REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN ENGINEERING

(Accredited by the Accreditation Board for Engineering and Technology)

COLLEGE OF ENGINEERING
THE UNIVERSITY OF OKLAHOMA

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

GENERAL REQUIREMENTS
Total Credit Hours . . . . 134•
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.

Pre-Architecture Option

0901F
Bachelor of Science in Engineering

Year	FIRST SEMESTER	Hours	SECOND SEMESTER	Hours
FRESHMAN	ENGL **1113**, Prin. of English Composition (Core I) CHEM **1315**, General Chemistry (Core II) MATH **1823**, Calculus & Analytic Geometry I (Core I) ENGR **1112**, Intro. to Engineering EN D **1011**, Intro. to the Built Environment EN D **1511**, Studies in Visual Acuity	3 5 3 2 1 1	ENGL **1213**, Prin. of English Composition (Core I) MATH **2423**, Calculus & Analytic Geometry II (Core I) PHYS **2514**, General Physics for Engineering & Science Majors (Core II) EN D **1133**, Graphics I EN D **1524**, Basic Design I	3 3 4 3 4
	TOTAL CREDIT HOURS	**15**	**TOTAL CREDIT HOURS**	**17**
SOPHOMORE	MATH **2433**, Calculus & Analytic Geometry III PHYS **2524**, General Physics for Engineering & Science Majors ENGR **2113**, Rigid Body Mechanics EN D **2143**, Graphics II EN D **2534**, Basic Design II	3 4 3 3 4	MATH **2443**, Calculus & Analytic Geometry IV ENGR **2153**, Strength of Materials ENGR **1001,** Engineering Computing ENGR **2213**, Thermodynamics ARCH **2544**, Architectural Design/Human Factors C E **3403**, Macromeritics	3 3 1 3 4 3
	TOTAL CREDIT HOURS	**17**	**TOTAL CREDIT HOURS**	**17**
JUNIOR	MATH **3113**, Introduction to Ordinary Differential Equations ENGR **3223**, Fluid Mechanics C E **2553**, Engineering Surveying C E **3414**, Structural Analysis I EN D **2413**, History of the Built Environment I †Approved Elective: Social Science (Core III)	3 3 3 4 3 3	ENGR **2613**, Electrical Science ARCH **3565**, Architectural Design/Human Factors AME **3173,** Heat Transfer EN D **2423**, History of the Built Environment II †Approved Elective: Artistic Forms (Core IV)	3 5 3 3 3
	TOTAL CREDIT HOURS	**19**	**TOTAL CREDIT HOURS**	**17**
SENIOR	HIST **1483**, U.S., 1492-1865, **or** **1493**, U.S., 1865-Present (Core IV) C E **3663**, Structural Design—Steel I ARCH **4443**, History of the American Built Environment (Core IV: Western Civ. & Culture) ARCH **4575**, Arch. Design/Building System Integration (Capstone) AME **3363,** Design of Thermal-Fluid and Mechanical Systems	3 3 3 5 3	P SC **1113**, American Federal Government (Core III) C E **3363**, Soil Mechanics C E **3673**, Structural Design—Concrete I ARCH **4033**, Project Documents †Approved Elective: Non-Western Culture (Core IV)	3 3 3 3 3
	TOTAL CREDIT HOURS	**17**	**TOTAL CREDIT HOURS**	**15**

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. ARCH 4443 fulfills the upper-division Gen. Ed. Requirement for Western Civ. and Culture.

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.

COURSES IN AEROSPACE AND MECHANICAL ENGINEERING (AME)

3173 Heat Transfer. Prerequisite: 3153, Engineering 2213; corequisite: 3122. Heat transfer by conduction, convection, and radiation; mass transfer and combined modes of heat transfer. (Sp)

3363 Design of Thermal-Fluid and Mechanical Systems. Prerequisite: 2303, 3173, Engineering 1001, Engineering 2213; 3143 or Engineering 2153; and 3153 or 3253 or Engineering 3223. Analysis, synthesis, and design of fluid flow, heat transfer and energy systems such as ducts and piping systems, fluid machinery, heat exchangers, thermal storage devices, furnaces, combustors, refrigeration and air conditioning systems. Design of mechanical systems and subsystems is also covered. **Lecture and laboratory** (F)

COURSES IN ARCHITECTURE (ARCH)

2544 Architectural Design/Human Factors (Crosslisted with Interior Design 2544). Prerequisite: EN D 2533. Study of human needs and activities as design determinants; lectures and individual projects. Emphasis on the design implications of spatial relationships, scale and function. Additional emphasis on the relationship between architecture and interior design. **Laboratory** (Sp, Su)

3565 Architectural Design/Environmental Factors. Prerequisite: 3555. Study of forces within the natural and built environment as design determinants; lectures and individual projects. Emphasis on the design implications of environmental forces and the built environment. **Laboratory** (Sp, Su)

G4033 Project Documents (Crosslisted with Landscape Architecture 4033). Prerequisite: 4575 or permission or CNS 4923. An introduction to the building construction industry and architectural project manual with emphasis on owner/contractor relations. (Sp)

4443 History of the American Built Environment. Prerequisite: EN D 2413 and 2423 or permission. Survey of the American built environment from initial settlement and subsequent European colonization through the middle of the twentieth century. The integral nature of the built environment, the unique characteristics of the American frontier, and the heterogeneous nature of the American culture will be emphasized. Buildings, urban patterns and ideas will be studied, supported by examples ranging from the recognized standards to the commonplace. (F)

4575 Architectural Design/Building Systems Integration. Prerequisite: 3223, 3232, 3565, 4333 or 4343. Integration of structures, environmental systems, construction materials and architectural detailing. Emphasis on the use of production and presentation drawings to communicate technical information. **Laboratory** (F, Su)

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 CIVIL ENGINEERING (C E)

2553 Engineering Surveying. Prerequisite: Mathematics 2423, Engineering 1112 and 1213 or concurrent enrollment. Theory and practice in errors, leveling, taping, angle measurement, stadia, mapping, traversing, areas, volumes, construction surveys, horizontal and vertical curves and land surveying. **Laboratory** (F)

3363 Soil Mechanics. Prerequisite: 3403, Engineering 3223. General treatment of the physical and mechanical properties of soils. Theories of lateral earth pressure, consolidation, bearing capacity, slope stability and groundwater flow. **Laboratory** (Sp)

3403 Macromeritics. Prerequisite: Chemistry 1415, Engineering 1213; corequisite: Engineering 2153. Study of the occurrence and properties of materials utilized by civil engineers; analyses of aggregates, concrete, masonry, steel, asphalt, and wood. **Laboratory** (Sp)

3414 Structural Analysis I. Prerequisite: Engineering 1213, 2153. Loads, reactions and force systems; introduction to design codes; analysis of frames and trusses; calculation of structural deformations; and analysis of indeterminate structures. Emphasis on classical solutions and time-tested approaches to structural engineering. Introduction to structural analysis computer programs to solve complex problems. (F)

3663 Structural Design—Steel I. Prerequisite: 3403, 3414. Design of steel structural members including tension elements, columns, beams and beam-columns; bolted and welded connection design; composite beam design; introduction to plastic design. **Laboratory** (F)

3673 Structural Design—Concrete I. Prerequisite: 3403, 3414. Analysis and design of reinforced concrete beams, columns, slabs, footings, etc., along with discussion of current building practice. **Laboratory** (Sp)

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)

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)

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)

COURSES IN ENVIRONMENTAL DESIGN (EN D)

1011 Introduction to the Built Environment. Introduction of the issues and factors that define quality in the built environment, including a discussion of current trends; a brief survey of the various design disciplines and the professional responsibilities of each. (F)

1133 Graphics I. Prerequisite: 1011, 1511; corequisite: 1524. Introduction to visual communications for the design profession, including technical drawing, empirical perspective, freehand drawing, and an introduction to computer graphics. (Sp, Su)

1511 Studies in Visual Acuity. Corequisite for majors: 1011. An introduction to formal design principles applied to the built environment: architecture, interiors, and landscapes. Attention is given to definitions with emphasis on illustrations to explore a range of applications across cultures, time, and disciplines. Stressed is the use of principles, concepts and techniques to create and communicate relationships among function, technology and context. (F)

1524 Design I. Prerequisite: 1011 and 1511; corequisite: 1133. An introduction to the basic principles and fundamental concepts for the design professions, with emphasis on color theory and application, materials and proportioning systems. (F)

2143 Graphics II. Prerequisite: 1133, 1524; corequisite: 2534. Theory and methods of measured perspective and shade and shadow. Continued work in computer graphics, and an introduction to presentation techniques. (F)

2413 History of the Built Environment I. A survey of the built environment from the first human presence through the Middle Ages, stressing the integral nature of the built environment and the cultural milieu. Buildings, urban patterns and ideas will be emphasized. Examples will range from recognized standards to the commonplace. (F, Sp)

2423 History of the Built Environment II. Prerequisite: 2413. A continuation of 2413 from the Middle Ages through the early twentieth century. (F, Sp)

2534 Design II. Prerequisite: 1133, 1524; corequisite: 2143. Emphasis on issues of form and space, natural light, climate, and site. An introduction to issues of building design, focusing on landscape, interiors and the building. (F)

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)