

1.) DATE: 3/12/14	2.) COMMUNITY COLLEGE: Yavapai College
3.) COURSE PROPOSED: Prefix: CHM Number: 121 Title: ENVIRONMENTAL CHEMISTRY Credits: 4	
CROSS LISTED WITH: Prefix: ENV Number: 121 ; Prefix: Number: ; Prefix: Number: ;	
Prefix: Number: ; Prefix: Number: ; Prefix: Number: ;	
4.) COMMUNITY COLLEGE INITIATOR: ASU TRANSFER SYSTEMS DEVELOPMENT PHONE:	
4807272424 FAX:	
ELIGIBILITY: Courses must have a current Course Equivalency Guide (CEG) evaluation. Courses evaluated as NT (non-transferable are not eligible for the General Studies Program.	
MANDATORY REVIEW:	
<input type="checkbox"/> The above specified course is undergoing Mandatory Review for the following Core or Awareness Area (only one area is permitted; if a course meets more than one Core or Awareness Area, please submit a separate Mandatory Review Cover Form for each Area).	
POLICY: The General Studies Council (GSC-T) Policies and Procedures requires the review of previously approved community college courses every five years, to verify that they continue to meet the requirements of Core or Awareness Areas already assigned to these courses. This review is also necessary as the General Studies program evolves.	
AREA(S) PROPOSED COURSE WILL SERVE: A course may be proposed for more than one core or awareness area. Although a course may satisfy a core area requirement and an awareness area requirement concurrently, a course may not be used to satisfy requirements in two core or awareness areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirements and the major program of study.	
5.) PLEASE SELECT EITHER A CORE AREA OR AN AWARENESS AREA:	
Core Areas: Natural Sciences (SQ) Awareness Areas: Select awareness area...	
6.) On a separate sheet, please provide a description of how the course meets the specific criteria in the area for which the course is being proposed.	
7.) DOCUMENTATION REQUIRED	
<input checked="" type="checkbox"/> Course Description	
<input checked="" type="checkbox"/> Course Syllabus	
<input checked="" type="checkbox"/> Criteria Checklist for the area	
<input checked="" type="checkbox"/> Table of Contents from the textbook required and/or list of required readings/books	
<input checked="" type="checkbox"/> Description of how course meets criteria as stated in item 6.	
8.) THIS COURSE CURRENTLY TRANSFERS TO ASU AS:	
<input type="checkbox"/> DEC prefix	
<input checked="" type="checkbox"/> Elective	
Current General Studies designation(s): NONE	
Effective date: 2014 Fall Course Equivalency Guide	
Is this a multi-section course? <input type="checkbox"/> yes <input type="checkbox"/> no	
Is it governed by a common syllabus? <input type="checkbox"/> yes <input type="checkbox"/> no	
Chair/Director:	Chair/Director Signature:

AGSC Action: Date action taken: Approved Disapproved

Effective Date:

Arizona State University Criteria Checklist for

NATURAL SCIENCES [SQ/SG]

Rationale and Objectives

In a relatively short time in the history of civilized societies, humankind moved from what was essentially an agrarian population into an industrial age, which in recent years has been profoundly shaped by such scientific and technological advances as genetic engineering, the computer, and space exploration. Our history of irrepressible ingenuity makes a compelling case for a future that will be even more profoundly influenced by science and technology. It is imperative that we react expeditiously and effectively to the problems and the promise that these advances create. We must ensure that technological change is directed to the benefit of society and that it will promote human dignity and values. Success in achieving this goal will depend upon the insight and knowledge of political and public opinion leaders, and the scientific enlightenment of educated citizens. To a significant degree, the ability of these individuals to understand the nature of the issues and the alternative courses of action will be determined by the quality of science presented at the nation's institutions of higher learning.

The recommendation of at least one laboratory course that includes a substantial introduction to the fundamental behavior of matter and energy in physical or biological systems derives from a number of considerations. First, all physical and biological phenomena have at their roots the fundamental principles governing the behavior of matter and energy. These principles have been shown over a period of time to be a value in reliably predicting and rationalizing a broad range of phenomena. Unless the lines to these roots are established, our understanding of the broader range of the sciences, and other fields upon which these sciences impinge, will be impaired. Second, because these fundamental principles have been experimentally established beyond reasonable doubt, the essentials of the scientific method can be clearly and coherently revealed by their study. Third, the study of the behavior of matter and energy illustrates the usefulness of mathematics in precisely describing and rationalizing certain physical phenomena, and the expressiveness of mathematical equation.

10/1989

REV: 1/1991, 3/1991, 1/2000, 10/2008

Proposer: Please complete the following sections and attach appropriate documentation.

ASU--[SQ] CRITERIA			
I. - FOR ALL QUANTITATIVE [SQ] NATURAL SCIENCES CORE AREA COURSES, THE FOLLOWING ARE CRITICAL CRITERIA AND MUST BE MET:			
YES	NO		Identify Documentation Submitted
<input checked="" type="checkbox"/>	<input type="checkbox"/>	A. Course emphasizes the mastery of basic scientific principles and concepts.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. Addresses knowledge of scientific method.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	C. Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	D. Addresses potential for uncertainty in scientific inquiry.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	E. Illustrates the usefulness of mathematics in scientific description and reasoning.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	F. Includes weekly laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	G. Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	H. Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.	Course syllabus and outline
II. - AT LEAST ONE OF THE FOLLOWING ADDITIONAL CRITERIA MUST BE MET WITHIN THE CONTEXT OF THE COURSE:			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	A. Stresses understanding of the nature of basic scientific issues.	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	B. Develops appreciation of the scope and reality of limitations in scientific capabilities.	Course syllabus and outline
<input type="checkbox"/>	<input type="checkbox"/>	C. Discusses costs (time, human, financial) and risks of scientific inquiry.	
NOTE: CRITERIA FOR [SG] COURSES BEGIN ON PAGE 4.			

III. - [SQ] COURSES MUST ALSO MEET THESE ADDITIONAL CRITERIA:			
YES	NO		Identify Documentation Submitted
<input checked="" type="checkbox"/>	<input type="checkbox"/>	A. Provides a substantial, quantitative introduction to fundamental principles governing behavior of matter and energy, in physical or biological systems.	Course syllabus and outline
		B. Includes a college-level treatment of some of the following topics (check all that apply below):	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	a. Atomic and molecular structure	Course syllabus and outline
<input type="checkbox"/>	<input type="checkbox"/>	b. Electrical processes	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	c. Chemical processes	Course syllabus and outline
<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Elementary thermodynamics	Course syllabus and outline
<input type="checkbox"/>	<input type="checkbox"/>	e. Electromagnetics	
<input type="checkbox"/>	<input type="checkbox"/>	f. Dynamics and mechanics	
[SQ] REQUIREMENTS CANNOT BE MET BY COURSES:			
<ul style="list-style-type: none"> • Presenting a qualitative survey of a discipline. • Focusing on the impact of science on social, economic, or environmental issues. • Focusing on a specific or limiting but in-depth theme suitable for upper-division majors. 			

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[SG] CRITERIA			
I. - FOR ALL <i>GENERAL</i> [SG] NATURAL SCIENCES CORE AREA COURSES, THE FOLLOWING ARE CRITICAL CRITERIA AND MUST BE MET:			
YES	NO		Identify Documentation Submitted
<input type="checkbox"/>	<input type="checkbox"/>	1. Course emphasizes the mastery of basic scientific principles and concepts.	
<input type="checkbox"/>	<input type="checkbox"/>	2. Addresses knowledge of scientific method.	
<input type="checkbox"/>	<input type="checkbox"/>	3. Includes coverage of the methods of scientific inquiry that characterize the particular discipline.	
<input type="checkbox"/>	<input type="checkbox"/>	4. Addresses potential for uncertainty in scientific inquiry.	
<input type="checkbox"/>	<input type="checkbox"/>	5. Illustrates the usefulness of mathematics in scientific description and reasoning.	
<input type="checkbox"/>	<input type="checkbox"/>	6. Includes weekly laboratory and/or field sessions that provide hands-on exposure to scientific phenomena and methodology in the discipline, and enhance the learning of course material.	
<input type="checkbox"/>	<input type="checkbox"/>	7. Students submit written reports of laboratory experiments for constructive evaluation by the instructor.	
<input type="checkbox"/>	<input type="checkbox"/>	8. Course is general or introductory in nature, ordinarily at lower-division level; not a course with great depth or specificity.	
II. - AT LEAST ONE OF THE ADDITIONAL CRITERIA THAT MUST BE MET WITHIN THE CONTEXT OF THE COURSE:			
<input type="checkbox"/>	<input type="checkbox"/>	A. Stresses understanding of the nature of basic scientific issues.	
<input type="checkbox"/>	<input type="checkbox"/>	B. Develops appreciation of the scope and reality of limitations in scientific capabilities.	
<input type="checkbox"/>	<input type="checkbox"/>	C. Discusses costs (time, human, financial) and risks of scientific inquiry.	

[SG] REQUIREMENTS CANNOT BE MET BY COURSES:	
	<ul style="list-style-type: none">• Presenting a qualitative survey of a discipline.
	<ul style="list-style-type: none">• Focusing on the impact of science on social, economic, or environmental issues.
	<ul style="list-style-type: none">• Focusing on a specific or limiting but in-depth theme suitable for upper-division majors.

Course Prefix	Number	Title	Designation
CHM	121	ENVIRONMENTAL CHEMISTRY	SQ

Explain in detail which student activities correspond to the **specific** designation criteria. Please use the following organizer to explain how the criteria are being met.

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
IA-D. Course emphasizes mastery of basic scientific principles, addresses knowledge of scientific method, includes coverage of methods of scientific inquiry, addresses potential for uncertainty in scientific inquiry.	This course is a basic introduction to elementary states of matter, chemical bonding and the periodic table. Elementary understanding of radioactivity and nuclear chemistry with basic ecology from a chemical point.	Course syllabus
IE-H. Illustrates usefulness of mathematics in scientific description and reasoning. Includes weekly laboratory; submits written reports of laboratory experiments. Course is intro level.	Use common laboratory instruments to perform experiments including pH meters, spectrophotometers, flame photometers, and gas chromatographs. Perform simple chemical analysis.	Course syllabus
2A and B. Provides a substantial, quantitative introduction to the fundamental principles governing behavior of matter and energy in physical or biological systems. Includes atomic structure, chemical processes, elementary thermodynamics.	Demonstrates the basic understanding of chemical principles involved in chemical reactions; understand the effects of radiation on biological systems.	Course syllabus

CHM 121 - Environmental Chemistry

COURSE DESCRIPTION:

CHM 121. Environmental Chemistry (4). Atomic structure, the Periodic Table, chemical bonding and reactions with emphasis on environmental applications: the atmosphere and air pollution, water and water pollution, pesticides, food additives, and nuclear wastes. This course is cross-listed with ENV 121. Prerequisite: Reading Proficiency. Three lecture. Three lab.

COURSE CONTENT:

1. Introduction, atomic structure, chemical bonding, chemical reactions, states of matter, gases
2. The atmosphere and atmospheric pollution
3. Water properties, pollutants--organic, heavy metals, biological and thermal
4. Organic compounds in the environment - structures, carcinogens and mutagens, pesticides, food additives, drugs
5. Nuclear chemistry - natural radioactivity, fission and fusion, nuclear energy.

LEARNING OUTCOMES:

1. Understand the basic atomic nature of matter, chemical bonding and the periodic table. (PBS 1)
2. Demonstrate an elementary understanding of the states of matter. (PBS 1,2)
3. Understand the basic chemical principles involved in chemical reactions. (PBS 2)
4. Understand the atmosphere, its composition and various atmospheric pollutants. (PBS 1,3)
5. Understand the chemical significance of water and the effects of chemical, biological and thermal pollution. (PBS 1,3)
6. Understand the basic structure of organic compounds used as pesticides and food additives and their effects. (PBS 1,3)
7. Demonstrate an elementary understanding of radioactivity and nuclear chemistry and the effects of radiation on biological systems. (PBS 1,3)
8. Understand basic ecology from a chemical point of view and the effects of pollutants on food chains and ecosystems. ((PSS 1,3)
9. Appreciate the social and economic implications of technology which underlie decisions about pollution, nuclear energy and food additives. (PBS 1,3)
10. Perform basic laboratory procedures such as titrations. (PBS 2)
11. Use common laboratory instruments including analytical balances, pH meters, specific ion electrodes, spectrophotometers, flame photometers and gas chromatographs. (PBS 2)
12. Perform simple chemical analysis such as biochemical oxygen demand, heavy metal detection, soil analysis. (PBS 2)

4.000 Credit hours

3.000 Lecture hours

3.000 Lab hours

Levels: Credit

Schedule Types: Additional Activity, Lab, Lecture, Lecture/Lab

Sciences & Health Division