

UNIVERSITY OF CALGARY
DEPARTMENT OF CHEMISTRY
COURSE SYLLABUS (CONTENT)
Winter 2016

COURSE: CHEM 209, General Chemistry for Engineers

LEC	DAYS	TIME	ROOM	INSTRUCTOR	OFFICE	PHONE	EMAIL	OFFICE HOURS
L01	TR	12:30-1:45PM	SB103	Dr. A. Scott Hinman	SA 144B	220-6017	ashinman@ucalgary.ca	TBA
L02	TR	8:00AM-9:15AM	ICT 102	Dr. A. Scott Hinman	SA 144B	220-6017	ashinman@ucalgary.ca	TBA
Course Coordinator:				Dr. A. Scott Hinman	SA 144B	220-6017	ashinman@ucalgary.ca	TBA
Lab / Tutorial Coordinator:				Dr. A. Musgrove Richer	EEEL 237C	220-7602	amanda.musgroveriche@ucalgary.ca	TBA

TEXTBOOK: Silberberg M, Lavieri S, Venkateswaran R. 2013. Chemistry: The Molecular Nature of Matter and Change. 1st Canadian Ed. McGraw-Hill Ryerson.

TOPICS INCLUDED AND SUGGESTED READING:

Students are responsible for all material included in the lectures, laboratories, and tutorials. Most of the relevant material for these content areas are in the designated sections from the textbook: Chapters 1-4, 6-11, 14-17 and 19.

Note that some material is regarded as review of high school chemistry and will not be addressed in lectures; however, being fundamental to many other topics in chemistry, will certainly be included in tutorials and exams.

Previous background knowledge to be reviewed before the course begins:

Chapter 1: Keys to the Study of Chemistry

Although all sections are included; the focus will be on sections 1.4–1.6.

CHAPTER 2: The Components of Matter

Although all sections are included; the focus will be on sections 2.5–2.9.

CHAPTER 3: Stoichiometry of Formulae and Equations

All sections are included.

CHAPTER 4: Gases and the Kinetic-Molecular Theory

Sections 4.1–4.4.

How fast is a reaction?

CHAPTER 14: Kinetics: Rates And Mechanisms Of Chemical Reactions

All sections 14.1–14.7 are included, but omit the effect of molecular structure on rate (page 571) and biological catalysts (page 583–584).

How far does a reaction proceed?

CHAPTER 15: Equilibrium: The Extent Of Chemical Reactions

All sections are included, but omit Equation 15.4 and 15.5 on page 603.

CHAPTER 16: Acid–Base Equilibria

16.1–16.2 are considered review material.

16.3–16.4 and selected topics within 16.5-16.6 will be included.

CHAPTER 17: Ionic Equilibria in Aqueous Systems

All sections, 17.1–17.4, are included, but omit Selective Precipitation (page 723–724) and Complex Ions of Amphoteric Hydroxides (page 731–732).

CHAPTER 19: Electrochemistry

Section 19.1 should be reviewed before lectures begin on this topic.

Sections 19.2–19.7 will be included, but omit parts of section 19.4 dealing with Gibbs Free Energy and Electrical Work.

What makes a bond?

CHAPTER 6: Quantum Theory and Atomic Structure

Sections 6.1–6.2 should be reviewed before lectures begin on this topic.

Sections 6.3–6.4 are included.

CHAPTER 7: Electron Configuration and Chemical Periodicity

Sections 7.1–7.3 are included with selected topics in 7.4 (ionic size and magnetic properties).

CHAPTER 8: Models of Chemical Bonding

Sections 8.1, 8.3, 8.5-8.6 are included with selected topics in 8.2.

CHAPTER 9: The Shape of Molecules

All sections, 9.1 and 9.2 are included.

CHAPTER 10: Theories of Covalent Bonding

Sections 10.1 and 10.2 are included.

LABORATORY EXPERIMENTS:

1. Determination of the Hardness of Tap Water (*Previous background knowledge*)
2. Kinetics of Fading of Phenolphthalein (*How fast is a reaction?*)
3. Equilibrium Constant for the Formation of $\text{Fe}(\text{SCN})^{2+}$ (*How far does a reaction proceed?*)
4. Visual and Potentiometric Acid-Base Titrations (*How far?*)
5. A Study of Concentration Cells to determine the K_{sp} for Silver Salts (*How far? What makes a bond?*)