

time-consuming tests of hypotheses and experimental caveats, trade-offs, and options. Taught in a case-study approach, teams consist of students with engineering, biology, computational sciences, and chemical backgrounds. Teams generate an interdisciplinary chemical genomic research project. May be taken Satisfactory (S) or No Credit (NC) with consent of instructor and graduate advisor. Cross-listed with BIEN 220. **Schultz**

**CMDB 230. Molecular Plant-Microbial Interactions (3)** Lecture, 2 hours; discussion, 1 hour. Prerequisite(s): BCH 100, BIOL 120/MCBL 120/PLPA 120, or equivalents. A study of the physiology of host-pathogen interactions with emphasis on the metabolism of diseased plants, nature of pathogenicity, and defense mechanisms in plants. Cross-listed with BPSC 230, GEN 230, and PLPA 230. **Eulgem, Jin**

**CMDB 250. Special Topics in Cell, Molecular, and Developmental Biology (1-2) F, W, S** Seminar, 1-2 hours. Prerequisite(s): graduate standing. Oral presentations and intensive small-group discussion of selected topics in the area of special competence of each participant. Content emphasizes recent advances in the topic area and varies accordingly. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**CMDB 257. Seminar in Cell, Molecular, and Developmental Biology (1) F** Seminar, 1 hour. Prerequisite(s): graduate standing. Lectures by visiting scholars on current research in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**CMDB 258. Graduate Student Seminar in Cell, Molecular, and Developmental Biology (1) S** one 1-day seminar. Prerequisite(s): graduate standing in Cell, Molecular, and Developmental Biology. An interdisciplinary seminar consisting of student presentations of original research and discussion of current research topics in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**CMDB 281 (E-Z). Seminar in Cell Development, Structure, and Function (2) F, W, S** Seminar, 2 hours. Prerequisite(s): graduate standing; consent of instructor. Lectures, discussions, and demonstrations by students, faculty, and invited scholars on selected subjects concerned with the principles of cell development, structure, and function. E. Cell Biology; F. Molecular Biology; G. Developmental Biology. Segments are repeatable. Cross-listed with BIOL 281 (E-Z).

**CMDB 290. Directed Studies (1-6)** Individual study, 3-18 hours. Prerequisite(s): graduate standing; consent of instructor and graduate advisor. Individual study, directed by a faculty member, of specially selected topics in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**CMDB 292. Concurrent Analytical Studies in Cell, Molecular, and Developmental Biology (2-4)** Outside research, 6-12 hours. Prerequisite(s): graduate standing. Elected concurrently with an appropriate undergraduate course, but on an individual basis. Students are required to submit one or more graduate papers based on research or criticism related to the course. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**CMDB 297. Directed Research (1-6)** Outside research, 3-18 hours. Prerequisite(s): graduate standing. Research and experimental studies conducted under the supervision of a faculty member on specially

selected topics in cell, molecular, and developmental biology. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

**CMDB 299. Research for the Thesis or Dissertation (1-12)** Outside research, 3-36 hours. Prerequisite(s): graduate standing. Original research in an area selected for the advanced degree. Graded Satisfactory (S) or No Credit (NC). Course is repeatable.

## Professional Course

**CMDB 301. Teaching of Cell, Molecular, and Developmental Biology at the College Level (1)** Seminar, 1 hour. Prerequisite(s): graduate standing. A program of weekly meetings and individual formative evaluations required of new teaching assistants. Covers instructional methods and classroom/section activities most suitable for teaching Biology. Conducted by the Teaching Assistant Development Program. Graded Satisfactory (S) or No Credit (NC).

## CHASS F1RST

**Subject abbreviation: CHFY**  
**College of Humanities, Arts, and Social Sciences**

Geoff Cohen Ph.D., Academic Coordinator  
1609 Humanities and Social Sciences  
(951) 827-7831; [Chassf1rst.ucr.edu](http://Chassf1rst.ucr.edu)

### Committee in Charge

Steven Brint, Ph.D. (Sociology)  
Tracy Fisher, Ph.D (Women's Studies)  
Michael Jayme, M.F.A. (Creative Writing)  
Vorris Nunly, Ph.D. (English)  
Georgia Warnke, Ph.D. (Philosophy)

CHASS F1RST provides first-year students with courses designed to help with the transition to UCR, a major research university setting, which involves high academic standards and rigorous course work. The courses offer students the resources and tools necessary to excel in the first year and beyond. They take place within a "learning-communities" framework so that students can successfully integrate into campus life.

## Lower-Division Courses

**CHFY 001 (E-Z). CHASS F1RST Humanities Course (5)** Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): first-year freshman standing in the College of Humanities, Arts, and Social Sciences. A College of Humanities, Arts, and Social Sciences course designed to introduce students to the humanities and to academic life. Segments of CHFY 001 (E-Z), CHFY 002 (E-Z), and/or CHFY 003 (E-Z) may be thematically and pedagogically linked.

**CHFY 002 (E-Z). CHASS F1RST Fine Arts Course (5)** Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): first-year freshman standing in the College of Humanities, Arts, and Social Sciences. A College of Humanities, Arts, and Social Sciences course designed to introduce students to the fine arts and to academic life. Segments of CHFY 001 (E-Z), CHFY 002 (E-Z), and/or CHFY 003 (E-Z) may be thematically and pedagogically linked.

**CHFY 003 (E-Z). CHASS F1RST Social Science Course (5)** Lecture, 3 hours; assignment of the remaining hours varies from segment to segment. Prerequisite(s): first-year freshman standing in the College of Humanities, Arts, and Social Sciences. A College of Humanities, Arts, and Social Sciences course designed to introduce students to the social sciences and to academic life. Segments of CHFY 001 (E-Z), CHFY 002 (E-Z), and/or CHFY 003 (E-Z) may be thematically and pedagogically linked.

**CHFY 010. CHASS Gateway Lecture Course (5)** Lecture, 3 hours; discussion, 1 hour; workshop, 1 hour. Prerequisite(s): first-year freshman standing in the College of Humanities, Arts, and Social Sciences. A College of Humanities, Arts, and Social Sciences course designed to introduce freshmen to the College's annual theme.

## Chemical and Environmental Engineering

**Subject abbreviations: CEE, CHE, ENVE**  
**The Marlan and Rosemary Bourns**  
**College of Engineering**

Yushan Yan, Ph.D., Chair  
Department Office, A242 Bourns Hall  
(951) 827-2859; [www.cee.ucr.edu](http://www.cee.ucr.edu)

### Professors

Wilfred Chen, Ph.D., *President's Chair*  
Robert Haddon, Ph.D. (Chemistry/Chemical and Environmental Engineering)  
Mark R. Matsumoto, Ph.D.  
Ashok K. Mulchandani, Ph.D.  
Joseph M. Norbeck, Ph.D. *W. Ruel Johnson Professor*  
Jianzhong Wu, Ph.D.  
Charles Wyman, Ph.D., *Ford Motor Company Chair in Environmental Engineering*  
Yushan Yan, Ph.D.

### Associate Professors

David R. Cocker, Ph.D.  
Nosang Myung, Ph.D.

### Assistant Professors

Akua A. Asa-Awuku, Ph.D.  
David Cwiertrny, Ph.D.  
David Kisailus, Ph.D.  
Sharon Walker, Ph.D., *John Babbage Chair in Environmental Engineering*  
\*\*

### Adjunct Professors

Marc A. Deshusses, Ph.D.  
Rex Hjelm, Ph.D.  
Ashutosh Sharma, Ph.D.  
Wayne Miller, Ph.D.

### Cooperating Faculty

Christopher Amrhein, Ph.D. (Environmental Sciences)  
Matthew J. Barth, Ph.D. (Electrical Engineering)  
John Y.-J. Shyy, Ph.D. (Biomedical Sciences)  
Paul J. Ziemann, Ph.D. (Environmental Sciences)