

## **Bachelor of Science in Chemistry, Option in Materials Science (120 units)**

This new state-supported program was recommended by the Academic Senate on April 21, 2016 and concurred by the President on May 31, 2016.

### **Program Description**

This option is designed primarily for those interested in careers that involve the chemistry of materials and the study of materials in relation to their applications. It is particularly appropriate for those seeking employment in private industry or government service as well as those students contemplating graduate work in these fields. This option requires approximately 81-87 units in the major, of which 40-44 units are in lower division and 41-43 are in upper division.

All students must achieve at least a 2.0 grade-point average in each of the following: 1. the entire college record, 2. all units attempted at CSULB, 3. all courses in the major, and 4. all upper division courses in the major completed at CSULB.

### **Requirements**

Lower Division:

Either take all of the following:

BIOL 211 Introduction to Evolution and Diversity (4)

Prerequisite/Corequisite: CHEM 111A with a grade of "C" or better.

BIOL 212 Intro to Cell and Molecular Biology (4)

Prerequisites: BIOL 211, CHEM 111A with grades of "C" or better. Prerequisite/Corequisite: CHEM 111B.

NOTE: BIOL 111, 111L, 212, 212L are required if courses were taken prior to catalog year 2010-11.

Or one of the following:

BIOL 200.## General Biology (4)

Prerequisite: GE Foundation requirements.

BIOL 205.## Human Biology (4)

Prerequisites: GE Foundation requirements.

BIOL 207. ## Human Physiology (4)

Prerequisites: GE Foundation requirements.

Take all of the following:

CHEM 111A. General Chemistry (5)

Prerequisites: A passing score on the Chemistry Placement Examination.

Corequisite: MATH 109 or higher.

CHEM 111B. General Chemistry (5)

Prerequisites: CHEM 111A and MATH 113 or 115 or 119A or 122 all with a grade of "C" or better.

CHEM 220A Organic Chemistry I (3)

Prerequisites: CHEM 111B with a grade of "C" or better. Corequisites: CHEM 224 is required for students repeating course. CHEM 223A must be taken concurrently if required by a degree plan.

CHEM 220B Organic Chemistry II (3)

Prerequisites: CHEM 220A with a grade of C or better

Corequisite: CHEM 223B or CHEM 320L except for students who previously earned a "C" or better in CHEM 223B or 320L

MATH 122 Calculus I (4)

Prerequisite: Appropriate MDPT placement or a grade of "C" or better in MATH 111 and 113.

MATH 123 Calculus II (4)

Prerequisite: A grade of "C" or better in MATH 122.

MATH 224 Calculus III (4)

Prerequisite: A grade of "C" or better in MATH 123 or 222.

PHYS 151 Mechanics and Heat (4)

Prerequisite/Corequisite: MATH 122.

PHYS 152 Electricity and Magnetism (4)

Prerequisite: PHYS 151; Prerequisite/Corequisite: MATH 123.

Upper Division:

Take all of the following courses:

CHEM 320L Organic Chemistry Laboratory (2) F, S

Prerequisites: CHEM 220A.

Corequisites: CHEM 220B, except for students who have previously earned a "C" or better in CHEM 320B.

CHEM 331 Inorganic Chemistry (3)

Prerequisites: CHEM 111B with a grade of "C" or better.

CHEM 332 Inorganic Chemistry Lab (2)

Prerequisite/Corequisite: CHEM 331.

CHEM 361 Chemical Communications (3)

Prerequisites: GE Foundation requirement. Students must have scored 11 or higher on the GVAR Placement Examination or completed the necessary portfolio course that is a prerequisite for a GVAR Writing Intensive Capstone. Prerequisite/Corequisite: CHEM 220A.

CHEM 371A Physical Chemistry: Thermodynamics and Kinetics (3)

Prerequisites: CHEM 111B, MATH 123, PHYS 152 (all with a grade of "C" or better).

Prerequisite/Corequisite: MATH 224.

CHEM 371B Physical Chemistry: Quantum Mechanics and Spectroscopy (3)

Prerequisites: CHEM 111B, MATH 123, PHYS 152 (all with a grade of "C" or better).

Prerequisite/Corequisite: MATH 224.

CHEM 373. Physical Chemistry Laboratory (3)

Prerequisites: CHEM 361, CHEM 371A or 377A, and CHEM 371B or 377B, all with a grade of "C" or better.

CHEM 431 Advanced Inorganic Chemistry (3)

Prerequisites: CHEM 331 with a grade of "C" or better.

Prerequisite/Corequisite: CHEM 371B

CHEM 451 Instrumental Methods of Analysis (5)

Prerequisites: PHYS 152, and either CHEM 361 or NSCI 361, and either CHEM 371B or CHEM 377B, all with a grade of "C" or better.

CHEM 461 Chemistry Capstone (1) F,S

Prerequisite: Department consent.

CHEM 496 Undergraduate Directed Research (1-3)

Prerequisite: Consent of instructor.

Take one of the following courses:

CHEM 441A Biological Chemistry (3)

Prerequisites: CHEM 220B and either CHEM 320L or CHEM 223B all with a grade of "C" or better; a biology or microbiology course is recommended.

CHEM 448 Fundamentals of Biological Chemistry (3)

Prerequisites: CHEM 220B or CHEM 227 either with a grade of "C" or better.

Additional Courses Required:

OPTION IN MATERIALS SCIENCE (9 units)

CHEM 385 Materials Science (3)

Prerequisite: CHEM 111A and PHYS 152 and (CHEM 111B or PHYS 320), completion of CHEM 111B is strongly recommended.

CHEM 385L Materials Science Laboratory (2)

Prerequisite: CHEM 111A and PHYS 152 and (CHEM 111B or PHYS 320), completion of CHEM 111B is strongly recommended

CHEM 385C Materials Science Colloquium (1)

Prerequisite: CHEM 111A and PHYS 152 and (CHEM 111B or PHYS 320), completion of CHEM 111B is strongly recommended

CHEM 485 Special Topics in Materials Chemistry (3)

Prerequisite: CHEM 220B and CHEM 331 and CHEM 385 or consent of instructor.

**EFFECTIVE: Fall 2017**

Campus Code: CHEMBS03U1

College: 65

Career: UD

CIP Code: 40.0501

CSU Code: 19051

PS 17-01