CHEM 81: LEARNERS ENGAGED IN ADVOCATING FOR DIVERSITY IN STEM

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2025
Units:	4
Hours:	4 lecture per week (48 total per quarter)
Advisory:	BIOL 1A, 40A, 41, or equivalent; ENGL 1A or 1AH or ESLL 26 or equivalent; not open to students with credit in BIOL 81, C S 81, or MATH 83.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area 7: Lifelong Learning
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable
Cross-Listed:	BIOL 81 C S 81 MATH 83

Student Learning Outcomes

- Construct evidence-based interventions to enhance equity and inclusion in the sciences
- Assess their 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 STEM and in STEM education
2. Compare various social phenomena related to equity and inclusion in STEM
3. Appraise physiological and psychological responses in environments lacking inclusivity
4. Construct evidence-based interventions to enhance equity and inclusion in STEM fields
5. Assess their own identities in relation to STEM equity and inclusion

Course Content

1. Current state of equity and inclusion in STEM and in STEM education
    a. Measurement of equity and diversity in STEM fields
        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
        iii. Impacts of diversity on the quality of STEM field products
        iv. Impacts of diversity on STEM field workers and users
2. Social phenomena related to equity and inclusion in STEM
    a. Implicit bias
    b. Deficit models
    c. Stereotype threat
    d. Sense of belonging
    e. Imposter syndrome
    f. Societal power relations
    g. Student relationships
    h. STEM identity
    i. 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 STEM
    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 STEM equity and inclusion
    a. Assessment of one's own intersectional identities
    b. Assessment of one's own strategies navigating within and disrupting traditional STEM 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
3. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

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

Methods of Instruction may include but are not limited to the following:

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. Wyer. "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.

Vakil, S., and M.M.K. de Royston. "Exploring Politicized Trust in a Racially Diverse Computer Science Classroom." Race Ethnicity and Education. 22(4) (2019): 545-567. https://doi.org/10.1080/13613324.2019.1592846

Vakil, Sepehr. "'I've Always Been Scared That Someday I'm Going to Sell Out': Exploring the relationship between Political Identity and Learning in Computer Science Education." Cognition and Instruction. 38:2 (2020): 87-115, DOI: 10.1080/07370008.2020.1730374.

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 or Computer Science