FRANCIS MARION UNIVERSITY: DESCRIPTION OF PROPOSED NEW COURSE or MODIFICATION OF AN EXISTING COURSE

Department/School: Biology Date: February 12 2021

Course No. or level: 491 Title: Research for the Secondary Educator

Semester hours: 1 Clock hours: 3 Lecture: 0 Laboratory: 1

Prerequisites: Biology 105 or 107 and 106 or 108

Enrollment expectation: 10
Indicate any course for which this course is a (an)

modification: None

substitute: Biology majors in the Secondary Biology Option take Special Studies (Biology 497) as a requirement. This course replaces 497 for that requirement (It does not otherwise replace 497). Typically 497 is a course in which a professor recruits a student to work with them on an independent research project in their area of expertise. There are currently more secondary students who need BIOL 497 than the department can sustain.

alternate: None

Name of person preparing course description: Nathan Harness

Department Chairperson's/Dean's Signature_____

Provost's Signature Peter King

Date of Implementation_____

Date of School/Department approval_____

Catalog description: Students devise and carry out an independent research project that can be translated for use in a high school science classroom. The research will address a scientific question and will be formatted as a citizen science project, with open-ended outcomes.

Purpose:

1. **For Whom (generally?):** Biology majors in the Secondary Education option

2. **What should the course do for the student?** It will teach them to devise novel research questions, carry out research aims and goals, and how to implement a citizen-science research project in a classroom. The course will help our secondary biology students to round out their education as scientist-educators.

Teaching method planned: This is a laboratory course, with three hours of lab each week. Labs will be devoted to reading relevant scientific articles, planning experiments, carrying out experiments, and discussing ethical considerations.

Textbook and/or materials planned (including electronic/multimedia):

- Various journal articles that illustrate citizen science, from relevant journals such as *American Biology Teacher* or *Science Scope*.

Course Content: (Please explain the content of the course in enough detail so that the Academic Affairs Committee can make an informed judgment. Include a syllabus for the course.)

Please see attached sample syllabi.

Biology 491: Research for the Secondary Educator

Instructor: Dr. Nathan Harness
Office: 219 MSB
Office Hours:
e-mail: nathan.harness@fmarion.edu
Phone: 843-661-1405

Text:

- We will read scientific articles posted as PDF's on Perusall. Perusall is free, but you will need to sign up for an account with your FMU email and the code I give you the first day of class.

Course Info: This is a 1 credit lab course that meets on Monday from 12:30-3:20

Requirements:

Perusall Annotations	20%
Assignments	20%
Two Presentations	20%
Manuscript	40%

Course description:

This course will teach you to devise and carry out an independent research project that can be translated for use in a high school science classroom. Your research will address a scientific question and will be formatted as a citizen science project, with open-ended outcomes. Your research will be written in the form of an inquiry lab that could be used at the high school or college level.

Student Learning Objectives:

- Construct a feasible scientific study that can be carried out with the resources available in a typical high school setting.
- Know the ethical considerations of working with various taxa, and conducting experiments with students
- Articulate background scientific information to non-specialists
- Write a manuscript with appropriate voice, style, and formatting for an applied science education journal

***Tentative* Lecture Schedule**

Week	Lab Topics	Assignments

1	**Course Introduction** **Research Ethics**	
2	**Research Methods** (Keeping a lab notebook, data management, etc.) **Identify area of interest** (e.g. Acoustics, Behavior, Biodiversity, etc.)	Due: Research Ethics assignment
3	**Article Discussion** (review American Biology Teacher example study) **Planning Your Experiment** (build a timeline, explore feasibility)	
4	**Independent Study** (time and space in the lab to conduct your experiment)	Due: A detailed experiment timeline
5	**Article Discussion** (review Science Scope example study) **Independent Study** (time and space in the lab to conduct your experiment)	
P	**Group Presentations**	Due: groups present the Introduction and background of their study
7	**R Studio** (Learn to use R-studio in a classroom setting, work with your sample data to run stats and make a graph)	
8	**Speaker** (A scientist-educator from the area will present and answer questions on implementing citizen-science in the classroom)	Due: R-Studio student template assignment
9	**Field Trip (**Field trip to the Freshwater Ecology Center. We will discuss working with students outdoors, sampling techniques, etc.)	
10	**Article Discussion** (review Freeman et. al from PNAS) **Independent Study** (time and space to run your experiment)	
11	**Writing Lab** A workshop on scientific writing	Assigned: Introduction, materials and methods
12	**Independent Study** (time and space in the lab to run your experiment)	
13	**Field Trip** (Field trip to local high school grounds, to brainstorm a biodiversity experiment)	
14	**Group Presentations**	Due: groups present the methods, results and discussion from their experiments
Final	**Final Project Due on day of Final**	Due: A paper formatted for submission to American Biology Teacher

Attendance and Participation Policy:
Attendance is paramount in a laboratory course. There is no way to make up work missed. Two unexcused absences will trigger a 5% reduction in your final grade. After a third absence you will be dropped from the course. Participation in both classroom discussion and in Perusall annotations is expected and required.

Assignments:

Assignments will be collected on blackboard. Late submissions are accepted for a penalty up to 24hours after the due date. After 24 hours submissions will be closed. Please talk with me ahead of time if you need an extension.

Presentations:

Each student will give two presentations worth 10% each. The first will cover the introductory material for your study. This is a good opportunity to learn about the taxa, relevant literature, etc. as it relates to your proposed experiment.

The second presentation will center around your materials and methods, your results or expected results, and your discussion.

For each presentation I will provide a detailed rubric in advance.

Final Product: Manuscript

Each project will conclude with a well written, well formatted manuscript styled for submission to the journal American Biology Teacher. You can find more information in the instructions for authors section of the American Biology Teacher website. I will also provide a rubric. Note that these are not necessarily intended to be submitted to the journal, but in exceptional cases we can discuss options for submission.

Field Trips

This course has two required field trips. They will occur during the time of the lab. You may also be working outdoors on campus during lab to complete your experiments. In all cases you should wear appropriate clothing, footwear, and be aware of your surroundings. I will provide a safety sheet and go over safety protocol.

Classroom Behavior:

In the class and lab, you are expected to treat your fellow classmates with respect and civility. If you engage in disruptive behavior you will be asked to leave the class and be counted as absent for that day. Repeated offenses will result in your being dropped from the course.

Academic Honesty and Plagiarism:

Every student is responsible for turning in his or her own unique work. Cheating and plagiarism will not be tolerated in the classroom. Depending upon the severity of the offense, you may receive an F for that assignment or an F for the entire course. You will also be reported to the appropriate university office. A first offense typically results in an F on that assignment or and F in the course. A second offense results in a one semester suspension. A third offense results in expulsion from the university. If you are not sure what constitutes cheating or plagiarism, ask me before completing the assignment. "I didn't know" is not an acceptable excuse.

Withdrawal

After the official last day to drop a course, you may still withdraw, but your grade will be either a W or WF, depending on your current grade, except in cases of incapacitating illness or family trauma.

Accommodations of Disabilities:

I am happy to make accommodations for students with special needs; please notify me and the Office of Counseling and Testing about any modifications requested either the first week of class, or as soon as you are able.

FRANCIS MARION UNIVERSITY: DESCRIPTION OF PROPOSED NEW COURSE or MODIFICATION OF AN EXISTING COURSE

Department/School Chemistry/CLA **Date** 02/21/2021

Course No. or Level 111 **Title:** General Chemistry I: General Concepts in Chemistry

Semester hours 3 Clock hours: Lecture 3 Laboratory 0

Prerequisites Mathematics 111 (or 111 E)

Enrollment expectation 460 per year

Indicate any course for which this course is a (an)

Modification _____
(proposed change in course title, course description, course content or method of instruction)

Substitute Chem 101
(The proposed new course replaces a deleted course as a General Education or program requirement.)

alternate _____
(The proposed new course can be taken as an alternate to an existing course.)

Name of person preparing course description Jennifer Kelley and Allen Clabo

Department Chairperson's/Dean's Signature Le R Peterson Jr.

Provost's Signature Peter King

Date of Implementation _____

Date of School/Department approval _____

Catalog description:

111 General Chemistry I: General Concepts in Chemistry (3:3) (Prerequisite/Corequisite Mathematics 111 (or 111E)) F, S, SU. The states of matter, including the gas laws; stoichiometry; electronic structure and bonding; periodicity; solutions.

Purpose:

1. Currently, Chemistry 101 combines the lecture and the laboratory as one course (4 credit hours). This change allows the separation of the lecture and the lab. Students who currently fail lecture but not lab have to repeat both. Separate grades for lecture and laboratory is a common practice at other universities. Our waiting list for this course is currently dependent on the

laboratory courses because laboratory course enrollment is limited for safety concerns. There is no change in the content of the course or the prerequisites, only the course number and credit hours. The laboratory will be listed as a separate, 1 credit hour course.

2. This will allow students that have passed the laboratory but not the lecture the option to repeat the lecture only. It should eliminate much of our waiting list by increasing the availability of lab enrollment.

Teaching method planned: In-person Lecture

Textbook and/or materials planned (including electronic/multimedia):

Chemistry, The Science in Context, 6th edition, Gilbert, Kirss, Bretz, and Foster, ISBN 978-0-393-69730-8

Smartwork5 online tutorial and homework program (access code is typically purchased with a textbook or eBook but can be purchased separately)

Course Content:
To gain an understanding of the following:

- Particles of Matter: Measurement and the Tools of Science (Chapter 1)
- Atoms, ions and molecules (Chapter 2)
- Stoichiometry and Reactions in Aqueous Solutions (Chapter 3 & 4)
- Properties of Gases (Chapter 5)
- A Quantum Model of Atoms (Chapters 7)
- Chemical Bonds and Molecular Geometry, Periodicity (Chapter 8 & 9)

When completed, forward to the Office of the Provost.

General Chemistry I
General Concepts in Chemistry
CHEM 111 Syllabus

Department of Chemistry
Francis Marion University
Florence, South Carolina

Lectures: TBD

Instructor: Dr. Jennifer G. Kelley
Room 303F LSF
Phone number: 661-1492
Email: jkelley@fmarion.edu
Office Hours: TBD

Prerequisites/Corequisites: You must have credit for or be enrolled in Math 111 (or 111E).

Course Description: This course will focus on developing an understanding of fundamental chemistry concepts.

Course Objectives: To gain an understanding of the following:

- Particles of Matter: Measurement and the Tools of Science (Chapter 1)
- Atoms, ions and molecules (Chapter 2)
- Stoichiometry and Reactions in Aqueous Solutions (Chapter 3 & 4)
- Properties of Gases (Chapter 5)
- A Quantum Model of Atoms (Chapters 7)
- Chemical Bonds and Molecular Geometry, Periodicity (Chapter 8 & 9)

Required Texts and Materials:

Chemistry, The Science in Context, 6th edition, Gilbert, Kirss, Bretz, and Foster, ISBN 978-0-393-69730-8 (eBook and Smartwork5, $79.95, Hardcover and Smartwork5, $168.75) **Access this course and register in Blackboard.**

Smartwork5 online tutorial and homework program (access code is typically purchased with a textbook or eBook, Smartwork 5 access only, $35.00).

Required Technological Materials:

1) **Students must use a laptop or desktop computer** to submit quizzes, exams, and homework. Cell phones, tablets, and other mobile devices do not support Blackboard's software for submitting files and exams; while you may get it to work *sometimes,* there is no guarantee it will work every time.
2) **Students must have a webcam with audio.** You will need a device with a camera and audio to participate fully in office hours. Your laptop or desktop may already have these. Your phone may also be sufficient for this. Some concepts can't be explained without seeing, for example working out a problem.

3) **Students must have reliable internet access** to complete the course. Some materials for the course—particularly the PowerPoints that may have voice over narration and imbedded videos—are large files. I strongly recommend downloading the files to use when working on assignments. If your only internet connection is via your phone, you will likely need to use a public Wi-Fi connection, work at a library, come to campus, or, if those are too difficult to find, drop the course.
4) **Students must have access to Office 365**. You will need to use Word, Excel and PowerPoint for this course. Students should be able to download a full version of Office 365 (**free of cost**) using their FMU email/password to login to www.office.com. Once logged in, you should see a button towards the top right of the screen that will allow you to "Install Office 365." Note* If you already have Office installed on your computer, you may have to uninstall that old version first. Please contact FMU Campus Technology at 843-661-1111 (Help Desk) or 843-661-1335 for help with issues downloading the software.
5) **Students must use Firefox or Chrome browsers**. Other browsers (Safari and Internet Explorer in particular) do not work well with Blackboard.
6) **Students must have the ability to save files as "universal" files types** (like .doc, .pdf, and .xlsm)**. Assignments turned in as .jpg, .jpeg, .tiff, .pages, etc. formats will not be accepted.** Files must be submitted as word documents (.doc, .docx), excel files (.xls, .xlsm), PowerPoint (.ppt) files or pdf (.pdf) files (hence the requirement for Office 365). If working with some other software, check for the option to export the file as a PDF. Please make sure the files actually do upload correctly by returning to your submission and opening your own file. You can download GooglesDocs files as Word Docs or PDFs and upload them to Blackboard.
7) **Students must have access to a scientific calculator.** You should have one available on your computer or cell phone (turn your phone sideways) but may find a handheld calculator more convenient. You will need the handheld calculator for face to face class meetings as phones are not allowed to be used on tests and quizzes. A suggested model is the Texas Instruments TI-30X IIS ($20-$25).

Grading:

Three Exams	45%
Homework	15%
Quizzes	15%
Final Exam	25%

Tentatively,
Exam 1 will cover Chapters 1, 2, & 3.
Exam 2 will cover Chapters 4, 5, & 7
Exam 3 will cover Chapters 8 & 9.

The final exam will be given on **TBD.**

Grading Scale:

90-100=A	70-78=C
88-89 =B^+	68-69=D^+
80-87 =B	60-67=D

78-79 =C$^+$ < 60 =F

Attendance: It is your responsibility to attend all of the Chem 111 class meetings. You are responsible for obtaining notes, handouts, or announcements missed due to absence. It is also your responsibility to make up missed homework or other assignments. **Missing more than 6 days of MWF class or 4 days of a TTH class will result in being dropped from the course with a failing grade.**

No extensions will be granted for online homework. You will be given at least two days to complete each assignment.

Your lowest quiz grade will be dropped. . Quizzes will be given in class and/or online and will be timed (typically 10 minutes). **There will be no make-up quizzes.**

There are no make-up exams. If you have an excusable absence, your final exam will count as your missed exam.

Course Withdrawal: TBD is the last day to withdraw from this course without academic penalty. The last day to withdraw from the course is **TBD.**

Cell Phones and Electronic Devices: Please turn off cell phones and electronic devices before entering the classroom. Use of electronic devices may result in **dismissal from class**. Also, your cell phone will not be used on quizzes or tests as a calculator.

Please refer to your Student Handbook for campus policies regarding Academic Integrity.

Policies given in this syllabus may be changed at the instructor's discretion.

FRANCIS MARION UNIVERSITY: DESCRIPTION OF PROPOSED NEW COURSE or MODIFICATION OF AN EXISTING COURSE

Department/School Chemistry/CLA **Date** 02/21/2021

Course No. or Level 111L **Title:** General Chemistry I Laboratory: General Concepts in Chemistry

Semester hours 1 Clock hours: Lecture 0 Laboratory 1

Corequisite/Prerequisites Mathematics 111 (or 111 E) and Chemistry 111

Enrollment expectation 460 per year

Indicate any course for which this course is a (an)

Modification _____
(proposed change in course title, course description, course content or method of instruction)

Substitute Chem 101
(The proposed new course replaces a deleted course as a General Education or program requirement.)

alternate _____
(The proposed new course can be taken as an alternate to an existing course.)

Name of person preparing course description Jennifer Kelley and Allen Clabo

Department Chairperson's/Dean's Signature _____

Provost's Signature Peter King

Date of Implementation _____

Date of School/Department approval _____

Catalog description:

111L General Chemistry I Laboratory: General Concepts in Chemistry (1:3) (Prerequisite/Corequisite Mathematics 111 (or 111E) and Chemistry 111) F, S, SU. Introductory laboratory experiments reinforce concepts from Chem 111 as well as description and explanation of observed reactions, measurements, calculations, proper use of laboratory equipment and laboratory safety.

Purpose:

1. Currently, Chemistry 101 combines the lecture and the laboratory as one course (4 credit hours). This change allows the separation of the lecture and the lab. Students who currently fail lecture but not lab have to repeat both.

Separate grades for lecture and laboratory is a common practice at other universities. Our waiting list for this course is currently dependent on the laboratory courses because laboratory course enrollment is limited for safety concerns. The creation of this new course listing allows the laboratory to be listed as a separate, 1 credit hour course. The lecture will be listed as a separate 3 credit hour course.There is no change in the content for this portion of the course or the Math prerequisite. An added corequisite or prerequisite of Chemistry 111 ensures students take the lecture with or before they take the lab.

2. This will allow students that have passed the laboratory but not the lecture the option to repeat the lecture only. It should eliminate much of our waiting list by increasing the availability of lab enrollment.

Teaching method planned: In-person Lecture/Laboratory

Textbook and/or materials planned (including electronic/multimedia):

Francis Marion University, Department of Chemistry, General Chemistry 111L Laboratory Manual (7-21 Revision), edited by B.L. Holliman

Student Laboratory Notebook with spiral binding and carbon copy pages

Lab Splash Goggles

A scientific calculator. A suggested model is the Texas Instruments TI-30X IIS.

Course Content:

1. Be able to use several items of equipment, including, but not limited to the top-loading electronic balance, analytical balance, conductivity meter and barometer.
2. To be able to build and describe several simple models of molecules.
3. To balance equations for reactions performed in the lab.
4. To be able to safely and efficiently use several items of scientific glassware.
5. To describe and explain phenomena observed in the lab.
6. To be able to make measurements and handle numbers in the resulting calculations.
7. To use the computer in checking the mathematical calculations performed for the labs and to draw graphs based on experimental data.
8. To be able to look up and report information from reference books and the Internet.

When completed, forward to the Office of the Provost.

Chemistry 111L (General Chemistry I Laboratory: General Concepts in Chemistry) Syllabus

Corequisites/Prerequisites: Math 111 (or 111E) and Chem 111

Laboratory: TBD

Instructor: Dr. Jennifer G. Kelley
Room 303F LSF
Phone number: 661-1492
Email: jkelley@fmarion.edu
Office Hours: TBD

Required Texts and Materials:

- *Francis Marion University, Department of Chemistry, General Chemistry 111L Laboratory Manual* (7-21 Revision), edited by B.L. Holliman (available at McNair Science Building 307 from 12:00-3:00 during the first 2 weeks of class, $20)
- Student Laboratory Notebook with spiral binding and carbon copy pages (available at the Patriot Bookstore, $25)
- Lab Splash Goggles ($5)

Required Technological Materials:

1) **Students must use a laptop or desktop computer** to submit quizzes, exams, and lab reports. Cell phones, tablets, and other mobile devices do not support Blackboard's software for submitting files and exams; while you may get it to work *sometimes,* there is no guarantee it will work every time.
2) **Students must have a webcam with audio.** You will need a device with a camera and audio to participate fully in office hours. Your laptop or desktop may already have these. Your phone may also be sufficient for this. Some concepts can't be explained without seeing, for example working out a problem.
3) **Students must have reliable internet access** to complete the course. Some materials for the course—particularly the PowerPoints that have voice over narration and imbedded videos—are large files. I strongly recommend downloading the files to use when working on assignments. If your only internet connection is via your phone, you will likely need to use a public Wi-Fi connection, work at a library, come to campus, or, if those are too difficult to find, drop the course.
4) **Students must have access to Office 365**. You will need to use Word, Excel and PowerPoint for this course. Students should be able to download a full version of Office 365 (**free of cost**) using their FMU email/password to login to www.office.com. Once logged in, you should see a button towards the top right of the screen that will allow you to "Install Office 365." Note* If you already have Office installed on your computer, you may have to uninstall that old version first. Please contact FMU Campus Technology at 843-661-1111 (Help Desk) or 843-661-1335 for help with issues downloading the software.
5) **Students must use Firefox or Chrome browsers**. Other browsers (Safari and Internet Explorer in particular) do not work well with Blackboard.
6) **Students must have the ability to save files as "universal" files types** (like .doc, .pdf, and .xlsm). **Reports turned in as .jpg, .jpeg, .tiff, .pages, etc. formats will not be accepted.** Files must be submitted as word documents (.doc, .docx), excel files (.xls, .xlsm), PowerPoint (.ppt) files or pdf (.pdf) files (hence the requirement for Office 365). If working with some other software, check for the option to export the file as a PDF. Please make sure the files actually do upload correctly by returning to your submission and opening your own file. You can download GooglesDocs files as Word Docs or PDFs and upload them to Blackboard.
7) **Students must have access to a scientific calculator.** You should have one available on your computer or cell phone (turn your phone sideways) but may find a handheld calculator more convenient. You will need the handheld calculator for face to face class meetings as phones are not

allowed to be used on tests and quizzes. A suggested model is the Texas Instruments TI-30X IIS ($20).

Evaluation Method:

Laboratory reports, prelab exercises & laboratory notebook
75%
Final laboratory exam

25%

You can view your grades throughout the semester by clicking on the My Grades tab in Blackboard. You will be able to see grades for individual assignments as well as your weighted average. Online tests, quizzes or reports that have instructor graded portions also have feedback that can be seen by clicking on the grade (in blue) for that item. To see comments on assignments, go back to the submission to view comments.

1. Reports can be turned in only for experiments actually performed by the student.
2. Reports are **due on the day of performance** of the lab (longer labs will be turned in 2 days after the lab) and points will be deducted for those turned in late at the rate of 10% per day. Reports turned in after 10 days will receive a grade of zero.
3. One laboratory grade will be dropped in the calculation of the final laboratory grade. Labs not attended or reports not turned in will count as zeroes. Three or more zeroes will result in ***failing the laboratory.***
4. Academic dishonesty on any lab will result in a grade of zero for that report. Repeated violations will result in dismissal from the university. An example is coming to lab with data already in data tables in your notebook.
5. Anytime a problem is worked, the answer alone is not sufficient, you must show the calculations.

Objectives for the Course:
1. Be able to use several items of equipment, including, but not limited to the top-loading electronic balance, analytical balance, conductivity meter and barometer.
2. To be able to build and describe several simple models of molecules.
3. To balance equations for reactions performed in the lab.
4. To be able to safely and efficiently use several items of scientific glassware.
5. To describe and explain phenomena observed in the lab.
6. To be able to make measurements and handle numbers in the resulting calculations.
7. To use the computer in checking the mathematical calculations performed for the labs and to draw graphs based on experimental data.
8. To be able to look up and report information from reference books and the Internet.

Laboratory Schedule:
The laboratory experiments Title (and page number in the manual) to be completed during the semester are listed opposite the scheduled week. *Students should consult the laboratory schedule each week to be certain they are preparing for the proper experiment.*

Week	Dates	Experiment Title	Page in Manual
1	TBD	Safety Video, General Lab Instruction, Intro to Lab Equipment and Conversions	23
2	TBD	Density Measurements	29
3	TBD	Chemical and Physical Changes	37
4	TBD	A Series of Chemical Changes	41
5	TBD	Formula of a Metal Oxide	45

6	TBD	Concentration: Molarity (No labs Fall Break week, Oct 7-11)	49
7	TBD	Conversion of Carbonate to Chloride	57
8	TBD	Quantitative Measurement of Conductance	61
9	TBD	Types of Chemical Reactions	65
10	TBD	Gas Laws: Boyle's Law and Molar Mass of a Gas	71
11	TBD	Molecular Structure	79
12	TBD	Lab Exams	--

See your lab instructor immediately if you miss a lab. You will still be responsible for the missed lab on the exam.

Notes:
The following should be noted concerning the laboratory period.

A. Some medical conditions make exposure to certain chemicals unwise. If you are currently under treatment by a health professional and/or you have a concern about possible exposure to chemicals in the laboratory required for this course, please discuss this matter with your physician.

B. The three-hour laboratory period will be divided into a one-hour recitation or problem-working session with the remaining two hours for performance of the assigned experiment. All experiments are expected to be done individually and independently unless otherwise specified by the instructor. However, you will find it useful to find other students to discuss your reports for different perspectives on questions, etc.

C. Video/PowerPoint pre-labs have been prepared for most experiments. The videos/PowerPoints are available on Blackboard. Every student is required to **view the prelab video/PowerPoint** before attending his or her scheduled laboratory period. Only minimal detailed laboratory instructions will be given at the laboratory period. The experimental procedure for each experiment is detailed in the laboratory manual. This procedure should be studied prior to viewing the video.

D. **Complete a prelab write-up before coming to lab (see page 20 in lab manual for an example).** The prelab write-up should summarize the procedure with enough detail that you can complete the lab without referring to your lab manual.

E. Students are expected to be ON TIME for the laboratory period. ON TIME means to be in your seat when it is time to start the period. The prelab portion of the laboratory period is a required experience as is the actual performance of the experiment. Any student who is late for the prelab period may not perform the experiment during their scheduled laboratory period. The entire laboratory period must be made up at the scheduled make-up period.

F. Before a missed laboratory can be made-up, permission to do so must be obtained from your regular laboratory instructor. If your excuse for missing your regular period is not acceptable, you will not be granted permission to make-up the experiment. You may appeal any decision to the department chair. Extenuating circumstances will be considered. If approval is not given, a zero will be assigned for the experiment. Do not wait until the last minute to see your instructor.

G. The departmental policy concerning eye protection in the laboratory is as follows:

> For proper eye protection ALL students enrolled in chemical laboratory courses are REQUIRED to purchase and wear **chemical splash goggles** (NOT GLASSES) which meet departmental requirements for impact and splash protection. The goggles must be worn by everyone including those who normally wear glasses and those who wear contacts. Those students who wear contacts in the laboratory will place a **label** on the goggles so indicating. These labels are available in the lab.

H. All students must have on file in the department a **signed statement agreeing to abide by all departmental safety regulations** including clothing and to abide by the departmental eye-safety program. The Safety Agreement Form is on the last page in the laboratory manual.

Computer Lab
For your convenience we have a computer lab in LSF 310. This has twelve computers with Internet access, word processing, spreadsheet, molecular modeling and drawing and graphing programs. Several times during the semester you will be required to produce graphs, etc. from computers. **Have a memory "stick" available to save your work.** You will need to **print from your campus student account**.

Before coming to each lab you must:

1. **watch the video/PowerPoint**
2. **complete a prelab write-up**
3. **be properly dressed**

FRANCIS MARION UNIVERSITY: DESCRIPTION OF PROPOSED NEW COURSE or MODIFICATION OF AN EXISTING COURSE

Department/School Chemistry/CLA **Date** 02/21/2021

Course No. or Level 112 **Title:** General Chemistry II: General Concepts in Chemistry

Semester hours 3 Clock hours: Lecture 3 Laboratory 0

Prerequisites Chemistry 111 and Chemistry 111L

Enrollment expectation 440 per year

Indicate any course for which this course is a (an)

Modification _____
(proposed change in course title, course description, course content or method of instruction)

Substitute Chem 102
(The proposed new course replaces a deleted course as a General Education or program requirement.)

alternate_____
(The proposed new course can be taken as an alternate to an existing course.)

Name of person preparing course description Jennifer Kelley and Allen Clabo

Department Chairperson's/Dean's Signature _____

Provost's Signature Peter King

Date of Implementation_____

Date of School/Department approval_____

Catalog description:

112 General Chemistry II: General Concepts in Chemistry (3:3) (Prerequisites: 111 and 111L) F, S, SU. Oxidation-reduction, equilibria, electrochemistry, thermodynamics, acids and bases, kinetics, chemistry of the representative elements, coordination compounds of the transition elements, nuclear chemistry.

Purpose:

1. Currently, Chemistry 102 combines the lecture and the laboratory as one course (4 credit hours). This change allows the separation of the lecture and the lab. Students who currently fail lecture but not lab have to repeat both. Separate grades for lecture and laboratory is a common practice at other

universities. Our waiting list for this course is currently dependent on the laboratory courses because laboratory course enrollment is limited for safety concerns. There is no change in the content of the course or the prerequisites, only the course number and credit hours. The laboratory will be listed as a separate, 1 credit hour course.

2. This will allow students that have passed the laboratory but not the lecture the option to repeat the lecture only. It should eliminate much of our waiting list by increasing the availability of lab enrollment.

Teaching method planned: In-person Lecture

Textbook and/or materials planned (including electronic/multimedia):

Chemistry, The Science in Context, 6th edition, Gilbert, Kirss, Bretz, and Foster, ISBN 978-0-393-69730-8

Smartwork5 online tutorial and homework program (access code is typically purchased with a textbook or eBook but can be purchased separately)

Course Content:
To gain an understanding of the following:

- Thermochemistry: Energy Changes in Chemical Reactions (Chapter 6)
- Thermodynamics: Spontaneous and Nonspontaneous Reactions and Processes (Chapter 17)
- Intermolecular Forces: The Uniqueness of Water (Chapter 10)
- Solutions: Properties and Behavior (Chapter 11)
- Solids: Crystals, Alloys, and Polymers (Chapter 12)
- Chemical Kinetics: Reactions in the Atmosphere (Chapter 13)
- Chemical Equilibrium: How Much Product Does a Reaction Really Make? (Chapter 14)
- Acid-Base Equilibria: Proton Transfer in Biological Systems (Chapter 15)
- Additional Aqueous Equilibria: Chemistry and the Oceans (Chapters 16)
- Electrochemistry: The Quest for Clean Energy (Chapter 18)

When completed, forward to the Office of the Provost.

General Chemistry II: General Concepts in Chemistry
CHEM 112 Syllabus
Department of Chemistry
Francis Marion University
Florence, South Carolina

Lectures: TBD

Instructor: Dr. Jennifer G. Kelley
Room 303F LSF
Phone number: 661-1492
Email: jkelley@fmarion.edu
Office Hours: TBD

Prerequisites: You must have a C or better in Chemistry 111 and Chemistry 111L.

Required Texts and Materials:

- *Chemistry, The Science in Context*, 6th edition, Gilbert, Kirss, Bretz, and Foster, ISBN 978-0-393-69730-8 (eBook and Smartwork5, $79.95, Hardcover and Smartwork5, $168.75) **Access this course and register in Blackboard.**

- *Smartwork5 online tutorial and homework program* (access code is typically purchased with a textbook or eBook, Smartwork 5 access only, $35.00).

Required Technological Materials:

1) **Students must use a laptop or desktop computer** to submit quizzes, exams, and homework. Cell phones, tablets, and other mobile devices do not support Blackboard's software for submitting files and exams; while you may get it to work *sometimes,* there is no guarantee it will work every time.
2) **Students must have a webcam with audio.** You will need a device with a camera and audio to participate fully in office hours. Your laptop or desktop may already have these. Your phone may also be sufficient for this. Some concepts can't be explained without seeing, for example working out a problem.
3) **Students must have reliable internet access** to complete the course. Some materials for the course—particularly the PowerPoints that may have voice over narration and imbedded videos—are large files. I strongly recommend downloading the files to use when working on assignments. If your only internet connection is via your phone, you will likely need to use a public Wi-Fi connection, work at a library, come to campus, or, if those are too difficult to find, drop the course.
4) **Students must have access to Office 365**. You will need to use Word, Excel and PowerPoint for this course. Students should be able to download a full version of Office 365 (**free of cost**) using their FMU email/password to login to www.office.com. Once logged in, you should see a button towards the top right of the screen that will allow you to "Install Office 365." Note* If you already have Office installed on your computer, you may have to uninstall that old version first. Please contact FMU Campus Technology at 843-661-1111 (Help Desk) or 843-661-1335 for help with issues downloading the software.
5) **Students must use Firefox or Chrome browsers**. Other browsers (Safari and Internet Explorer in particular) do not work well with Blackboard.
6) **Students must have the ability to save files as "universal" files types** (like .doc, .pdf, and .xlsm)**. Reports turned in as .jpg, .jpeg, .tiff, .pages, etc. formats will not be accepted.** Files must be submitted as word documents (.doc, .docx), excel files (.xls, .xlsm), PowerPoint (.ppt) files or pdf (.pdf) files (hence the requirement for Office 365). If working with some other software, check for the option to export the

file as a PDF. Please make sure the files actually do upload correctly by returning to your submission and opening your own file. You can download GoogiesDocs files as Word Docs or PDFs and upload them to Blackboard.

7) **Students must have access to a scientific calculator.** You should have one available on your computer or cell phone (turn your phone sideways) but may find a handheld calculator more convenient. You will need the handheld calculator for face to face class meetings as phones are not allowed to be used on tests and quizzes. A suggested model is the Texas Instruments TI-30X IIS ($20-$25).

Course Description: This course will continue developing an understanding of fundamental concepts introduced in Chem 111 as they pertain to inorganic chemistry.

Course Objectives: To gain an understanding of the following:

- Thermochemistry: Energy Changes in Chemical Reactions (Chapter 6)
- Thermodynamics: Spontaneous and Nonspontaneous Reactions and Processes (Chapter 17)
- Intermolecular Forces: The Uniqueness of Water (Chapter 10)
- Solutions: Properties and Behavior (Chapter 11)
- Solids: Crystals, Alloys, and Polymers (Chapter 12)
- Chemical Kinetics: Reactions in the Atmosphere (Chapter 13)
- Chemical Equilibrium: How Much Product Does a Reaction Really Make? (Chapter 14)
- Acid-Base Equilibria: Proton Transfer in Biological Systems (Chapter 15)
- Additional Aqueous Equilibria: Chemistry and the Oceans (Chapters 16)
- Electrochemistry: The Quest for Clean Energy (Chapter 18)

Grading:

Three Exams	45%
Homework	15%
Quizzes	15%
Comprehensive Final Exam	25%

No extensions will be granted for online homework.

Your lowest quiz grade will be dropped. Quizzes will be given in class and/or online and will be timed (typically 10 minutes). **There will be no make-up quizzes.**

There are no make-up exams. If you have an excusable absence, your final exam will count as your missed exam.

Tentatively,
Exam 1 will cover Chapters 6, 17, 10 & 11.
Exam 2 will cover Chapters 12, 13, & 14.
Exam 3 will cover Chapters 15, 16, & 18.

The final exam will be given on **TBD**.

Grading Scale:

90-100=A	70-78=C
88-89 =B^+	68-69=D^+
80-87 =B	60-67=D
78-79 =C^+	< 60 =F

Attendance: It is your responsibility to attend all of the Chem 112 class meetings. You are responsible for obtaining notes, handouts, or announcements missed due to absence. It is

also your responsibility to make up missed homework or other assignments. **Missing more than 6 days of MWF class or 4 days of a TTH class will result in being dropped from the course with a failing grade.**

Course Withdrawal: The last day to withdraw from the course is **TBD.**

Cell Phones and Electronic Devices: Please turn off cell phones and electronic devices before entering the classroom. Use of electronic devices may result in **dismissal from class.** Also, your cell phone will not be used on quizzes or tests as a calculator.

Please refer to your Student Handbook for campus policies regarding Academic Integrity.

Policies given in this syllabus may be changed at the instructor's discretion.

FRANCIS MARION UNIVERSITY: DESCRIPTION OF PROPOSED NEW COURSE or MODIFICATION OF AN EXISTING COURSE

Department/School Chemistry/CLA **Date** 02/21/2021

Course No. or Level 112L **Title:** General Chemistry II Laboratory: General Concepts in Chemistry

Semester hours 1 Clock hours: Lecture 0 Laboratory 1

Prerequisites Chemistry 111 and Chemistry 111L

Corequisite or Prerequisite Chemistry 112

Enrollment expectation 440 per year

Indicate any course for which this course is a (an)

Modification _____
(proposed change in course title, course description, course content or method of instruction)

Substitute Chem 102
(The proposed new course replaces a deleted course as a General Education or program requirement.)

alternate_____
(The proposed new course can be taken as an alternate to an existing course.)

Name of person preparing course description Jennifer Kelley and Allen Clabo

Department Chairperson's/Dean's Signature _____

Provost's Signature Peter King

Date of Implementation_____

Date of School/Department approval_____

Catalog description:

112L General Chemistry II Laboratory: General Concepts in Chemistry (1:3) (Prerequisites 111 and 111L; prerequisite/corequisite 112) F, S, SU. Introductory laboratory experiments that reinforce concepts from Chemistry 112 as well as description and explanation of observed reactions, measurements, calculations, proper use of laboratory equipment and laboratory safety.

Purpose:

1. Currently, Chemistry 102 combines the lecture and the laboratory as one course (4 credit hours). This change allows the separation of the lecture and the lab. Students who currently fail lecture but not lab have to repeat both. Separate grades for lecture and laboratory is a common practice at other universities. Our waiting list for this course is currently dependent on the laboratory courses because laboratory course enrollment is limited for safety concerns. The creation of this new course listing allows the laboratory to be listed as a separate, 1 credit hour course. The lecture will be listed as a separate 3 credit hour course. There is no change in the content for this portion of the course. The change in prerequisites reflects the separation of the lecture and lab in Chemistry 101, and the corequisite or prerequisite of Chemistry 112 ensures students take the lecture with or before they take the lab.

2. This will allow students that have passed the laboratory but not the lecture the option to repeat the lecture only. It should eliminate much of our waiting list by increasing the availability of lab enrollment.

Teaching method planned: In-person Lecture/Laboratory

Textbook and/or materials planned (including electronic/multimedia):

Francis Marion University, Department of Chemistry, General Chemistry 112L Laboratory Manual (2022 Edition), edited by Dr. B.L. Holliman

Student Laboratory Notebook with spiral binding and carbon copy pages

Lab Splash Goggles

Course Content:

1. Be able to use several items of equipment, including, but not limited to the top-loading electronic balance, analytical balance, voltmeter, pH meter, visible spectrophotometer and computer data acquisition.
2. To be able to build and describe several simple models of molecules.
3. To balance equations for reactions performed in the lab.
4. To be able to safely and efficiently use several items of scientific glassware.
5. To describe and explain phenomena observed in the lab.
6. To be able to make measurements and handle numbers in the resulting calculations.
7. To use the computer in checking the mathematical calculations performed for the labs and to draw graphs based on experimental data.
8. To be able to look up and report information from reference books and the Internet.

When completed, forward to the Office of the Provost.

Chemistry 112L (General Chemistry II Laboratory: General Concepts in Chemistry) Syllabus

Prerequisites: A grade of C or better in Chem 111 and Chem 111L

Corequisite/Prerequisite: Chem 112

Laboratory: TBD

Instructor: Dr. Jennifer G. Kelley
Room 303F LSF
Phone number: 843-661-1492
Email: jkelley@fmarion.edu
Office Hours: TBD

Required Texts and Materials:

- *Francis Marion University, Department of Chemistry, General Chemistry 112L Laboratory Manual* (2022 Edition), edited by Dr. B.L. Holliman (available at stock room window first two weeks of class, McNair Science Building 307, $20)
- Student Laboratory Notebook with spiral binding and carbon copy pages (available at the Patriot Bookstore, $25)
- Lab Splash Goggles ($5)

Required Technological Materials:

1) **Students must use a laptop or desktop computer** to submit quizzes, exams, and lab reports. Cell phones, tablets, and other mobile devices do not support Blackboard's software for submitting files and exams; while you may get it to work *sometimes,* there is no guarantee it will work every time.
2) **Students must have a webcam with audio.** You will need a device with a camera and audio to participate fully in office hours. Your laptop or desktop may already have these. Your phone may also be sufficient for this. Some concepts can't be explained without seeing, for example working out a problem.
3) **Students must have reliable internet access** to complete the course. Some materials for the course—particularly the PowerPoints that have voice over narration and imbedded videos—are large files. I strongly recommend downloading the files to use when working on assignments. If your only internet connection is via your phone, you will likely need to use a public Wi-Fi connection, work at a library, come to campus, or, if those are too difficult to find, drop the course.
4) **Students must have access to Office 365**. You will need to use Word, Excel and PowerPoint for this course. Students should be able to download a full version of Office 365 (**free of cost**) using their FMU email/password to login to www.office.com. Once logged in, you should see a button towards the top right of the screen that will allow you to "Install Office 365." Note* If you already have Office installed on your computer, you may have to uninstall that old version first. Please contact FMU Campus Technology at 843-661-1111 (Help Desk) or 843-661-1335 for help with issues downloading the software.
5) **Students must use Firefox or Chrome browsers**. Other browsers (Safari and Internet Explorer in particular) do not work well with Blackboard.
6) **Students must have the ability to save files as "universal" files types** (like .doc, .pdf, and .xlsm)**. Reports turned in as .jpg, .jpeg, .tiff, .pages, etc. formats will not be accepted.** Files must be submitted as word documents (.doc, .docx), excel files (.xls, .xlsm), PowerPoint (.ppt) files or pdf (.pdf) files (hence the requirement for Office 365). If working with some other software, check for the option to export the file as a PDF. Please make sure the files actually do upload correctly by returning to your submission and opening your own file. You can download GooglesDocs files as Word Docs or PDFs and upload them to Blackboard.
7) **Students must have access to a scientific calculator.** You should have one available on your computer or cell phone (turn your phone sideways) but may find a handheld calculator more

convenient. You will need the handheld calculator for face to face class meetings as phones are not allowed to be used on tests and quizzes. A suggested model is the Texas Instruments TI-30X IIS ($20).

Evaluation Method:
The parts of the laboratory grade are:

laboratory reports, prelab exercises & laboratory notebook	75%
final laboratory exam	25%

You can view your grades throughout the semester by clicking on the My Grades tab in Blackboard. You will be able to see grades for individual assignments as well as your weighted average. Online tests, quizzes or reports that have instructor graded portions also have feedback that can be seen by clicking on the grade (in blue) for that item. To see comments on assignments, go back to the submission to view comments.

1. Reports can be turned in only for experiments actually performed by the student.
2. Handwritten lab reports are **due the following week at the beginning of the next lab period. Points will be deducted for those turned in late at the rate of 10% per day. Reports turned in after 10 days will receive a grade of zero.**
3. One laboratory grade will be dropped in the calculation of the final laboratory grade. Labs not attended or reports not turned in will count as zeroes. Three or more zeroes will result in ***failing the laboratory***.
4. Academic dishonesty on any lab will result in a grade of zero for that report. Repeated violations will result in dismissal from the university. An example is coming to lab with data already in data tables in your notebook or copying from online or someone else's work.
5. Anytime a problem is worked, the answer alone is not sufficient, you must show the calculations.

Objectives for the Course:
1. Be able to use several items of equipment, including, but not limited to the top-loading electronic balance, analytical balance, voltmeter, pH meter, visible spectrophotometer and computer data acquisition.
2. To be able to build and describe several simple models of molecules.
3. To balance equations for reactions performed in the lab.
4. To be able to safely and efficiently use several items of scientific glassware.
5. To describe and explain phenomena observed in the lab.
6. To be able to make measurements and handle numbers in the resulting calculations.
7. To use the computer in checking the mathematical calculations performed for the labs and to draw graphs based on experimental data.
8. To be able to look up and report information from reference books and the Internet.

Laboratory Schedule:
The laboratory experiments Title (and page number in the manual) to be completed during the semester are listed opposite the scheduled day. Materials for online labs will be provided on Blackboard. ***Students should consult the laboratory schedule each week to be certain they are preparing for the proper experiment as the labs will not be performed in the order in the manual.***

Lab Date	Experiment #	Title of Experiment	Page
TBD	2	Thermochemistry	33-38
TBD	1	Acid and Base Titration Part 1	23-27
TBD	1	Acid and Base Titration Part 2 & 3	28-32
TBD	3	Oxidation Reduction Reactions	39-46
TBD	4	Electrochemistry	47-54
TBD	5	Kinetics - Microscale	55-62
TBD	8	Measurement of pH, Ksp, Strong Acid Titration	77-83

TBD	7	Iron (III) – Thiocyanate Equilibria	69-75
TBD	6	Several Reversible Reactions	63-68
TBD	9	Weak Acid Titration	85-91
TBD	10	Coordination Complexes	93-99
TBD	--	LABORATORY EXAM (25% of lab grade)	Instructor

Contact your lab instructor immediately if you miss a lab. It is your responsibility to make your instructor aware of extenuating circumstances. If you do not complete a lab, you will still be responsible for the missed material on the exam.

Notes:
The following should be noted concerning the laboratory period.

A. Some medical conditions make exposure to certain chemicals unwise. If you are currently under treatment by a health professional and/or you have a concern about possible exposure to chemicals in the laboratory required for this course, please discuss this matter with your physician.

B. The three-hour laboratory period will be divided into a one-hour recitation or problem-working session with the remaining two hours for performance of the assigned experiment. All experiments are expected to be done individually and independently unless otherwise specified by the instructor.

C. Video/PowerPoint pre-labs have been prepared for most experiments. The videos are available on Blackboard. Every student is required to **view the prelab video/PowerPoint** before attending his or her scheduled laboratory period. Only minimal detailed laboratory instructions will be given at the laboratory period. The experimental procedure for each experiment is detailed in the laboratory manual. This procedure should be studied prior to viewing the video to aid in understanding the information in the video.

D. **Complete a prelab write-up before coming to lab (see page 20 in lab manual for an example).** The prelab write-up should summarize the procedure with enough detail that you can complete the lab without referring to your lab manual.

E. Students are expected to be ON TIME for the laboratory period. ON TIME means to be in your seat when it is time to start the period. The prelab portion of the laboratory period is a required experience as is the actual performance of the experiment. Any student who is late for the prelab period may not perform the experiment during their scheduled laboratory period.

F. Before a missed laboratory can be made-up, permission to do so must be obtained from your regular laboratory instructor. If your excuse for missing your regular period is not acceptable, you will not be granted permission to make-up the experiment. You may appeal any decision to the department chair. Extenuating circumstances will be considered. If approval is not given, a zero will be assigned for the experiment. Do not wait until the last minute to see your instructor.

G. The departmental policy concerning eye protection in the laboratory is as follows:

   For proper eye protection, ALL students enrolled in chemical laboratory courses are REQUIRED to purchase and wear **chemical splash goggles** (NOT GLASSES) which meet departmental requirements for impact and splash protection. The goggles must be worn by everyone including those who normally wear glasses and those who wear contacts. Those students who wear contacts but do not have eyeglasses may wear contacts in the laboratory with a **label** on the goggles so indicating. These labels are available in the lab.

H. All students must have on file in the department a **signed statement agreeing to abide by all departmental safety regulations** including clothing and to abide by the departmental eye-safety program. The Safety Agreement Form is available in the lab manual.

Computer Lab
For your convenience, we have a computer lab in LSF 310. This room has computers with Internet access, word

processing, spreadsheet, molecular modeling and drawing and graphing programs. Several times during the semester you will be required to produce graphs, etc. from computers. **Have a USB memory stick available** to save your work. You will need to **print from your campus student account**.

Before coming to each lab, you must:

1. **complete a prelab write-up**
2. **watch the video**
3. **be properly dressed**