FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER:	CHM 3130C
COURSE TITLE:	Chemistry Instrumentation
PREREQUISITE(S):	CHM 2046C (General Chemistry II with a corresponding lab) with a grade of "C" or better
COREQUISITE(S):	None
CREDIT HOURS:	4
CONTACT HOURS/WEEK:	7
CONTACT HOUR BREAKDOWN:	
Lecture/Discussion:	3
Laboratory:	4
Other _____:	
FACULTY WORKLOAD POINTS:	5.8
STANDARDIZED CLASS SIZE ALLOCATION:	27 (laboratory safety considerations)

CATALOG COURSE DESCRIPTION:

The foundations of chemical instrumental analysis, i.e., atomic and molecular identification and structure through spectroscopic, electrochemical, and separation methods.

SUGGESTED TEXT(S):

Skoog, Douglas A., Holler, F. James, Crouch, Stanley R., Principles of Instrumental Analysis, Thomson Brooks/Cole, Latest edition

Rouessac, Francis, Rouessac, Annick, Modern Instrumentation Methods and Techniques, John Wiley and Sons, Latest edition

SUGGESTED TEXT(S):	Robinson, James W., Skelly Frame, Eileen M., Frame II, George M., Undergraduate Instrumental Analysis, CRC Press, Latest edition
IMPLEMENTATION DATE:	Fall Term, 2011 (20121)
REVIEW OR MODIFICATION DATE:	

COURSE TOPICS		CONTACT HOURS PER TOPIC
I.	Introduction	1
II.	Measurement	6
	a. Electronics, Circuits, Operational Amplifiers, Instrumentation	
	b. Analog to Digital Conversion	
	c. Digital Electronics and Computers	
III.	Atomic Spectroscopy	10
	a. Introduction and Optics	
	b. Absorption and Emission Spectroscopies	
	c. Fluorescence and Mass Spectroscopies	
IV.	Molecular Spectrocopy	10
	a. Ultraviolet-Visible Spectroscopy	
	b. Molecular Fluorescence, Luminesence, and Phosphorescence	
	c. Infrared and Raman Spectroscopies	
	d. NMR	
	e. Mass Spectroscopy	
V.	Methods of Electroanalytics	9
	a. Potentiometry	
	b. Coulometry	
	c. Voltammetry	
VI.	Methods of Separation	9
	a. Gas and Liquid Chromatography	
	b. Supercritical Fluid Chromatography	
	c. Capillary Electrophoresis and Electrochromatography	
	d. Field-Flow Fractionation	
	Total Lecture Hours:	45

LABORATORY ACTIVITIES		CONTACT HOURS PER TOPIC
I.	Introduction and Lab Safety	2
II.	Measurement	6
	a. Electronics, Circuits, Operational Amplifiers, Instrumentation	
	b. Analog to Digital Conversion	
	c. Digital Electronics and Computers	
III.	Atomic Spectroscopy	12
	a. Optics and Electrooptics	
	b. Absorption and Emission Spectroscopy	
	c. Fluorescence and Mass Spectroscopies	
IV.	Molecular Spectrocopy	16
	a. Ultraviolet-Visible Spectroscopy	
	b. Molecular Fluorescence, Luminesence, and Phosphorescence	
	c. Infrared and Raman Spectroscopies	
	d. NMR	
	e. Mass Spectroscopy	
V.	Methods of Electroanalytics	12
	a. Potentiometry	
	b. Coulometry	
	c. Voltammetry	
VI.	Methods of Separation	12
	a. Gas and Liquid Chromatography	
	b. Supercritical Fluid Chromatography	
	c. Capillary Electrophoresis and Electrochromatography	
	d. Field-Flow Fractionation	
	Total Laboratory Hours:	60

Florida State College At Jacksonville

Course Learning Outcomes & Assessment

NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

Section 1

COURSE PREFIX AND NUMBER: CHM 3130C

SEMESTER CREDIT HOURS (CC): 4
CONTACT HOURS (NCC):

COURSE TITLE: Chemistry Instrumentation

Section 2

TYPE OF COURSE: (Click on the box to check all that apply)

- ☐ AA Elective
- ☐ AS Required Professional Course
- ☐ College Prep
- ☐ AS Professional Elective
- ☐ AAS Required Professional Course
- ☐ Technical Certificate
- ☒ Other B.S. Biomedical Sciences Upper Division Core Course
- ☐ PSAV
- ☐ Apprenticeship
- ☐ General Education: (For General Education courses, you must also complete Section 3 and Section 7)

Section 3 (If applicable)

INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

- ☐ Communications
- ☐ Social & Behavioral Sciences
- ☐ Mathematics
- ☐ Natural Sciences
- ☐ Humanities

Section 4

INTELLECTUAL COMPETENCIES:

- ☐ Reading
- ☐ Speaking
- ☒ Critical Analysis
- ☒ Quantitative Skills
- ☒ Scientific Method of Inquiry
- ☐ Writing
- ☐ Listening
- ☐ Information Literacy
- ☐ Ethical Judgment
- ☐ Working Collaboratively

Section 5

STATE GENERAL EDUCATION LEARNING OUTCOME AREA

- ☐ Communication
- ☐ Critical Thinking
- ☐ Scientific and Quantitative Reasoning
- ☐ Information Literacy
- ☐ Global Sociocultural Responsibility

Section 6 **LEARNING OUTCOMES**		***Type of Outcome: Gen. Ed, Program, Course***	**METHOD OF ASSESSMENT**
•	Demonstrate knowledge of instrument-based analytical chemistry	Course	Methods of assessment can include exams, quizzes, papers, lab reports, lab practicals, and/or oral presentations
•	Demonstrate knowledge of the atomic and molecular spectroscopies	Course	Methods of assessment can include exams, quizzes, papers, lab reports, lab practicals, and/or oral presentations
•	Demonstrate knowledge of electrochemical methods	Course	Methods of assessment can include exams, quizzes, papers, lab reports, lab practicals, and/or oral presentations
•	Demonstrate knowledge of chemical separation methods	Course	Methods of assessment can include exams, quizzes, papers, lab reports, lab practicals, and/or oral presentations

•	Demonstrate technical and analytical laboratory skills as they apply to biomedical sciences research and/or applications.	Program	Students will answer a set of questions developed by the program faculty and delivered across courses in the discipline. A faculty panel will evaluate the answers a common rubric with scores from 1 (not yet competent) to 3 (competent).
•	Demonstrate the application of interdisciplinary natural science curricula to biomedical sciences.	Program	Students will answer a set of questions developed by the program faculty and delivered across courses in the discipline. A faculty panel will evaluate the answers a common rubric with scores from 1 (not yet competent) to 3 (competent).
•	Conduct an experiment, collect and analyze data, and interpret results in a laboratory setting	Discipline	Students will answer a set of questions developed by the program faculty and delivered across courses in the discipline. A faculty panel will evaluate the answers a common rubric with scores from 1 (not yet competent) to 3 (competent).
•	Analyze, evaluate, and test a scientific hypothesis	Discipline	Students will answer a set of questions developed by the program faculty and delivered across courses in the discipline. A faculty panel will evaluate the answers a common rubric with scores from 1 (not yet competent) to 3 (competent).
•	Use basic scientific language and processes and be able to distinguish between scientific and non-scientific explanations	Discipline	Students will answer a set of questions developed by the program faculty and delivered across courses in the discipline. A faculty panel will evaluate the answers a common rubric with scores from 1 (not yet competent) to 3 (competent).
•	Identify unifying principles and repeatable patterns in nature, the values of natural diversity, and apply them to problems or issues of a scientific nature	Discipline	Students will answer a set of questions developed by the program faculty and delivered across courses in the discipline. A faculty panel will evaluate the answers a common rubric with scores from 1 (not yet competent) to 3 (competent).

Section 7

Name of Person Completing This Form: Stephen Lukacs, Ph.D. Date: December 17, 2010