

New Syllabus of Record

1. Catalog Description

	CHEM 113 Advanced General Chemistry I	(3c-3l-4cr)
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-	others, or harm to the environment.
	3. Detailed Course Outline
	Advanced General Chemistry I is intended to be a single lecture section with multiple lab sections. Ideally, one instructor will cover lecture and lab, although in some semesters, additional instructors may
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6. Undergraduate Course Attendance Policy

The University expects all students to attend class. The attendance policy for this course will be consistent with the Undergraduate Course Attendance Policy in the IUP Undergraduate Catalog.

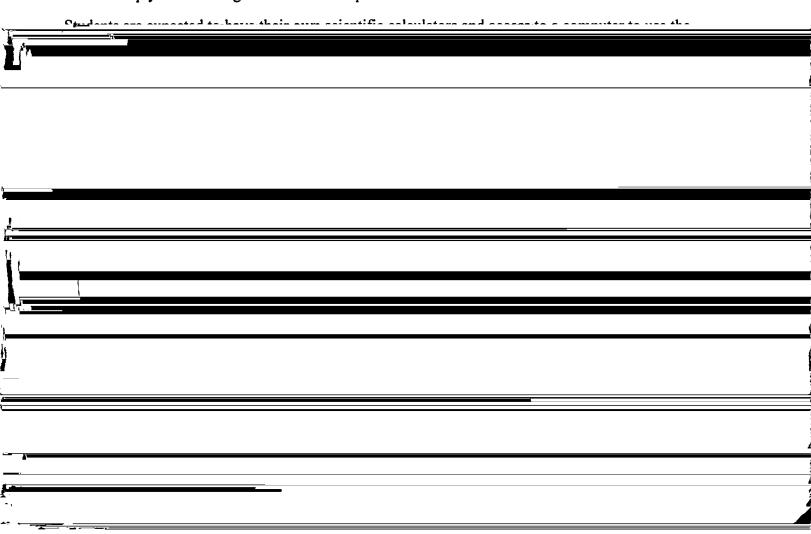
7. Required textbook(s)

Lecture: Atkins, P., Jones L., Chemical Principles, 5th ed., W.H. Freeman, NY, 2010.

<u>Laboratory</u>: Abraham, M. R.; Pavelich, M. J., *Inquiries into Chemistry*, Waveland Press, Inc., Prospect Heights, II., 1999. (This laboratory manual has an older publication date, but remains one of the best guided inquiry chemistry laboratory manuals available.)

8. Special Resource Requirements

<u>Safety</u>: Some approved form of eye protection must be worn at all times in the laboratory. Students who do not comply with this regulation will be required to withdraw from the course.



computer-based programs and web-sites that provide supplementary materials. Some sections of the course may utilize on-line course materials as part of the instruction.

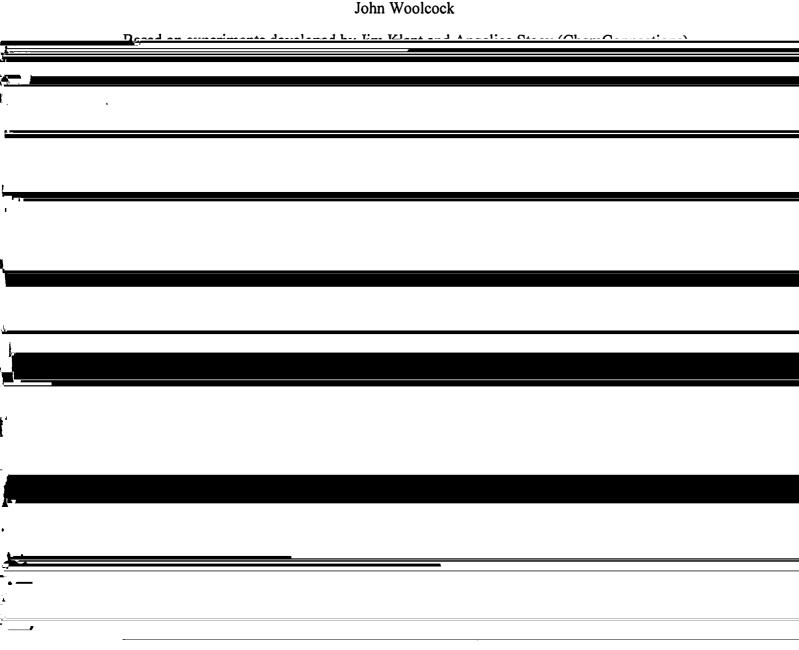
9. Bibliography

Brown, T.E., LeMay, H.E., Bursten, B.E., Murphy, C., Woodward, P., *Chemistry: The Central Science*, 12th ed., Prentice Hall, New Jersey, 2012

Garratt. J., Threlfall. R., Overton, T. A Question of Chemistry: Creative Problems for Critical Thinkers,

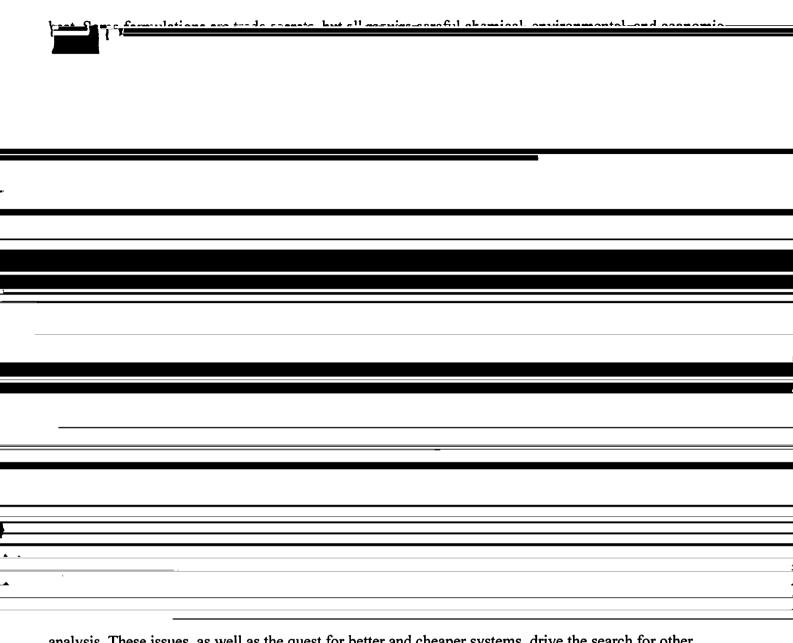
CAMDLE ACCIONMENT

AIR BAGS 'R US



Scenario:

In this experiment, you have been asked by your boss, I.M. Gaseous, of the AIR BAGS 'R US Co., to



analysis. These issues, as well as the quest for better and cheaper systems, drive the search for other compounds and formulations for the gas-producing reaction used in the system.

The Ideal Gas Law and Mass-Mole Relationships

In the reaction shown above, the CO₂ gas produced obeys the Ideal Gas Law. In fact, at normal temperatures and pressures, all gases obey the Ideal Gas Law. This law combines together all the major properties of a gas: pressure (P), volume (V), temperature (T), and amount (n) or moles of gas. The algebraic expression of this law is:

$$PV = nRT$$

where P is the pressure of the gas in atmospheres (atm); V is the volume of gas in liters (L), n is the moles of gas (mol), T is the temperature of the gas in Kelvin (K), and R is the Ideal Gas Law Constant. The value of R is 0.0821 atm L mol⁻¹ K⁻¹. With this equation and the measurement of any three properties, the fourth property can be calculated.

In most laboratories, the properties of P, V, and T are often measured in units different from those used in

	n_1 = number of moles of gas in the standard state (1.0 mol) n_2 = number of moles of gas needed for the experiment V_1 = volume of a gas in the standard state (22.4 L)
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	T_1 = temperature in the standard state (273 K) T_2 = temperature of the experiment (current room temperature)
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	•	You should calculate the exact amounts of solid NaHCO ₂ and 6 <u>M.H</u> Cl solution that are needed to
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		produce just enough gas to create a cushion of the largest possible volume without breaking the seal on the bag. Record the amounts you use below.
	•	The trigger and deployment system should require minimal external parts or assistance.
	•	You should have the acid and the NaHCO ₃ inside the airbag in a stable configuration that will

- You should have the acid and the NaHCO₃ inside the airbag in a stable configuration that will survive handling without deployment until triggered.
- You will want to measure the thickness of the bag and how fast it inflates.

Address the following issues:

- 1. List safety considerations for testing your airbag, including handling and disposing of chemicals.
- 2. Show all calculations and reaction equations that were needed to predict the amounts of reagents predicted to fill the air bag.
- 3. Describe or sketch the design of your airbag, including the mechanism that you use as a trigger in the deployment. After each test of the airbag, empty all waste into the sink. The bags may be rinsed in the sink and wiped out with a paper towel to dry them for the next trial.

PART III.

Optimization of the Airbag Design

Once you have a successful airbag design that you can operate, use your model to determine if changing the amount of one or both of the reactants changes the speed of inflation or creates a better/poorer

	Report
√ an-	In addition to the tables and information above, explain the experimental variables you adjusted to optimize your airbag. Include why you chose the amounts you did, and why you think that the best airbag was made with those amounts (particularly if the amounts were different from those calculated from the
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	Sample Assessment
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	 Each problem gives a word equation, number substitution, and shows appropriate unit analysis. Answers are numerically correct, with the correct number of significant figures and correct units.
	(5 points each; 15 points total)

Clear explanation given of how the volume of the airbag was found(5 points)

Part I

2. Summary of the proposed revisions.

- 1. Course title change from "Concepts in Chemistry I" to "Advanced General Chemistry I"
- 2. Pre-requisite addition of minimum MATH SAT score and high school chemistry
- 3. Catalog Description change
- 4. Change in course objectives to fit expected student learning outcomes
- 5. Minimum Lab Grade of 70% required for passing course.
- 6. Updated course text and bibliography

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3. Justification/rationale for the revision.

1. Course title and pre-requisite changes reflect the target audience for the course. The revision to Advanced General Chemistry is designed to improve retention of science majors. CHEM 111 (General Chemistry I) is an existing liberal studies Natural Science course for science majors that does not have any pre-requisites. CHEM 113 (Concepts in Chemistry I) was a Liberal Studies Science, freshman chemistry course for primarily chemistry majors, with a guided inquiry-based laboratory program that was designed to develop critical thinking skills. Over time, it has become

OLD SYLLABUS OF RECORD FOR CHEM 113 CONCEPTS IN CHEMISTRY

I. **CATALOG DESCRIPTION**

COURSE TITLE:

CHEM 113, Concepts in Chemistry

NUMBER OF CREDITS:

PREQUISITES:

4 cr (3c-3l-4sh)

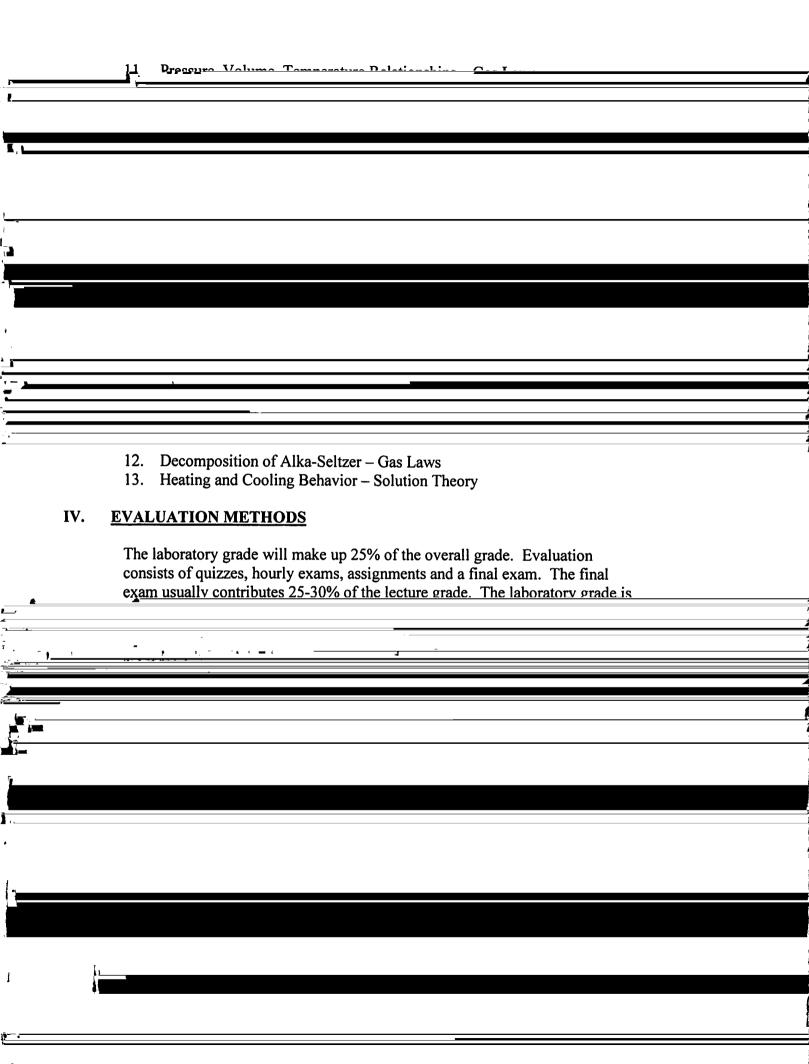
COURSE DESCRIPTION:

Introductory course for chemistry majors.

Topics covered include atomic theory, an bonding, molecular geometry, gas laws, the

LECTURE

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		chemistry. The periodic table of the elements. Chemical formulas and nomenclature.	
	2.	Introduction to Inorganic Reactions	4 lectures
		Writing and halancing chemical equations Types of	
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<u>.</u>	2	chemical reactions: acid-base, precipitation, oxidation-reduction, combustion.	1 Lantumas.



Liberal Studies Course Approval General Information

	coordinator. All lab sections will do the same set of experiments. There is a department guideline standard evaluation procedure for all sections that requires a student to earn 70% in the laboratory portion of the course in order to pass.
_	2. Many important discoveries and advances in chemistry come from women and ethnic minorities:
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	the 1800s, George Washington Carver's contributions to plant chemistry, the periodic table described

1. This course will have one lecture section. The lecture instructor will serve as course (lecture and lab)

From: Anne E Kondo <akondo@iup.edu>
Date: 02/13/12 10:45 AM

To: luciano@iup.edu, hovan@iup.edu, talwar@iup.edu, mbriggs <lkup@iup.edu>,

bharathn@iup.edu

This message has attached files. Show

Dear Colleagues,

The about place find animan maries on memorals for CUDM 112 and animal a

(Concepts in Chemistry I and II). In the past, enrollment in these courses has been restricted primarily to chemistry, chemistry education, biochemistry and geology majors; the lab has been guided-inquiry. To better serve both well-prepared science

Liberal Studies Course Approval Checklist Instruction Sheet

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che	cklist is available for this. If you have questions, contact the Liberal Studies Office, 103 Stabley,
tele	phone 357-5715.
	s checklist is intended to assist you in developing your course to meet IUP's Criteria for Liberal
	dies and to arrange your proposal in a standard order for consideration by the Liberal Studies
	mmittee (LSC) and the University-Wide Undergraduate Curriculum Committee (UWUCC). When have finished, your proposal will have these parts:
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