Core Requirements

Requirements include:

- **CSM 2170 - Computer Science I**. Credits: 4
  (3-2-4) F, S. The development of algorithmic solutions to numeric and non-numeric problems. Implementation in a block-structured programming language such as C++. CS 911
- **MAT 1441G - Calculus and Analytic Geometry I.** Credits: 5
  (5-0-5) F, S. Limits, continuity, and derivatives for functions of one variable, applications of the derivative, the definite integral, applications of the integral. MTH 901; M1 900-1
- **MAT 2442 - Calculus and Analytic Geometry II.** Credits: 5
  (5-0-5) F, S. Transcendental functions, techniques of integration, further applications of the integral, parametric equations and polar coordinates, infinite sequences and series. MTH 902; M1 900-2
- **MAT 2443 - Calculus and Analytic Geometry III.** Credits: 4
  (4-0-4) F, S. Three-dimensional analytic geometry and vectors, differential calculus of multivariate functions, integral calculus of multivariate functions, line and surface integrals. MTH 903; M1 900-3
- **MAT 2550 - Introduction to Linear Algebra.** Credits: 3
  3-0-3) F, S. The study of linear algebra and its applications.
- **MAT 3501 - Differential Equations I.** Credits: 3
  (3-0-3) S. Techniques and applications of ordinary differential equations. First order ordinary differential equations and higher order linear equations. An introduction to partial differential equations, Fourier series, boundary value problems and Sturm-Liouville theory. MTH 912
- **MAT 3701 - Probability and Statistics I.** Credits: 3
  (3-0-3) F. Basic concepts of probability and statistics.
- **PHY 1351G - General Physics I.** Credits: 3
  (3-0-3) F. Classical mechanics including a detailed study of statics, kinematics, dynamics, simple harmonic motion; with straight-line, projectile, and rotational motion; also conservation principles, work, energy, momentum. The first of a three-semester sequence designed for students in chemistry, pre-engineering, mathematics, physics, etc.
- **PHY 1352G - General Physics I Laboratory.** Credits: 1
  (0-3-1) F. Experimental work demonstrating physics principles and their applications related to topics studied in PHY 1351.
- **PHY 1361 - General Physics II.** Credits: 3
  (3-0-3) S. Thermodynamics, electricity and magnetism. The second of a three-semester sequence designed for students in chemistry, pre-engineering, mathematics, physics, etc. EGR 912; BIO 904
- **PHY 1362 - General Physics II Laboratory.** Credits: 1
  (0-3-1) S. Experimental work demonstrating physics principles and their applications related to topics studied in PHY 1361. WI
- **PHY 1371 - General Physics III.** Credits: 3
  (3-0-3) F. Wave motion and sound, optics, modern physics. The third of a three-semester sequence designed for students in chemistry, pre-engineering, mathematics, physics, etc. EGR 914; BIO 904

- **PHY 1372 - General Physics III Laboratory.** Credits: 1
  (0-3-1) F. Experimental work demonstrating physics principles and their applications related to topics studied in PHY 1371..
- **PHY 3410 - Electricity and Magnetism I.** Credits: 3
  (3-0-3) F-even-numbered years. Coulomb's law, electric fields, potential, Gauss' law, capacitance, dielectrics, electrostatic energy, DC circuits, introduction to magnetic fields and forces, induction.
- **CHM 1310 – Chemistry I.** Credits: 3
  (3-0-3) An introduction to fundamental chemical principles and related phenomena. Topics include: atomic and electronic structure, bonding, chemical composition, chemical reactions, gases, stoichiometry, and thermochemistry.
- **CHM 1315G – Chemistry I Lab.** Credits: 1
  (0-3-1) Experimental work illustrating chemical principles and concepts described in the companion lecture course.
- **EEN 1001 – Introduction to Engineering and Physics.** Credits: 1
  (1-0-1) An introduction to the study of the fields of engineering and physics. It includes a brief history of the subjects, an introduction to the many disciplines of engineering and subfields of physics, and the career paths of both physics majors and engineering majors. It introduces the nature of problem solving skills that will be acquired during their studies. In addition, students will learn about available resources, such as professional organizations, computational tools, and research opportunities.
- **EEN 3150 - Electronics.** Credits: 4
  (2-4-4) F. A study of the fundamental principles of, and hands-on experience with, analog electronics. Topics include: DC, AC and transient circuit analysis techniques, rectification, active and passive filtering, regulation, oscillator circuits, and computer simulations using PSpice.
- **EEN 3270 - Introduction to Circuit Analysis.** Credits: 4
  (4-0-4) S. Basic principles of network analysis, including Kirchoff's laws, node and mesh equations, equivalent circuits, operational amplifiers, transient analysis, sinusoidal steady-state analysis, three-phase circuits, transformers, network functions, and frequency response. EGR 931
- **EEN 4301 - Digital Systems and Design.** Credits: 4
  (3-3-4) Principles and practices of digital systems and design. Topics include logic signals and gates, CMOS logic, bipolar logic, combinational and sequential logic design, VHDL hardware description language, and an introduction to memory, complex programmable logic devices, and field-programmable gate arrays.
- **EEN 4401 - Signals and Systems.** Credits: 3
  (3-0-3) Development of continuous- and discrete-time concepts and methods, including convolution, Fourier Analysis, Laplace Transform, and Z-Transform, and introduction to applications in sampling and filtering.
- **EEN 4501 - Introduction to Control Systems.** Credits: 4
  (3-3-4) An introductory course on modern feedback and control systems including topics in stability, root locus, frequency response methods, Nyquist/Bode diagrams, application of

Laplace and Fourier transforms, lead-lag, PID compensators, digital control, and practical hardware implementations.

- **EEN 4601 - Introduction to Semiconductor Device Physics.** Credits: 3
  (3-0-3) The physics and operating principles of semiconductor devices including pn junctions, Schottky barriers, bipolar junction transistors, field effect transistors, and optical devices.
- **EEN 4701 - Senior Design.** Credits: 3
  (1-5-3) A capstone experience for students in the electrical engineering major. Students work in teams to complete an engineering design that is fully documented and prototyped.

And 3-4 hours of electives chosen from the list below:

- **CSM 2670 - Computer Science II.** Credits: 4
  (3-2-4) S. Intermediate programming techniques with emphasis on object oriented design, recursion as a problem solving strategy, event-driven programming, graphical user interface design, and software engineering principles. All programming will be done in an object-oriented programming language (such as Java, C++, or Python). CS 912
- **CSM 3670 - Principles of Computer Systems.** Credits: 3
  (2-2-3) F. Computer organization, data representation, instruction sets, syntax and semantics of assembly language programming, the assembly process, implementation of subroutines, I/O and interrupts.
- **EEN 4275 – Internship in Electrical Engineering.** Credits: 1-2
  (0-[3-6]-[1-2]) Students participate in an internship position in an industry related to electrical engineering to gain practical experiences in the field.
- **PHY 3420 – Electricity and Magnetism II.** Credits: 4
  (4-0-4) S-odd-numbered years. Advanced magnetism, magnetic materials, magnetic energy, varying electric currents, AC circuits, Maxwell's equations, electromagnetic radiation, and topics in special relativity.
- **PHY 4320 - Computational Physics.** Credits: 4
  (3-3-4) S-odd-numbered years. This is a project-oriented course in computational physics, with an emphasis on the understanding of the computational approach to complex physics problems through detailed case studies. Topics include realistic projectile motion, oscillatory motion and chaos, the solar system, potentials and fields, waves, random systems, molecular dynamics, and quantum mechanics.
- **PHY 4470 – Optics**. Credits: 4
  (3-3-4) F-odd-numbered years. Geometrical optics, optical instruments, wave optics: superposition, coherence, interference, diffraction, polarization.