Civil Engineering

1. Add the following course:

   **CE 579 Simulation of Transportation Systems (3 cr)**
   This course introduces students to the simulation of transportation systems, including the algorithms that constitute most traffic simulation models and how the models are applied to the study of real transportation problems. The course considers the fundamental issues that the transportation engineer must consider when developing and applying simulation models, the core algorithms that constitute transportation simulation models, how to build and test a simulation network, the process for validating and calibrating a simulation model, how model results should be analyzed and presented, and the process for using and the value of hardware-in-the-loop simulation.

   **Prereq:** Permission

   Recommended Short Course Title: Transportation Simulation

   **Rationale:** This course is needed to provide experience for graduate students in transportation engineering program in the development, use, calibration, validation, and application of transportation simulation models. This course has been taught twice as CE 504 so it needs to be made a permanent course if we are to continue to teach it.

2. Change the following course:

   **CE J431/J511 Design of Water and Wastewater Systems I (3 cr)**
   Application of fundamental engineering science to the design of systems for the treatment of domestic and industrial water supplies, treatment and re-use of domestic sewage and industrial wastes. Three lectures a week. Additional projects/assignments required for graduate credit.

   **Prereq:** CE 322, CE 330, or Permission. A minimum grade of 'C' or better is required for all pre/coreqs.

   **Rationale:** There have been, and are currently, situations where a graduate student (either on campus or in Engineering Outreach) has needed another CE500-level course focused in wastewater; however, we only offer two (CE512 and CE532). Adding a 500-level option to CE431 will provide graduate students more course options for their studies. In particular, the Engineering Management program has a very strong desire for CE431 to be offered with a 500-level option. It is also anticipated that this change will have a positive impact on Engineering Outreach enrollment. CE431 is currently offered via EO, and thus the 500-level option would be as well. Students pursuing their masters of engineering, civil engineering, could include this course in their study plan as part of meeting the 500-level requirements that are discipline specific. There is precedent to this requested change, as CE432 (Design of Water and Wastewater Systems II) is offered as CE532.

Computer Science

1. Drop the following courses:

   **CS 101 Introduction to Computer Science (3 cr)**
   Survey of computer science and topics of importance to computer scientists; includes topics such as the nature of problems, unsolvability, hardware, human factors, security, social, ethical, and legal issues; exposure to practical aspects of computer networks. Three lectures and one recitation per week. Recommended Preparation: two yrs of high school algebra.

   **Recommended Equivalent Course:** None

   **Rationale:** Haven’t taught this course in years. Cleaning up dead courses.

   **CS 105 Computer Science as a Profession (2 cr)**
   Introduction to the computer science profession and curriculum; fields of study available; current topics in departmental research; curriculum planning; legal, ethical, and social issues in computing; academic ethics and responsibilities. (Fall only)

   **Recommended Equivalent Course:** CS 112

   **Rationale:** This course is being dropped from curriculum as part of streamlining the curriculum for recruitment and retention. The course requirement will be waived by appeal to the department.

2. Change the following courses:
CS 112  Introduction to Problem Solving and Programming  Computational Thinking and Problem Solving (3 cr)
Introduction to computational thinking and problem solving, including elementary computing concepts such as variables, loops, functions, lists, conditionals, concurrency, data types, simple object oriented concepts, I/O, events, syntax, structured programming, basic concepts of computer organization, editing and the influence of computers in modern society. Intro to fundamental problem solving techniques using the computer; use of a programming language; structured programming concepts; use of fundamental data types; including arrays and structures; basic concepts of computer organization, editing, and program execution; programming lab in which the student gains hands on experience in problem solving with modern programming tools.
Prereq: Math 108 with a grade of 'C' or better; or sufficiently high ACT, SAT, or Math Placement Test score to qualify for Math 143

Recommended Short Course Title: Computational Thinking

CS 120  Computer Science I (4 cr)
Fundamental programming constructs, Algorithms, problem-solving, Fundamental data structures, Overview of programming languages, Machine Introduction to language translation, Introduction to object-oriented programming. This course includes a lab. Three lec and one 2-hr lab a wk.
Prereq: Math 108 or sufficiently high ACT, SAT, or Math Placement Test score to qualify for Math 143
Math 143 with a grade of 'C' or higher or CS 112 with a grade of 'B' or higher; or sufficiently high ACT, SAT, or Math Placement Test score to qualify for Math 170

Rationale: Statistics on the last 10 years of grades in math and CS show a correlation between math grades and success in CS. To improve retention we believe that having success in early programming courses is paramount and so we have increased the difficulty of the math prereqs. We have also integrated this with the new CS112 course so that it can lead into this course but only if the student’s grades show a solid grasp of the material.

CS 121  Computer Science II (4-3 cr)
Abstract data types and data structures: linked lists, stacks, queues, trees, and graphs. Methods to implement and algorithms to manipulate these structures. Dynamic memory methods, sequential file processing, additional searching and sorting algorithms, recursion, and object-oriented programming. Three lec and one 2-hr lab a wk.
Prereq: CS 120 with a grade of 'C' or higher
Coreq: Math 176

Rationale: Statistics on the last 10 years of data show that both: grades in CS 120 and student’s proficiency in Mathematics are a fair predictor of success in CS 121. We have added CS 112 as an optional entry level course within the CS program with the intent that this would give students more time and opportunities to better prepare for success in both CS 120 and 121. We are also removing the laboratory session in CS 121 in an effort to focus those teaching resources into CS 112 and CS 120.

CS 401  Contemporary Issues in Computer Science (1 cr)
Ethical, legal, social, and intellectual property issues; current research topics; and other issues of importance to the professional computer scientist. Graded P/F.
Prereq: Senior standing in CS

Rationale: Improve the description of the course by making it more in line with ABET accreditation requirements.

3. Change the curricular requirements of Computer Science (B.S.C.S.):

Required course work includes the university requirements (see regulation J-3) and:

General Education Electives (5 cr):
Comm 101  Fundamentals of Public Speaking (2 cr)
Engl 317  Technical Writing (3 cr)

Computer Science (43 cr):
CS 105  Computer Science as a Profession (2 cr)
CS 120  Computer Science I (4 cr)
CS 121  Computer Science II (4-3 cr)
CS 150  Computer Organization and Architecture (3 cr)
CS 210  Computing Languages (3 cr)
CS 240  Computer Operating Systems (3 cr)
CS 270  System Software (3 cr)
CS 383  Software Engineering (3 cr)
CS 385  Theory of Computation (3 cr)
CS 395  Analysis of Algorithms (3 cr)
CS 401  Contemporary Issues in Computer Science (1 cr)
CS 445  Compiler Design (4 cr)
CS 480  CS Senior Capstone Design I (3 cr)
CS 481  CS Senior Capstone Design II (3 cr)

Mathematics and Statistics (17 cr):
Math 170  Analytic Geometry and Calculus I (4 cr)

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Math 175   Analytic Geometry and Calculus II (4 cr)
Math 176   Discrete Mathematics (3 cr)
Math 330   Linear Algebra (3 cr)
Stat 301   Probability and Statistics (3 cr)

One of the following laboratory science sequences (8-9 cr):
Biol 115 and Biol 116   Cells and the Evolution of Life and Organisms and Environments (8 cr)
Chem 111 and Chem 112   Principles of Chemistry I and Principles of Chemistry II (9 cr)
Phys 211, Phys 211L and Phys 212, Phys 212L   Engineering Physics I and Lab and Engineering Physics II and Lab (8 cr)
Phys 211, Phys 211L and Phys 213, Phys 213L   Engineering Physics I and Lab and Engineering Physics III and Lab (8 cr)

Science electives from the following sets of courses (4 cr):
Biology – all courses except Biol 102
Chemistry – all courses except Chem 100 and Chem 101
Environmental Science – only EnvS 101 and EnvS 102
Geography – only Geog 100, Geog 301, or Geog 401
Geology – all courses
Microbiology, Molecular Biology, and Biochemistry – all courses
Physics – all courses except Phys 100, Phys 200, Phys 400, and Phys 403

Upper-division technical electives selected to satisfy the credit distribution in these categories (15 cr):
Computer Science (12 cr) – any upper-division CS course except 499.

Courses to total 128-120 credits for this degree, not counting Engl 101, Math 143, and other courses that might be required to remove deficiencies. A minimum grade of ‘C’ is required in CS 120, CS 121, CS 150, CS 210, CS 240, CS 270, Math 170, Math 176, and Math 175 in order to graduate.

Students majoring in computer science must earn a grade of C or better in CS 120, CS 121, and CS 150 and a C or better in Math 176 before registration is permitted in 200 level CS courses. Students majoring in computer science must earn a grade of C or better in CS 210, CS 240, CS 270, and Math 170 and Math 175 before registration is permitted in upper-division CS courses.

Students must consult with their advisors when selecting electives within the curriculum to insure that their career objectives are met.

Rationale: Removal of CS105 is replaced by an optional CS112 preCS course for those whose math scores show the lack of mathematical maturity to take CS120. The ABET content of 105 has been distributed in other courses. The course can now be dropped. The lab is dropped off of CS121 where it was not considered a great benefit. The 3 credits gained in this move now allows us to add CS480 to match the capstone courses in the other COE programs.

**Engineering**

1. Change the following courses:

**EM 582 Advanced Topics in Project Management (3 cr)**

Discussion and application of advanced project management topics beyond those prescribed by traditional project management approaches. Specific topics include project portfolio management, multi-project management, use of Theory of Constraints (TOC) and Critical Chain approaches to drive improved results, and application of Agile practices within an overall Waterfall life cycle model. These approaches should be applicable to a wide variety of industries and functions. Application of project management tools from a management perspective to address the basic nature of all types of projects including public, business, engineering, information systems, etc. Individual and group projects will apply project management tools to case studies and readings on current issues in project management. The course will roughly cover the eight knowledge areas recommended by the Project Management Institute.

**Prereq:** CE 482 or PMP Certification  [Instructor Permission]

Rationale: Course is being updated and taught by a new instructor.