CHEM R130: ORGANIC CHEMISTRY I

Originator
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College
Oxnard College

Discipline (CB01A)
CHEM - Chemistry

Course Number (CB01B)
R130

Course Title (CB02)
Organic Chemistry I

Banner/Short Title
Organic Chemistry I

Credit Type
Credit

Start Term
Fall 2021

Catalog Course Description
This course studies the fundamental principles of organic chemistry with the emphasis upon the practical application of modern principles to functional groups, reactivity, physical properties, and methods of synthesis of organic compounds. The lab portion of the course will give students the opportunity to engage in experiments that provide concrete examples of materials covered in the lecture portion of the course.

Taxonomy of Programs (TOP) Code (CB03)
1905.00 - Chemistry, General

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
May be required

Faculty notes on field trips; include possible destinations or other pertinent information
CSUCI, to use their analytical instruments.

Grading method
Letter Graded

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
52.5
Maximum Contact/In-Class Lecture Hours
52.5

Activity

Laboratory
Minimum Contact/In-Class Laboratory Hours
105
Maximum Contact/In-Class Laboratory Hours
105

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
157.5
Total Maximum Contact/In-Class Hours
157.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
105
Maximum Outside-of-Class Hours
105

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
262.5
Total Maximum Student Learning Hours
262.5

Minimum Units (CB07)
5
Maximum Units (CB06)
5

Prerequisites
CHEM R122

Entrance Skills

Entrance Skills

Ability to apply hybridization and valence bond theory to explain how the molecular shape is attained and perfume the basic operations in a chemistry laboratory.

Prerequisite Course Objectives

CHEM R122-Quantitatively and qualitatively describe acid/base and solubility equilibria in solution. Identify acids and bases in terms of Arhenius, Bronsted-Lowry, and Lewis Theory.
CHEM R122-Determine the spontaneity of process from quantitative and qualitative determination of changes in entropy, enthalpy, and free energy. Determine variation of spontaneity with temperature and concentration changes. Relate free energy and equilibrium constant.
CHEM R122-Balance redox equations. Calculate standard cell potentials from tables of reduction potentials. Identify components of a voltaic or electrolytic cell. Write balanced equations for the redox reactions involved. Use the Nernst Equation to calculate non-standard cell potentials and the value of the equilibrium constant for redox reactions. Relate free energy and cell potential to redox reaction spontaneity.
CHEM R122-Give rate laws for first and second order reactions. Determine rate law from experimental data. Relate rate law and reaction mechanism. Describe effect of temperature upon reaction rate and calculate activation energy from rate verses temperature data.
CHEM R122-Write and balance nuclear equations for various types of radioactive decay. Explain and predict nuclear stability and decay processes based on n/p (neutron/proton) ration and the periodic table. Calculate binding energy, mass defect, and energy of nuclear reactions. Relate decay rate, half life, and sample age. Describe nuclear fission and fusion processes and their utilization as energy supplies. Discuss biological effects of nuclear radiation and environmental problems associated with nuclear waste.
CHEM R122-Apply VSEPR (Valence Shell Electron Pair Repulsion) Theory to predict molecular shapes. Apply hybridization and valence bond theory to explain how the molecular shape is attained and to describe multiple bonding. Apply simple molecular orbital theory and energy level diagrams to determine electron configuration, bond order and magnetic properties of diatomic molecules of second-row elements.
CHEM R122-Discuss periodic properties and chemical reactions of main group metals and non-metals.
CHEM R122-Describe the physical and chemical properties of transitional metals. Name coordination compounds, including isomers, and discuss their spectroscopic and magnetic properties in terms of crystal field theory.

Requisite Justification

Requisite Type

Prerequisite

Requisite

CHEMR122

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	Demonstrate the ability to use the library/Internet to find information related to certain organic structures.
2	Define structural details when given UV (Ultraviolet Spectroscopy), IR (Infrared Spectroscopy), NMR (Nuclear Magnetic Resonance), and Mass Spectrum data.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	Describe the products of organic reaction by applying basic principles learned in the course.
2	Illustrate a suitable reaction pathway to a given product.
3	Perform a multi-step synthesis of organic compounds in the laboratory.
4	Classify the reactions as electrophilic addition, nucleophilic addition, nucleophilic substitution, elimination, or redox using the reaction mechanism.
5	Name organic compounds using IUPAC (International Union of Pure and Applied Chemistry) nomenclature.
6	Explain a reaction and give a reasonable mechanism for that reaction.
7	Demonstrate the ability to use the library to find information related with certain organic substances.
8	Discuss a specific reaction type of his/her choice by oral presentation or a five-page typed report.
9	Establish two reactions leading to the same product and to indicate the one will be more likely to occur.
10	Define structural details when given UV (Ultraviolet), IR (Infrared), NMR (Nuclear Magnetic Resonance), and mass spectrum data.
11	Recognize isomers, such as conformational, constitutional, cis- and trans- or R- and S- isomers.

Course Content

Lecture/Course Content

1. Structure and Bonding
   a. Atomic Structure
   b. Valence Bond Theory
   c. Hybridization
2. Polar Covalent Bonds; Acids and Bases
   a. Electronegativity
   b. Resonance Structures
   c. Definitions of Acids and Bases
3. Alkanes and Cycloalkanes
   a. Functional Groups
   b. Alkyl Groups
   c. Naming Alkanes and Cycloalkanes
   d. Isomers and Properties of Alkanes and Cycloalkanes

4. Stereochemistry of Alkanes and Cycloalkanes
    a. Conformations of Ethane, Propane, Butane, Cyclopropane, Cyclopentane, and Cyclohexane
    b. Conformational Analysis of Monosubstituted and Disubstituted cyclohexane
    c. Conformations of Polycyclic Molecules
5. An Overview of Organic Reactions
    a. Kinds of Organic Reactions
    b. Mechanisms of Organic Reactions
    c. Example of a Polar Reaction: Addition of HBr to Ethylene
    d. Describing a Reaction: Energy, Rate, Equilibria
    e. Energy Diagram of an Organic Reaction
6. Alkenes: Structure and Reactivity
    a. Calculating Degree of Unsaturation
    b. Naming Alkenes: Cis-Trans Isomers and E, Z Designation
    c. Electrophilic Addition of Alkenes: Markovnikov's Rule
    d. Evidence of Mechanism of Electrophilic Addition
    e. Carbocation Rearrangements
7. Alkenes: Reactions and Synthesis
    a. Preparation of Alkenes: Elimination
    b. Additions of Alkenes: Halogenation, Hydration, Hydrogenation, and Polymerization
8. Alkynes: Introduction to Organic Synthesis
    a. Structures and Names of alkynes
    b. Preparation of Alkynes
    c. Reactions of alkynes: Hydration, Reduction, Alkylation, and Oxidative Cleavage of Alkynes
    d. An Introduction to Organic Synthesis
9. Stereochemistry
    a. Enantiomers, Tetrahedral Carbon, and Chirality
    b. Optical Activity
    c. Molecules with More than Two Chiral Centers: Diastereomers and Meso Compounds
    d. Racemic Mixtures and Their Resolution
    e. Stereochemistry of Reactions
10. Alkyl Halides
    a. Structures and Names of Alkyl Halides
    b. Radical Halogenation of Alkanes
    c. Preparation Alkyl Halides from Alcohols
    d. Reaction of Organohalides: Grignard Reagents
    e. Organometallic Coupling Reactions
    f. Oxidation and Reduction of Organic Chemistry
11. Reaction of Alkyl Halides: Nucleophilic Substitution and Elimination
    a. Stereochemistry of Nucleophilic Substitution
    b. The S_N2 (Bimolecular Nucleophilic Substitution) and S_N1 (Unimolecular Nucleophilic Substitution) Reactions
    c. The E2 (Bimolecular Elimination) and E1 (Unimolecular Elimination) Reactions
12. Structure Determination: Mass Spectrometry and Infrared Spectroscopy
    a. Interpreting Mass Spectra
    b. Infrared Spectroscopy of Organic Molecules
13. Structure Determination: Nuclear Magnetic Resonance Spectroscopy
    a. The Nature of NMR (Nuclear Magnetic Resonance) Absorption
    b. 13C NMR Spectroscopy
14. Conjugated Dienes and Ultraviolet Spectroscopy
    a. Molecular Orbitals of Dienes
    b. Kinetic versus Thermodynamic Control of Reactions
    c. The Diels-Alder Cycloaddition Reaction
    d. Ultraviolet Spectroscopy
15. Benzene and Aromaticity
    a. Naming Aromatic Compounds
    b. Aromaticity and 4n + 2 Rule
    c. Pyridines and Pyrrole
    d. Spectra of Aromatic Compounds
16. Chemistry of Benzene

a. Electrophilic Aromatic Substitution
b. Oxidation and Reduction of Benzene
c. Synthesis of Trisubstituted Benzene

Laboratory or Activity Content

1. Introduction, Record Keeping, and Laboratory Safety
2. Technique Training:
   a. Melting point
   b. Recrystallization
   c. Simple Distillation
   d. Fractional Distillaion
   e. Steam Distillation
   f. Extraction
3. Instrumentation Operational Training:
   a. Gas Chromatography and Mass Spectrum
   b. HPLC-High Performance Liquid Chromatography
   c. Infrared Spectroscopy
   d. UV-Spectrophotometer
   e. Polarimeter
   f. Nuclear Magnetic Resonance Spectroscopy-NMR (optional)
4. Synthesis and Mechanisms:
   a. Dehydration of Cyclohexanol from Cyclohexene
   b. Reaction of 1, 3-Cylopentadiene and Maleic Anhydride
   c. Preparation of 1-Bromobutane
   d. Preparation of 2-Chloro-2-Methylbutane
5. Study of Ractivity and Chemical Kinetic of Benzene Realitive Rates of Electrophillic Aromatic Bromination

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
Skills demonstrations
Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Computational homework
Essay exams
Essays
Group projects
Individual projects
Journals
Laboratory activities
Laboratory reports
Oral analysis/critiques
Objective exams
Oral presentations
Projects
Problem-Solving Assignments
Problem-solving exams
Quizzes
Reports/papers
Research papers
Simulations

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
Computer-aided presentations
Collaborative group work
Class activities

Class discussions
Distance Education
Demonstrations
Group discussions
Instructor-guided use of technology
Internet research
Laboratory activities
Lecture
Practica
Small group activities

Describe specific examples of the methods the instructor will use:

- The instructor will give the lecture and use the whiteboard to show how a correct molecular structure should be drawn, including the location of the chemical bonds on the proper atoms.
- The instructor will illustrate the structures, reactions, and mechanisms of electrophilic addition, nucleophilic addition, nucleophilic substitution, elimination, or redox reactions.
- The instructor may provide the links to the videos of the topic lecture or demonstration of lab techniques and some experiments to students for classifying the organic functional group and its corresponding family.

Representative Course Assignments

Writing Assignments

- Students will complete assignments that include structural drawing and IUPAC (International Union of Pure and Applied Chemistry) nomenclature of hydrocarbon compounds.
- Students will write a term paper with the topics related to the optical activity (medicines), gasoline, or pollution caused by organic substances.
- Students will write reactions and mechanisms of hydrocarbon compounds.
- Students will be required to write a pre-lab report in a duplicated lab notebook prior to the scheduled experiment.
- Students will be required to enter the data collected during the lab time, calculate the percent yield, and write a conclusion of each lab work.

Critical Thinking Assignments

- The instructor will lead the discussion, such as "The Art of Organic Synthesis" to illustrate the contribution of modern organic synthesis in medicine, biomedical engineering, synthetic fabrics, and many other products. Each student will be assigned to a specific topic and required to search the internet/library to list the pros and cons (pollution or possible long-term effects to human) of the modern organic synthesis. The results will be either posted on the class discussion board or presented in person.
- Students will use the reaction pattern of a specific molecule to explain the possible mechanism which could cause the formation of by-products.

Reading Assignments

1. Textbook and lab manual covering all facts of organic chemistry and related experiments.
2. Journals related with chemistry, diet, health care; such as Journal of Chemical and Engineering News, published by American Chemical Society; Popular Science
3. Internet; such as www.acs.org (http://www.acs.org), http://ocw.mit.edu/OcwWeb/Chemistry/, www.chemweb.com (http://www.chemweb.com), www.anytimetutor.com (http://www.anytimetutor.com)

Skills Demonstrations

Students should demonstrate safely perform the required chemistry experiments in an in-person lab, such as:

- properly operate a melting point apparatus to measure the melting points of different organic compounds;
- properly set-up boiling point glassware to measure the boiling points of organic compounds;
- properly transfer chemicals from a larger container to a test tube;
- safely transfer organic compounds under the fume hood;
- properly set-up glassware for simple distillation, fractional distillation, and steam distillation.
- safely perform acid-base extraction to separate the mixture of organic acid, base, and a neutral compound.
- properly use a vacuum filtration apparatus to collect the products.
- properly operate the instruments, such as UV, IR, and Polarimeter, in a chemistry lab.
- properly set-up and perform TLC and HPLC experiments to identify the different mixtures.
- safely perform synthesis reactions involving dehydration, Diels-Alder Reactions, S_N1, S_N2, E1, or E2, and substitution of benzene.

Other assignments (if applicable)

- Encourage students to form a study group working together to solve the problems related to additions of alkenes, reaction mechanisms, and interpret IR and NMR spectra.
- Guide students regarding critical thinking about the chemical and physical properties of organic compounds related to the functions of in our life.
- Use the online tools illustrating a molecule in three dimensional way to visualize an optical molecule.
- Help students individually in the instructor's office to show the detail of reaction mechanisms.

Outside Assignments

Representative Outside Assignments

- Students will be required to complete weekly homework and reading assignments from the textbook.
- Students may be required to search the internet to write an essay/discussion with the topics related to their study. The topics of the essay/discussion reflect the discovery in the new virus, new vaccines, new drugs, and the application of new technology in chemistry fields.

Articulation

C-ID Descriptor Number

CHEM 150

Status

Approved

Comparable Courses within the VCCCD

CHEM V12A - General Organic Chemistry I

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

Area F: Ethnic Studies

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type
Textbook

Description
McMurry, John. *Organic Chemistry.* (2016 or latest edition) Cengage Learning. Boston, MA. USA

Resource Type
Textbook

Description
Gilbert, J.C. & Martin, S.F. *Experimental Organic Laboratory-A miniscale and Microscale Appoach. (2015 or latest edition)* Brook/Cole-Cengage Learning. Boston, MA. USA

Resource Type
Other Instructional Materials

Description
Duplicated lab notebook.

Resource Type
Other Instructional Materials

Description
Scientific calculator.

Resource Type
Other Instructional Materials

Description
Molecular model set.

Resource Type
Other Instructional Materials

Description
A box colored pens or pencils.

Resource Type
Other Instructional Materials

Description
Safety goggles.

Distance Education Addendum

Definitions

Distance Education Modalities
Hybrid (51%–99% online)
Hybrid (1%–50% online)
100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.
Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.
Yes

Regular Effective/Substantive Contact

Hybrid (1%–50% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	Regular use of asynchronous discussion boards encourages various types of interaction and critical thinking skills among all course participants. Questions and topics posed will allow students to discuss, compare and contrast, identify, and analyze elements of the course outcomes. Students will be required to respond to one another with substantive comments with the intent of creating a dialog. Other discussion boards may be used for Q&A and general class discussion by students and instructor to facilitate student success and strengthen student learning outcomes.
E-mail	E-mail, class announcements and various learning management system tools such as “Message Students Who” and “Assignment Comments”, will be used to regularly communicate with all students on matters such as clarification of class content, reminders of upcoming assignments and/or course responsibilities, to provide prompt feedback to students on coursework to facilitate student learning outcomes, or to increase the role of an individual educator in the academic lives of a student. Students will be given multiple ways to email instructor through both the learning management system inbox and faculty provided email accounts.
Face to Face (by student request; cannot be required)	The instructor will hold weekly, scheduled office hours either in person or via-web conferencing, for students to be able to meet and discuss course materials or individual progress. Students can request additional in-person or web conferencing meetings with faculty member as needed. Faculty may encourage online students to form “study groups” in person or online.
Other DE (e.g., recorded lectures)	Faculty will use a variety of ADA compliant tools and media integrated within the learning management system to help students reach SLO competency. Tools may include: • Recorded Lectures, Narrated Slides, Screencasts • Instructor created content • OC Online Library Resources • Canvas Peer Review Tool • Canvas Student Groups (Assignments, Discussions) • 3rd Party (Publisher) Tools (MyOpenMath) • Websites and Blogs • Multimedia (YouTube, Films on Demand, 3CMedia, Khan Academy, etc.)
Synchronous Dialog (e.g., online chat)	Instructor will provide a set time each week where they will be available for synchronous chat and be available in the discussion board and can answer questions in live time.
Video Conferencing	Video tools such as ConferZoom can be used to provide live synchronous or asynchronous sessions with students. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session. Recordings of all live sessions will be made available within the LMS. Video Conferences will be used to facilitate SLOs and student-to-student group meetings will also be encouraged.
Telephone	Students can request for instructor to call or vice versa in order to answer one-on-one questions about course material or student progress.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Synchronous Dialog (e.g., online chat)	Synchronous through ConferZoom for the topics related to the course contents. The set-time will be published in the course schedule. The instructor may also provide a set time as office hours each week where she/he will be available for answering questions in live time.

Asynchronous Dialog (e.g., discussion board)	Asynchronous essay/discussion through Canvas related to the course contents. The instructor will use asynchronous discussion boards encourages all students to participate in various types of interaction and critical thinking. Other discussion boards may be used for Q&A and general class discussions by students and instructors to facilitate student success in the course. Except for the midterm and final exam, other course assessments will be conducted through at the asynchronous time, such as upload homework, take a quiz, or conduct simulation experiments.
E-mail	Email/Canvas LMS communication tools will be used frequently to converse with students, such as giving the feedback of uploaded homework and essay, clarifying course contents, reminding the upcoming class events, and regarding the issues related to later homework, grades, absences, etc.
Telephone	Students may request telephone calls for immediate assistant such as registration and grades, etc.
Face to Face (by student request; cannot be required)	Students will be on campus in-person to perform some organic experiments using specific techniques and operate UV and IR instruments. The other face-to-face time with the instructor will be during weekly class meetings, open office hours, and times requested by a student. This time will provide students to discuss and ask questions about the material covered in the course or other concerns in the class, such as individual progress. The instructor will encourage students to form “study groups” online and keep “connected” among students.
Video Conferencing	ConferZoom help sessions scheduled before or after synchronous time. The instructor may also encourage students to form a study group using other media to facilitate student-to-student interactions.
Other DE (e.g., recorded lectures)	The instructor may use a recorded lecture, video, cumulated notes, 3C media, and other external links, to integrate with the course contents. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session.

100% online Modality:

Method of Instruction	**Document typical activities or assignments for each method of instruction**
Asynchronous Dialog (e.g., discussion board)	Asynchronous sessions through Canvas related to the course contents. The instructor will use asynchronous discussion boards encourages all students to participate in various types of interaction and critical thinking. Other discussion boards may be used for Q&A and general class discussions by students and instructors to facilitate student success in the course. Except for the midterm and final exam, other course assessments will be conducted through at the asynchronous time, such as upload homework, take a quiz, or conduct simulation experiments.
E-mail	Email/Canvas LMS communication tools will be used frequently to converse with students, such as giving the feedback of uploaded homework and essay, clarifying course contents, reminding the upcoming class events, and regarding the issues related to later homework, grades, absences, etc.
Face to Face (by student request; cannot be required)	Face to face will be arranged through ConferZoom. The instructor will hold scheduled office hours for students to be able to meet and discuss course materials or individual progress. Students can request additional zoom meetings with the faculty member as needed. Faculty may encourage students to form “study groups” online.
Other DE (e.g., recorded lectures)	The instructor may use a recorded lecture, video, cumulated notes, 3C media, and other external links, such as YouTube, Films on Demand, Khan Academy, etc. to integrate with the course contents. The contents may provide the instructions of glassware set-up, operating common analytic instruments in organic labs, such as gas chromatography and infrared spectrometer, and interpreting the spectra of IR and NMR. ADA compliance will be upheld with Closed Captioning during the session or of the recorded session.

Synchronous Dialog (e.g., online chat)	Synchronous through ConferZoom for the topics related to the course contents. The set-time will be published in the course schedule. The instructor may also provide a set time as office hours each week where she/he will be available for answering questions in live time. The midterms and final exams will be conducted during the synchronous schedule time.
Telephone	Students may request the instructor to call or vice versa in order to answer one-on-one questions about course material or student progress or registration issues.
Video Conferencing	ConferZoom help sessions will be scheduled before or after synchronous time. The instructor may also encourage students to form a study group using video conferences to facilitate student-to-student interactions. Students may request extra asynchronous sessions for a group discussion to work on the class projects or experiment simulations.

Examinations

Hybrid (1%–50% online) Modality
Online
On campus

Hybrid (51%–99% online) Modality
Online
On campus

Primary Minimum Qualification
CHEMISTRY

Review and Approval Dates

Department Chair
09/02/2020

Dean
09/02/2020

Technical Review
09/09/2020

Curriculum Committee
09/09/2020

DTRW-I
MM/DD/YYYY

Curriculum Committee
11/25/2020

Board
MM/DD/YYYY

CCCCO
MM/DD/YYYY

Control Number
CCC000452588

DOE/accreditation approval date
MM/DD/YYYY