### REQUIREMENTS FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE

Accredited by the Computing Accreditation Commission of ABET, [http://www.abet.org](http://www.abet.org)

**GALLOGLY COLLEGE OF ENGINEERING**

THE UNIVERSITY OF OKLAHOMA

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#### GENERAL REQUIREMENTS

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<th>Course Code</th>
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<td>ENGL 1113</td>
<td>Prin. of English Composition (Core I)</td>
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<td>MATH 1914</td>
<td>Differential and Integral Calculus (Core I)</td>
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<td>PS 1113</td>
<td>American Federal Government (Core III)</td>
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<td>ENGR 1411</td>
<td>Freshman Engineering Experience</td>
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<td>CS 3233</td>
<td>Intro. to Computer Programming</td>
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<td>†Approved Elective: Artistic Forms (Core IV)</td>
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**FIRST SEMESTER**

- **Total Credit Hours**: 12-121

**SECOND SEMESTER**

- **Total Credit Hours**: 12

### FRESHMAN

#### TOTAL CREDIT HOURS

- **ENGL 1113**: Prin. of English Composition (Core I)
- **MATH 1914**: Differential and Integral Calculus (Core I)
- **PS 1113**: American Federal Government (Core III)
- **ENGR 1411**: Freshman Engineering Experience
- **CS 3233**: Intro. to Computer Programming
- †Approved Elective: Artistic Forms (Core IV)

#### TOTAL CREDIT HOURS

- **17**

### SOPHOMORE

#### TOTAL CREDIT HOURS

- **ENGL 1213**: Prin. of English Composition (Core I), or
- **EXPO 1213**: Expository Writing (Core I)
- **MATH 2924**: Differential and Integral Calculus II
- **CS 2334**: Programming Structures & Abstractions
- †Approved Elective: Natural Science (Core II)
- †Open Elective

#### TOTAL CREDIT HOURS

- **16**

### JUNIOR

#### TOTAL CREDIT HOURS

- **MATH 3113**: Intro. to Ordinary Differential Equations, or
- **MATH 3413**: Physical Mathematics I
- **COMM 2613**: Public Speaking
- **C S 3113**: Intro. to Operating Systems
- **C S 3202**: Software Requirements & Specifications
- **C S 3823**: Theory of Computation

#### TOTAL CREDIT HOURS

- **14-15**

### SENIOR

#### TOTAL CREDIT HOURS

- **CS 4273**: Software Engineering II (Capstone)
- †Approved Elective: Western Civ. & Culture (Core IV)
- **CS 4413**: Algorithm Analysis
- **MATH 4073**: Numerical Analysis
- **CS 4513**: Database Management Systems

#### TOTAL CREDIT HOURS

- **15**

### 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](http://www.ou.edu/content/coe/wssc/advising/where.html). Three 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 must successfully complete prerequisite courses (with a minimum C grade) before proceeding to the next course.
- Students should read the College of Engineering Scholastic Regulations which are posted on the WSSC website under Advising (see Advising Syllabus): [http://www.ou.edu/content/coe/wssc/advising/index.html](http://www.ou.edu/content/coe/wssc/advising/index.html).
- 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.
- To be chosen from C S 4013, 4023, 4033, 4053, 4073, 4113, 4133, 4233, 4433, 4613, 4743, 4823, and 4973.
- 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.
- Courses taken to fulfill the Natural Science requirement must be chosen from the University-Wide General Education Approved Course List (Core II). 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. Open electives are not required to be General Education approved.
- Another laboratory course Core II course may be substituted for PHYS 1311.
- MATH 1823, 2423, 2433, and 2443 sequence can be substituted for MATH 1914, 2924, and 2934. NOTE: See an adviser in the Arts and Sciences Advising Center (EL 124) about a possible minor in mathematics.
- 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 (S/U graded credits are acceptable). Please verify with the Gallogly College of Engineering, Williams Student Services Academic Advising Office, 112 Felgar Hall, (405) 325-4096.

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For Students Entering the Oklahoma State System for Higher Education  
Summer 2016 through Spring 2017
4263 Software Engineering I. Prerequisite: C S 3323 and COMM 2613 and ENGL 3153 or B C 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, requirements definition, implementation, and testing. Students will work in teams to design and document software products. Study of professional ethics, responsibility, and liability. (F, Sp)

†G4273 Software Engineering II. Prerequisite: C S 3053 and C S 2813 or C S 4015 or MATH 2513. No student may obtain credit for CS 4273 and CS 5213. Methods and tools for software development, testing, and project management. Students will work in teams to design a significant software product, including design documents, user's guide, and process reports, using methods and processes studied in Software Engineering I. Students will practice oral and written communication skills. (Sp)

G4233 Compiler Construction. Prerequisite: 2413 and 3823. Introduction to the theory and implementation of programming language compilers and interpreters. Class projects require the design of medium scale software systems. (Sp)

G4413 Algorithm Analysis. Prerequisite: C S 4315 or C S 4015, and C S 2813 or C S 4005 or MATH 2513. Design and analysis of algorithms and measurement of their complexity. (F)

G5503 Computational Methods in Discrete Optimization (Slashlisted with 5433). Prerequisite: Mathematics 3333 and 4413 or concurrent enrollment in 4413. Linear programming: simplex method for LP problems, degeneracy and anticycling strategies, duality theory and component slackness conditions, revised simplex method, sensitivity analysis and simplex method for general LP problems. No student may earn credit for both 4743 and 5343. (F)

G5413 Database Management Systems. Prerequisite: C S 4315 or C S 4015, and C S 2813 or C S 4005 or MATH 2513. Design and implementation of DBMS including transaction processing, query languages, entity-relationship diagrams, functional dependencies, normalization, storage structures, access methods, query processing, transaction management, web-enabled applications, and administration. The impact of databases on organizations, society, and legal and professional responsibilities including security and confidentiality. (F)

G5461 Computer Architecture (Crosslisted with Electrical and Computer Engineering 4613). Prerequisite: C S 4315 or Electrical and Computer Engineering 4323, or 4044. Covers basic concepts of computer system design and communication between components, along with current and historical examples of computer architecture. (F)

G5483 Cryptography (Slashlisted with 5823). Prerequisite: 3823 and 4143. Elementary number theory, time complexity for doing arithmetic, finite fields, RSA, discrete logarithm and Diffie-Hellman, zero-knowledge protocols and oblivious transfer. Basic elliptic curve cryptosystems, elliptic curve factorization and primality proving. No student may earn credit for both 4823 and 5823. (F)

G5973 Special Topics. Prerequisite: 2413 and permission of instructor. May be repeated with change of subject matter; maximum credit nine hours. A special topics course necessitated by the rapidly changing nature of computer science. Topics offered under this number will be accepted as approved Computer Science electives for Computer Science majors. (Irreg.)

COURSES IN ENGINEERING (ENGR)

1411 Freshman Engineering Experience. Prerequisite: declared major in Engineering or permission of instructor. Required of all entering freshmen. Lecture and laboratory hour cover a variety of topics including: majors and minors; career planning; advising; and extra-curricular activities. Students also work on multi-disciplinary engineering projects in smaller groups during the lab hour. (F)

COURSES IN MATHEMATICS (MATH)

1914 Differential and Integral Calculus I. Prerequisite: satisfactory score on the placement test or, for incoming students, credit differnt from high school. Prerequisites: Two hours of 2923 and two hours of 2433. Further developments of integral calculus, functions of several variables, partial differentiation and gradients, multiple integrals, line and surface integrals, Green-Stokes-Gauss theorems. (F, Sp, Su)

†G3113 Introduction to Ordinary Differential Equations. Prerequisite: MATH 2423 or MATH 2454 or MATH 2823. Five hours of 3413. First order ordinary differential equations, linear differential equations with constant coefficients; two and three variables, Laplace transforms, phase portraits, stability. (F, Sp, Su)

G3433 Linear Algebra I. Prerequisite: MATH 2433 or MATH 2934 or permission of instructor. Systems of linear equations, determinants, finite dimensional vector spaces, linear transformations and matrices, vector spaces, linear dependence and independence, rank, basis, inner product space. (F, Sp, Su)

G4313 Physical Mathematics I. Prerequisite: MATH 2443 or MATH 2943 or permission of instructor. Systems of linear equations, determinants, finite dimensional vector spaces, linear transformations and matrices, vector spaces, linear dependence and independence, rank, basis, inner product space. (F, Sp, Su)

G4341 Applied Statistical Methods. Prerequisite: MATH 2133 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)