

CHEM 81: LEARNERS ENGAGED IN ADVOCATING FOR DIVERSITY IN SCIENCE

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Fall 2022
Units:	4
Hours:	4 lecture per week (48 total per quarter)
Advisory:	BIOL 1A, 40A, 41, or equivalent; ENGL 1A, 1AH, 1S & 1T, or ESLL 26, or equivalent; MATH 17 or Intermediate Algebra or equivalent, completed with a letter grade of "C" or better; not open to students with credit in BIOL 81 or MATH 83.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area VII: Lifelong Learning
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable
Cross-Listed:	BIOL 81 MATH 83

Student Learning Outcomes

- Construct evidence-based interventions to enhance equity and inclusion in the sciences
- Assess their own own identities in relation to science equity and inclusion
- Appraise physiological responses in environments lacking inclusivity
- Compare various social phenomena related to equity and inclusion in the sciences
- Evaluate the current state of equity and inclusion in science and in science education

Description

This course is intended for students interested in equity, diversity, and inclusion in the sciences. Students will explore research on inclusion and diversity in STEM and health science, as well as research on interventions to enhance inclusion and diversity in those fields in higher education contexts. Students will reflect on how their own identities have impacted their experiences in science and develop strategies to promote equity in their future STEM or health science careers. Through service learning, students will co-author culturally relevant curricular materials that will expand faculty capacity to connect students' personal lives to course content. Materials developed by students will be used and assessed in STEM and/or health science courses at Foothill College, local middle schools, and/or local high schools, and will be made available for a nationwide audience of teachers and professors.

Course Objectives

The student will be able to:

1. Evaluate the current state of equity and inclusion in science and in science education
2. Compare various social phenomena related to equity and inclusion in the sciences
3. Appraise physiological responses in environments lacking inclusivity
4. Construct evidence-based interventions to enhance equity and inclusion in the sciences
5. Assess their own own identities in relation to science equity and inclusion

Course Content

1. Current state of equity and inclusion in science and in science education
 - a. Measurement of equity and diversity in the sciences
 - i. Equity gaps
 - b. Significance of diversity in STEM and health science
 - i. Impacts of diversity on research quality/outcomes
 - ii. Impacts of diversity on health outcomes/health disparities
2. Social phenomena related to equity and inclusion in the sciences
 - a. Implicit bias
 - b. Deficit models
 - c. Stereotype threat
 - d. Sense of belonging
 - e. Imposter syndrome
 - f. Science identity
 - g. Self-efficacy
3. Physiological responses in environments lacking inclusivity
 - a. Endocrine responses
 - b. Neurological responses
4. Evidence-based interventions to enhance equity and inclusion in the sciences
 - a. Inclusive teaching and learning strategies
 - b. Role modeling
 - c. Possible selves
 - d. Scientific teaching
 - e. Strategies for the assessment of interventions
5. Understanding one's own identities in relation to science equity and inclusion
 - a. Assessment of one's own intersectional identities
 - b. Assessment of one's own strategies navigating within and disrupting traditional science environments
 - c. Exploration of strategies for monitoring equity and promoting inclusion in academic and professional settings

Lab Content

Not applicable.

Special Facilities and/or Equipment

1. Multimedia lecture room
2. Student and instructional computers with internet access

Method(s) of Evaluation

Self, peer, and instructor evaluation of educational interventions developed by students

Written assignments requiring analysis of academic articles or book chapters
 Reflective journals
 Participation in discussions
 Exams consisting of subjective and objective items
 Evaluation of case studies

Method(s) of Instruction

Lecture
 Cooperative learning activities
 Discussions

Representative Text(s) and Other Materials

No textbooks exist for this one-of-a-kind a course, so course readings rely on primary sources from the research literature. This means students often read classic papers in the field that were authored more than five years ago. That said, numerous readings from within the last five years are also included.

Weekly academic articles or book chapters on equity and inclusion in the sciences, supplemented at instructor's discretion with additional readings or course reader.

The following are examples of suggested books for the course:

Palmer, Robert T., and J. Luke Wood. Community Colleges and STEM: Examining Underrepresented Racial and Ethnic Minorities. 2013.
 Steele, Claude. Whistling Vivaldi: How Stereotypes Affect Us and What We Can Do. 2011.
 Wood, J.L., and R.T. Palmer, eds. STEM Models of Success: Programs, Policies, and Practices in the Community College. 2014.

The following are examples of suggested academic articles for the course:

Schinske J., H. Perkins, A. Snyder, and M. Wyr. "Scientist Spotlight Homework Assignments Shift Students' Stereotypes of Scientists and Enhance Science Identity in a Diverse Introductory Science Class." CBE - Life Sciences Education. 15(3) (Fall 2016): ar47.
 Tanner, K. "Structure Matters: Twenty-One Teaching Strategies to Promote Student Engagement and Cultivate Classroom Equity." CBE - Life Sciences Education. 12(3) (Fall 2013): 322-331.
 Miriti, M. N. "Nature in the eye of the beholder: A case study for cultural humility as a strategy to broaden participation in STEM." Education Sciences. 9(4) (2019): 291.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Reading and annotation of academic articles and book chapters on STEM equity
2. Journal responses to assigned readings
3. Composition of biographical vignettes on diverse scientists
4. Composition of educational interventions aimed at enhancing STEM equity and inclusion

Discipline(s)

Biological Sciences or Chemistry or Mathematics