical Education</i> , 88, 703–707. |
| R 23 Sep | Herron, J. D. (1975). Piaget for chemists. <i>Journal of Chemical Education</i> , 52(3), 146–150. |
| R 30 Sep | Cracolice, M. S. (2005). How students learn: Knowledge construction in college chemistry courses. In N. J. Pienta, M. M. Cooper, & T. J. Greenbowe (Eds.), <i>Chemists' guide to effective teaching</i> (pp. 12-27). Upper Saddle River, NJ: Pearson Prentice Hall. |
| R 07 Oct | Monteyne, K., & Cracolice, M. S. (2003). |

R 14 Oct	Herron, J. D. (1996).
R 21 Oct	Skinner, B. F. (1984). The shame of American education. <i>American Psychologist</i> , 39(9), 947–954.
R 28 Oct	Bodner, G. M. (1986). Constructivism: A theory of knowledge. <i>Journal of Chemical Education</i> , 63(10), 873–878.
R 04 Nov	Shaw et al. (2006). Intellectual ability and cortical development in children and adolescents. <i>Nature</i> , 440.
R 11 Nov	Cracolice, M. S. (2002).
R 18 Nov	Adey, P., Shayer, M., & Yates, C. (2001).
R 25 Nov	Thanksgiving Holiday
R 02 Dec	Bird, L. (2010). Logical reasoning ability and student performance in general chemistry. <i>Journal of Chemical Education</i> , 87(5), 541-546.
R 09 Dec	Bodner, G. M. (1992). Why changing the curriculum may not be enough. <i>Journal of Chemical Education</i> , 69(3), 186–190.
F 17 Dec	Vitae, Teaching Philosophy, & Cover Letter
Some of these reading assignments may be updated or revised as we move through the semester.	

Each is graded on a 10-point scale, for a total of 140 points.

A	93% to 100%	131–140 points
A–	90% to 92.9%	126–130 points
B+	87% to 89.9%	122–125 points
B	83% to 86.9%	117–121 points
B–	80% to 82.9%	112–116 points

We'll deal with lower grades should the occasion arise. I'll let you know if we need such a discussion.

Drops: **Monday 20 September** is the last day to drop by CyberBear (5:00 PM). Dropping on or before this date results in NO RECORD of taking this course on your transcript. This is also the last date to change your grade option to AUDIT.

Monday 01 November is the last day to drop with the approvals of your advisor and the course instructor. Dropping between **18 September** and **29 October** results in a grade of W on your transcript.

After **01 November**, you have effectively made the decision to stay in the course until the end. After this date, you must have documented justification of a circumstance beyond your control to drop the course.

Other: Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the university. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/vpsa/policies/student_conduct.php

This course syllabus is not a contract; it is a tentative outline of course policies. Changes may be made during the semester at my discretion.