OU encourages students to complete at least 29 hours of applicable coursework each year to have the opportunity to graduate in five years.

### Yearly Requirement Breakdown

#### FRESHMAN YEAR

- **FIRST SEMESTER**
  - ENGL 1113, Prin. of English Composition (Core I)  3
  - ♦ MATH 1914, Differential and Integral Calculus I (Core I)  4
  - PS 1113, American Federal Government (Core III)  3
  - ♦CS 1323, Intro. to Computer Programming  3
  - ♦Approved Elective: Artistic Forms (Core IV)  3
  - TOTAL CREDIT HOURS: 17

- **SECOND SEMESTER**
  - ENGL 1213, Prin. of English Composition (Core I), or EXPO 1213, Expository Writing (Core I)  3
  - ♦ MATH 2924, Differential and Integral Calculus II  4
  - CS 2334, Programming Structures & Abstractions  3
  - ♦Approved Elective: Natural Science (Core II)  3
  - #Open Elective  0
  - TOTAL CREDIT HOURS: 16

#### SOPHOMORE YEAR

- **FIRST SEMESTER**
  - ♦ MATH 2934, Differential and Integral Calculus III  4
  - CS 2603, Applied Logic for Hardware & Software  3
  - ♦ PHYS 1311, General Physics Lab I  0-1
  - PHYS 2514, General Physics for Engineering & Science Majors (Core II)  4
  - ♦Approved Elective: Social Science (Core III)  3
  - TOTAL CREDIT HOURS: 14-15

- **SECOND SEMESTER**
  - CS 2813, Discrete Structures  3
  - CS 2413, Data Structures  3
  - CS 2613, Computer Organization  3
  - #Approved Elective: Natural Science (Core II)  3
  - #Open Elective  0
  - TOTAL CREDIT HOURS: 14

#### JUNIOR YEAR

- **FIRST SEMESTER**
  - MATH 3113, Intro. to Ordinary Differential Equations, or MATH 3413, Physical Mathematics I  3
  - COMM 2613, Public Speaking  3
  - CS 3113, Intro. to Operating Systems  3
  - CS 3202, Software Requirements & Specifications  2
  - CS 3823, Theory of Computation  3
  - TOTAL CREDIT HOURS: 14

- **SECOND SEMESTER**
  - ENG 3153, Technical Writing, or B C 2813, Business Communication  2-3
  - ENGR 2002, Professional Engineering Development  0-1
  - MATH 3333, Linear Algebra  3
  - CS 3053, Human Computer Interaction  3
  - CS 3323, Principles of Programming Languages  3
  - ♦ MATH 4753, Applied Statistical Methods, or IS 3293, Applied Engineering Statistics, or ♦ MATH 4743, Intro. to Mathematical Statistics  3
  - TOTAL CREDIT HOURS: 15

#### SENIOR YEAR

- **FIRST SEMESTER**
  - CS 4263, Software Engineering I  3
  - CS 4413, Algorithm Analysis  3
  - CS 4513, Database Management Systems  3
  - ♦ CS G400/5000 Approved Elective, or ♦ MATH 4073, Numerical Analysis  3
  - ♦Approved Elective: Western Civ. & Culture (Core IV)  3
  - TOTAL CREDIT HOURS: 15

- **SECOND SEMESTER**
  - ♦ HIST 1483, U.S., 1492-1865, or ♦ HIST 1493, U.S., 1865-Present (Core IV)  3
  - ♦ CS 4273, Software Engineering II (Capstone)  3
  - ♦ CS G400/5000 Approved Elective  3
  - ♦CS Approved Elective  3
  - ♦Approved Elective: Non-Western Culture (Core IV)  3
  - TOTAL CREDIT HOURS: 15

### FIFTH YEAR

- **FIRST SEMESTER**
  - ♦ G5000-level Approved Elective  3
  - ♦G5000-level Approved Elective  3
  - ♦G5000-level C S Elective  3
  - ♦G5000-level Approved Elective  3
  - TOTAL CREDIT HOURS: 9

- **SECOND SEMESTER**
  - ♦G5000-level Approved Elective  3
  - ♦G5000-level C S Elective  3
  - ♦G5000-level Approved Elective  3
  - CS 5990 or C S seminar course  3
  - TOTAL CREDIT HOURS: 9

**Students are eligible for graduate status upon graduation with the Bachelor of Science in Computer Science.**

Students may enter the accelerated program based on the undergraduate degree pattern offered in the year they first enrolled in the Oklahoma State System of Higher Education or later.

**NOTE:** Engineering transfer students may take ENGR 3511 in place of ENGR 1411.

Courses designated as Core I, II, III, IV or Capstone 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. Three of these 12 hours must be upper-division (3000-4000). See list in the Class Schedule.

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.

- At least one of the Natural Science courses must be a non-Physics course. The number of credits in Core II natural science and open electives must be 14 credit hours or more. All science courses must be for science or engineering majors.

- To be chosen from CS 4013, 4323, 4513, 4613, 4973 or any C S 5000-level course.

- Another laboratory science Core II course may be substituted for PHYS 1311.

- At least one of these three MATH courses must be completed.

- Students must choose the following for these four electives: one Theory elective; two Systems electives; and one Applications electives. No more than one of these courses may be at the 4000-level. Courses for the areas are from the approved list from the School of Computer Science.

- No more than two enrollments (in 5970, "Graduate Seminar") courses are allowed.

- Honors College students may substitute C S 3960 for ENGL 3153/B C 2813 and C S 3980 for an approved C S elective. Both C S 3960 and 3980 must be completed.

- Thesis option requires a total of 9 hours of 5000-level electives, which must include six hours of C S 5980. Non-thesis option requires a total of 12 hours of 5000-level electives.

- MATH 1823, 2423, 2433, and 2443 sequence can be substituted for MATH 1914, 2924, and 2934.

- If selecting ENGR 2002, students must take or have an additional 1 hour of credit or open elective. Open electives are not required to be General Education approved, however, they cannot be taken as the student elected Pass/No Pass option (SU graded credits are acceptable). Please verify with the Gallogly College of Engineering, Williams Student Services Academic Advising Office, 112 Fedgar Hall, (405) 325-4096.
4263 Software Engineering I. Prerequisite: CS 3323 and COMM 2613 and ENGL 3153 or BC 2813, and Computer Science major or minor. No students may obtain credit for CS 4263 and CS 5213.
Methods and tools for software specification, design, and documentation. Emphasis on architectural modularity, encapsulation of software objects, and software development processes such as design review, code inspection, and defect tracking. Students working in teams apply these ideas to design and develop a software project using software development technologies, resulting in an analysis of program structure, user's guide, and process reports, using methods and processes studied in Software Engineering I. Students will practice oral and written communication skills. (Sp).

G4232 Compiler Construction. Prerequisite: 2431 and 3823. Introduction to the theory and implementation of programming languages compilers and interpreters. Class projects require the design and implementation of software to solve problems in specific domains. (F, Sp).

G4413 Database Management Systems. Prerequisite: CS 2431 or CS 3055, and CS 2813 or CS 4055 or MATH 2513. Design and analysis of algorithms and measurement of their complexity. (F).

G4413 Computational Methods in Discrete Optimization (Slashed with 5433). Prerequisite: Mathematics 2513 or 2533. Techniques for solving discrete optimization problems. Integer programming, branch and bound, cutting plane algorithms. A simple algorithm for general LP problems, degeneracy and anticycling strategies, duality theory and complementary slackness conditions, revised simplex method, sensitivity analysis and simplex method for general LP problems. Network optimization: the transshipment problem, network simplex method, shortest path algorithms, the maximum flow problem, and the primal dual method. No student may earn credit for both 4433 and 5433. (F).

G4513 Database Management Systems (Slashed with 5433). Prerequisite: CS 2431 or CS 3055, and CS 2813 or CS 4055 or MATH 2513. The design and implementation of DBMS including data models, query languages, entity-relationship diagrams, functions, methodologies, normalization, structure languages, access methods, query processing, transaction management, web-enabled applications, and administration. The Impact of databases on individuals, organizations, and society, and legal and professional responsibilities including security and privacy will be discussed. A commercial DBMS is used. Students practice written communication skills. (F).

CS 313 Computer Architecture (Crosslisted with Electrical and Computer Engineering 4613). Prerequisite: 2613 or Electrical and Computer Engineering 3223, or 4004. Covers basic concepts of computer system design and communication between components, along with current and historical examples of computer architecture. (F, Sp).

CS 4213 Introduction to Operating Systems (Slashed with 5413). Prerequisite: MATH 3333. Interaction between applications, architectures, and algorithms. Review of linear algebra, serial, pipelined vector processors, cluster of processors. Measures of performance of parallel algorithms. Parallel algorithms for the solution of linear systems. No student may earn credit for both 4743 and 5743. (F).

CS 4273 Software Engineering II. Prerequisite: CS 4263 or MATH 2423 or MATH 2513. The design and implementation of software, including design, project planning, development, delivery, and Economic analysis of computer software. Emphasis on the development of software for education, research, and practice oral and written communication skills. (Sp).

CS 4523 Compiler Construction. Prerequisite: 2431 and 3823. Introduction to the theory and implementation of programming language compilers and interpreters. Class projects require the design and implementation of software to solve problems in specific domains. (F, Sp).

COURSES IN ENGINEERING (ENGR)
1141 Freshman Engineering Experience. Prerequisite: declared major in Engineering or permission of instructor. Freshmen entering the College of Engineering complete this course during their first or second year. The course is designed to help freshmen with a declared Engineering major or minor to meet the people and professional contacts that will help them grow and develop. The course offers opportunities for freshmen with a declared Engineering major or minor to meet the people and professional contacts that will help them grow and develop. The course offers opportunities for freshmen with a declared Engineering major or minor to meet the people and professional contacts that will help them grow and develop. The course offers opportunities for freshmen with a declared Engineering major or minor to meet the people and professional contacts that will help them grow and develop. (Irreg.)

COURSES IN MATHEMATICS (MATH)
1914 Differential and Integral Calculus I. Prerequisite: satisfactory score on the placement test, for students directed from high school or community college, or permission of student's advisor. Introduces the fundamental concepts of calculus, the substitution rule, applications of integration to computation of areas. (F, Sp, Su) [1–M]

1913 Differential and Integral Calculus II. Prerequisite: 1914 with a grade of C or better. Duplicates two hours of 2423 and two hours of 2433. Further applications of integration, the natural logarithmic and exponential functions, indeterminate forms, techniques of integration, improper integrals, parametric curves and polar coordinates, infinite sequences and series. (F, Sp, Su) 2013 Differential and Integral Calculus III. Prerequisite: 2924 with a grade of C or better. Duplicates one hour of 2413 and three hours of 2433. Vectors and vector functions, functions of several variables, partial differentiation and gradients, multiple integration, line and surface integrals, Green–Stokes–Gauss theorems. (F, Sp, Su). (G3131 Introduction to Ordinary Differential Equations. Prerequisite: MATH 2423 or MATH 2513. Two hours of 2413 and two hours of 2433. Linear differential equations with constant coefficients, two-by-two linear systems, Laplace transforms, phase planes and stability. (F, Sp, Su).

G3331 Linear Algebra I. Prerequisite: MATH 2433 or MATH 2934 or permission of instructor. Structure of linear vector spaces, determinants, inner product spaces, linear transformations and matrices, characteristic values and vectors. (F, Sp, Su).

G4313 Physical Mathematics I. Prerequisite: MATH 2433 or MATH 2934 or concurrent enrollment. Complex numbers and functions. Fourier series, solution methods for ordinary differential equations and partial differential equations, Laplace transforms, series solutions, Legendre's equation. Duplicates two hours of 3113. (F).

G4073 Numerical Analysis. Prerequisite: 3113 or 3413. Solution of linear and nonlinear equations, approximation of functions, numerical integration and differentiation, introduction to analysis of convergence and errors, pitfalls in automatic computation, one-step methods in the solution of ordinary differential equations. (F).

4734 Introduction to Statistical Methods (Slashed with 5734). Prerequisite: 4733. Mathematical development of basic concepts in statistics: estimation, hypothesis testing, sampling from normal and other populations, regression, goodness-of-fit. No student may earn credit for both 4743 and 2743. (Sp).

G4753 Applied Statistical Methods. Prerequisite: MATH 2123 or MATH 2423 or MATH 2924 or permission of instructor. Estimation, hypothesis testing, analysis of variance, regression and correlation, goodness-of-fit, other topics as time permits. Emphasis on applications of statistical methods. (F, Sp, Su).