

# REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN ENGINEERING

(Accredited by the Accreditation Board for Engineering and Technology)

## COLLEGE OF ENGINEERING THE UNIVERSITY OF OKLAHOMA

### GENERAL REQUIREMENTS

Total Credit Hours: ..... 128 •

**Minimum Retention/Graduation Grade Point Averages:**

Overall - Combined and OU ..... **2.00**

Major - Combined and OU ..... **2.00**

Curriculum - Combined and OU ..... **2.00**

A minimum grade of C is required for each course in the curriculum.

Basic Curriculum ❖

**0901A**  
Bachelor of Science  
in Engineering

For Students Entering the  
Oklahoma State System  
for Higher Education:  
**Summer 2000 through  
Spring 2001**

Year	FIRST SEMESTER	Hours	SECOND SEMESTER	Hours
<b>FRESHMAN</b>	<b>ENGL 1113</b> , Prin. of English Composition (Core I)	3	<b>ENGL 1213</b> , Prin. of English Composition (Core I)	3
	<b>CHEM 1315</b> , General Chemistry (Core II)	5	<b>MATH 2423</b> , Calculus & Analytic Geometry II (Core I)	3
	<b>MATH 1823</b> , Calculus & Analytic Geometry I (Core I)	3	<b>PHYS 2514</b> , General Physics for Engineering & Science Majors (Core II)	4
	<b>ENGR 1112</b> , Intro. to Engineering	2	<b>P SC 1113</b> , American Federal Government (Core III)	3
	<b>HIST 1483</b> , U.S., 1492-1865, <b>or</b> <b>1493</b> , U.S., 1865-Present (Core IV)	3	<b>ENGR 1213</b> , Graphics & Design	3
	<b>TOTAL CREDIT HOURS</b>	<b>16</b>	<b>TOTAL CREDIT HOURS</b>	<b>16</b>
<b>SOPHOMORE</b>	<b>MATH 2433</b> , Calculus & Analytic Geometry III	3	<b>MATH 2443</b> , Calculus & Analytic Geometry IV	3
	<b>PHYS 2524</b> , General Physics for Engineering & Science Majors	4	<b>MATH 3113</b> , Introduction to Ordinary Differential Equations	3
	<b>ENGR 2313</b> , Structure & Properties of Materials	3	<b>ENGR 1001</b> , Engineering Computing	1
	<b>ENGR 2113</b> , Rigid Body Mechanics	3	<b>ENGR 2153</b> , Strength of Materials	3
	‡Basic Science Elective	3	†Approved Elective, Core III: Social Science	3
	<b>TOTAL CREDIT HOURS</b>	<b>16</b>	<b>TOTAL CREDIT HOURS</b>	<b>16</b>
<b>JUNIOR</b>	<b>ENGR 2613</b> , Electrical Science	3	§Elective	3
	<b>ENGR 3223</b> , Fluid Mechanics	3	§Elective	3
	<b>ENGR 3723</b> , Numerical Methods for Engineering Computations	3	§Elective	3
	§Elective	3	§Elective	3
	†Approved Elective, Core IV: Artistic Forms	3	§Elective	3
	<b>TOTAL CREDIT HOURS</b>	<b>15</b>	<b>TOTAL CREDIT HOURS</b>	<b>18</b>
<b>SENIOR</b>	§Elective	3	<b>ENGR</b> Senior Capstone	3
	§Elective	3	Advanced Math Elective	3
	§Elective	3	§Electives	10
	§Elective	3		
	†Approved Elective, Core IV: Non-Western Culture	3		
	<b>TOTAL CREDIT HOURS</b>	<b>15</b>	<b>TOTAL CREDIT HOURS</b>	<b>16</b>

❖ This program is for highly motivated and clearly focused students who wish to work with a faculty member to develop an individualized program. Students interested in this extremely challenging opportunity should see an adviser in the Koch Advising Center, CEC 104.

Courses designated as Core I, II, III or IV are part of the General Education curriculum. Students must complete a minimum of 40 hours of General Education courses, chosen from the approved list.

†To be chosen from the University-Wide General Education Approved Course List. Six of these 12 hours must be upper-division (3000-4000). See list in the Class Schedule.

In the College of Engineering, in order to progress in your curriculum, and as a specific graduation requirement, a grade of C or better is required in each course in the curriculum. Please refer to the General Catalog for additional enrollment limitations.

Students should read the College of Engineering Scholastic Regulations which are posted on the Advising Bulletin Board across from CEC 104.

Students must successfully complete prerequisite courses (with a minimum C grade) before proceeding to the next course.

•Two college-level courses in a single foreign language are required; this may be satisfied by successful completion of 2 years in a single foreign language in high school. Students who must take foreign language at the University will have an additional 6-10 hours of coursework.

§Advanced program electives must be developed with assistance of the faculty adviser. (See Koch Advising Center for questions.)

‡Any mathematics, physics, or chemistry course taken beyond PHYS 2524 and CHEM 1315, or a course in geology.

## Engineering—Basic Curriculum—0901A—Page 2

Each student should, with the advice and approval of his/her faculty adviser, plan a program of 49 credit hours of advanced courses in engineering, science and related topics. This program of courses should provide a cohesive coverage of selected elements of the spectrum of contemporary engineering concerns with a depth and breadth of coverage appropriate to the requirements of an accredited basic professional engineering curriculum. (See Planning Addendum.)

### SPECIFIED ELECTIVES

One course in advanced mathematics beyond Math 3113.

One course in modern physics or other basic science.

### ENGINEERING ELECTIVES

In addition to those courses in the basic curriculum, courses should be selected which provide 8 credits of engineering science and 15 credits of engineering design. Two of these courses must involve engineering laboratory experience. A complete list of courses is available from the advisers in the Koch Advising Center, CEC 104.

### SENIOR CAPSTONE ELECTIVE

Selection of the engineering electives should fulfill the prerequisite requirements for completion of a designated senior capstone course. Each department within the college has developed a senior capstone course for students within its discipline.

### ADDITIONAL ELECTIVES

These electives contribute to the program to give a total of 49 hours of elective credit. Appropriate courses include additional science or mathematics and professional development courses. Such development courses typically include technical writing, public speaking, management, economics, and/or business ethics.

## COURSES IN CHEMISTRY AND BIOCHEMISTRY (CHEM)

**1315 General Chemistry.** Prerequisite: Mathematics 1503 or 1643, or math ACT equal to or greater than 23. First of a two-semester sequence in general chemistry. Topics covered: basic measurement, gas laws and changes in state, stoichiometry, atomic theory, electron configuration, periodicity, bonding, molecular structure and thermochemistry. **Laboratory** (F, Sp, Su)

## COURSES IN ENGINEERING (ENGR)

**1001 Engineering Computing.** Prerequisite: Mathematics 1823 or concurrent enrollment. Introduction to computer programming and University computing facilities; program design and development; computer application exercises in engineering. (F, Sp, Su)

**1112 Introduction to Engineering.** Prerequisite: Mathematics 1523. Engineering fundamentals/problem solving, (principles of mechanics, energy balances, simple circuits), graphics, specifications, ethics, contracts, introduction to the engineering library. (F, Sp, Su)

**1213 Graphics and Design.** Drafting, blueprint reading, orthographic projection, sketching and the graphical representation of engineering data. Students will carry out design projects related to their fields of specialization. **Laboratory** (F, Sp)

**2113 Rigid Body Mechanics.** Prerequisite: 1112, Physics 2514 and Mathematics 2433 or concurrent enrollment in 2433. Vector representation of forces and moments; general three-dimensional theorems of statics; free bodies; two- and three-dimensional statically determinate frames; centroids and moments of inertia of areas. Absolute motion of a particle; motion of rigid bodies; rotating axes and the Coriolis component of acceleration; Newton's laws applied to translating and rotating rigid bodies; principles of work and energy and impulse and momentum in translation and rotation; moments of inertia of masses. (F, Sp, Su)

**2153 Strength of Materials.** Prerequisite: 2113. Elementary elasticity and Hooke's law; Poisson's ratio; solution of elementary one- and two-dimensional statically indeterminate problems; stresses and strains due to temperature changes; stresses induced by direct loading, bending and shear; deflection of beams; area-moment and moment distribution; combined stresses; structural members of two materials; columns. (F, Sp)

**2213 Thermodynamics.** Prerequisite: 1112, Mathematics 2433 and Physics 2524 or concurrent enrollment. First and second laws of thermodynamics are developed and applied to the solution of problems from a variety of engineering fields. Extensive use is made of partial differential calculus to interrelate the thermodynamic functions. (F, Sp, Su)

**2313 Structure and Properties of Materials.** Prerequisite: 1112, Chemistry 1315 and concurrent enrollment in Physics 2524. The behavior of materials under various conditions and environments is correlated to atomic and molecular structure and bonding. (F, Sp)

**2613 Electrical Science.** Prerequisite: 1112, Mathematics 2423; Physics 2524 or concurrent enrollment. Formulation and solution of circuit equations, network theorems, sinusoidal steady-state analysis, simple transients. (F, Sp, Su)

**3223 Fluid Mechanics.** Prerequisite: 2213, Mathematics 2433; concurrent enrollment in 2113 and Mathematics 3113. Coverage of the fundamentals of fluid statics and dynamics. Formulation of the equation of fluid flow, i.e., Navier Stokes Equations, Eulers Equations, Bernoulli Equations, etc. and their application. Examples of ideal fluid flow and viscous fluid flow, such as flow in open and closed conduits. (F, Sp, Su)

**†G3723 Numerical Methods for Engineering Computation.** Prerequisite: 1112, 1001 or Computer Science 1313 or 1323, and Mathematics 3113. Basic methods for obtaining numerical solutions with a digital computer. Included are methods for the solution of algebraic and transcendental equations, simultaneous linear equations, ordinary and partial differential equations, and curve fitting techniques. The methods are compared with respect to computational efficiency and accuracy. (F, Sp, Su)

## COURSES IN MATHEMATICS (MATH)

**1823 Calculus and Analytic Geometry I.** Prerequisite: 1523 at OU, or satisfactory score on the placement test, or satisfactory score on the ACT/SAT. Topics covered include equations of straight lines; conic sections; functions, limits and continuity; differentiation; maximum-minimum theory and curve sketching. A student may not receive credit for this course and 1743. (F, Sp, Su)

**2423 Calculus and Analytic Geometry II.** Prerequisite: 1823. Integration and its applications; the calculus of transcendental functions; techniques of integration; and the introduction to differential equations. A student may not receive credit for this course and 2123. (F, Sp, Su)

**2433 Calculus and Analytic Geometry III.** Prerequisite: 2423. Polar coordinates, parametric equations, sequences, infinite series, vector analysis. (F, Sp, Su)

**2443 Calculus and Analytic Geometry IV.** Prerequisite: 2433. Vector calculus; functions of several variables; partial derivatives; gradients, extreme values and differentials of multivariate functions; multiple integrals; line and surface integrals. (F, Sp, Su)

**†G3113 Introduction to Ordinary Differential Equations.** Prerequisite: 2443 or concurrent enrollment. Duplicates two hours of 3413. First order ordinary differential equations, linear differential equations with constant coefficients, Laplace transformations, power-series solutions of differential equations, Bessel functions. (F, Sp, Su)

## COURSES IN PHYSICS (PHYS)

**2514 General Physics for Engineering and Science Majors.** Prerequisite: Mathematics 1823. Not open to students with credit in 1205. Vectors, kinematics and dynamics of particles, work and energy systems of particles, rotational kinematics and dynamics, oscillations, gravitation, fluid mechanics, waves. (F, Sp, Su)

**2524 General Physics for Engineering and Science Majors.** Prerequisite: 2514 and Mathematics 2423. Not open to students with credit in 1215. Temperature, heat, thermodynamics, electricity, magnetism, optics. (F, Sp, Su)