regular or special education classrooms in middle grades. Current conceptions of the middle-grades curriculum within an emphasis on social, biological, and physical sciences. Effective teaching methods. Offered irregularly.

306A. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —F (F)

306B. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —W (W)

306C. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —S (S)

307. Methods in Elementary Science (2)
Lecture/discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program. Principles, procedures, and materials for teaching the biological and physical sciences in elementary schools. —F (F) Patterson, Passmore, Trexler

308. Methods in Elementary Social Studies (2)
Lecture/discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program. Principles, procedures, and materials for teaching history and the social sciences in elementary schools. —W (W) Rosa

309. The Teaching of Mathematics, K–9 (3)
Lecture/discussion—3 hours. Prerequisite: acceptance in Teacher Credential Program. Mathematics curriculum and teaching methods for K–9 reflecting the needs of California’s diverse student populations. —W (W) Mendle

322A. Pedagogical Preparation for Secondary Social Science I (3)
Lecture/discussion—1 hour. Prerequisite: acceptance in Teacher Credential Program. Introduction to teaching methods and curriculum approaches for secondary social science teaching. State and national curriculum standards; application of learning theory to effective instruction; interdisciplinary teaching and active learning approaches; effective teaching strategies for English Learners. —F (F)

322B. Pedagogical Preparation for Secondary Social Science II (3)
Lecture/discussion—1 hour; discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program. Introduction and teaching methods and curriculum approaches for secondary social science teaching. Interdisciplinary approaches to teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values; student assessment and evaluation. —W (W) Rosa

323A. Physical Science in the Secondary School (3)
Laboratory/discussion—2 hours; discussion/laboratory—1 hour. Prerequisite: acceptance in Teacher Credential Program. Activity-based overview of concepts and processes in secondary school physical sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning. —F (F) Passmore, Pomery

323B. Life Sciences in the Secondary School (3)
Laboratory/discussion—2 hours; discussion/laboratory—1 hour. Prerequisite: acceptance in Teacher Credential Program. Activity-based overview of concepts and processes in secondary school biology and life sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning, and issues. —W (W) Passmore, Pomery

324A. Methods and Technology in Secondary Mathematics I (4)
Lecture/discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Introduction to methods and curriculum for teaching mathematics at the secondary level. Introduction to applications of computer technology as instructional, intellectual, and communication tools for mathematics teachers. —F (F) Wallace

324B. Methods in Secondary Mathematics II (3)
Lecture/discussion—3 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Expansion of methods and curriculum for teaching mathematics at the secondary level. Intermediate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching. —W (W) Wallace

325. Research and Methods in Secondary English Language Arts (4)
Discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Research on teaching and learning in the language arts. Principles, procedures and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and linguistically diverse populations. —F (F) Holmes

326. Teaching Language Minority Students in Secondary Schools: Methods and Research (4)
Seminar—3 hours; fieldwork—3 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Research on principles, procedures and curricula for teaching discipline-specific concepts to language-minority students in secondary schools. Second-language acquisition principles and instructional strategies. Offered irregularly.

327A. Teaching Methods for Secondary Foreign Language/Spanish, Part I (3)
Lecture—3 hours. Prerequisite: acceptance in Teacher Credential Program. Introduction to methods for teaching Spanish as a foreign and a heritage language in secondary schools. State and National Standards. Theories on second language acquisition. Lesson plans. Effective teaching strategies and classroom management. —W (W) Lightfoot, Passmore, Trexler

327B. Teaching Methods for Secondary Foreign Language/Spanish, Part II (3)
Lecture—3 hours. Prerequisite: acceptance in Teacher Credential Program. Continuation to methods for teaching Spanish as a foreign and a heritage language in secondary schools. Research and practice on foreign and heritage language teaching. Expansion of effective teaching strategies and classroom management. Open to Graduate Teaching Credential students. Offered irregularly.

398. Group Study (1-5)
(S/U grading only)

399. Individual Study (1-5)
(S/U grading only)
Endocrinology and Metabolism

See Internal Medicine (IMD), on page 437.

Engineering

(College of Engineering)
Jennifer Sinclair Curtis, Ph.D., Dean
S. Felix Wu, Ph.D., Associate Dean—Academic Personnel and Planning
Jean S. VanderGheynst, Ph.D., Associate Dean—Research and Graduate Studies
James A. Schao Ph.D., Associate Dean—Undergraduate Studies
C.P. (Case) van Dam, D. Engr., Associate Dean—Facilities and Capital Planning
Bruce White, Ph.D., Executive Associate Dean

College Office. 1042 Kemper Hall
530-752-7642;
http://engineering.ucdavis.edu
http://www.facebook.com/UCDEngineering

Undergraduate Study

The college has eight departments:
Biological and Agricultural Engineering
Biomedical Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science Engineering
Electrical and Computer Engineering
Materials Science and Engineering
Mechanical and Aerospace Engineering

Graduate Study
Graduate degrees (M.S and Ph.D.) are offered in the following engineering disciplines:
Biological Systems Engineering
Biomedical Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science
Electrical and Computer Engineering
Materials Science and Engineering
Mechanical and Aerospace Engineering
Transportation Technology and Policy

The Major Programs
Eleven majors, leading to the B.S. degree, are open to students:
Aerospace Science & Engineering
Biochemical Engineering
Biological Systems Engineering
Biomedical Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Computer Science and Engineering
Electrical Engineering
Materials Science and Engineering
Mechanical Engineering

Minor Programs
The College of Engineering offers nine undergraduate minors:
Biomedical Engineering (Department of Biomedical Engineering)
Computational Biology (Department of Computer Science)
Construction Engineering and Management (Department of Civil and Environmental Engineering)
Electrical Engineering (Department of Electrical and Computer Engineering)
Energy Science and Technology (Department of Biological and Agricultural Engineering)
Energy Policy (Department of Biological and Agricultural Engineering)
Energy Efficiency (Department of Biological and Agricultural Engineering)
Materials Science (Department of Materials Science and Engineering)
Sustainability in the Built Environment (Department of Civil and Environmental Engineering)

Courses in Engineering (ENG)
Students are encouraged to closely adhere to all prerequisite requirements. The instructor is author-
rized to drop students from a course for which stated prerequisites have not been completed.

Lower Division

1. Introduction to Engineering (1)
Lecture—1 hour. Open to first year students only. Introduction to the role of engineers in our acquisition and development of engineering knowledge, the differences and similarities among engineering fields, and the work ethic and skills required for engineering. (F,SP grading only.) GE credit. SE — F. (F) Schoaf

2. Creativity and Entrepreneurship for Engineers (3)
Discussion—3 hours. Introduction to entrepreneurial thinking from an engineer’s perspective. Focus on identifying entrepreneurial opportunities, developing prototypes, and generating business models. Empha-
sis on developing a creative and entrepreneurial mindset. GE credit. SciEng 3, SocSci 103A or SS 103B.

4. Engineering Graphics in Design (3)
Lecture—2 hours. laboratory—3 hours. Engineering design, descriptive geometry, pictorial sketching, computer-aided graphics, and their application in the solution of engineering problems. GE credit. SciEng 100, SS 103A.

6. Engineering Problem Solving (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A, 17A or 21A, C- or above; Math-
ematics 168, 176 or 218, C or above (may be taken concurrently). Methodology for solving en-

9. Linear Algebra (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A, 17A or 21A, C- or above. GE credit. SciEng 100, SS 103A.

10. The Science Behind the Technology in Our Lives (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Understanding of how the technol-
ogy in our lives works using only basic concepts and rudimentary mathematics. GE credit. SciEng or SocSci, Wt 1 SE or SS — F. (F, W, WJ) Schoaf, Pathik

12. Engineering Research Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Understanding of how the technol-

15. Introduction to Engineering (4)
Lecture—1 hour. Prerequisite: Participation in the MESA Engineering Program or consent of instructor. Designed to broaden student’s understanding of the engineering profession, its methods, principles, design and development process, career opportunities, and professional resources. Offered irregularly. GE credit. SciEng 3, SocSci 103A.

17. Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 22A (C- or better recommended); Mathematics 22B (C- or better recommended) may be taken concurrently; Physics 9C or 9HD (C- or bet-

19. Introduction to Space Exploration: Understanding the Technological and Environmental Challenges to Our Exploration of the Solar System (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school level Algebra, Geometry, General Science (Physics and Chemistry). Introductory overview of the space environment. Discussion of space explo-
ration technology including propulsion, orbital mechanics, and spacecraft engineering. Offered irregularly. GE credit. SciEng 3, SS 103B.