Technical Electives for ELEN Majors

BIOL 113  Essentials in Biology (3-3) 4 credits – One semester in introductory biology for non-majors; chemical basis of life, cellular and molecular biology, genetics, evolution, biodiversity and interaction of organisms with their environment; includes a laboratory to supplement and reinforce lecture topics.

ESET 352  Electronics Testing I (3-3) 4 credits – Testing of electronic devices and systems; including test planning, test reporting, test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations; both circuit analysis (2/3) and circuit design (1/3) with several analog and mixed-signal systems. Prerequisites: ENTC 350 with a grade of C or better; completion of CBK courses with a grade of C or better; junior or senior in electronic systems engineering technology. Listed as ENTC 352 prior to 2015-16 catalog.

ISEN 303  Engineering Economic Analysis (3-0) 3 credits – Principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and tax implications; certainty; uncertainty; risk analysis; public sector analysis and break-even concepts. Prerequisite: MATH 152.

MATH 414  Fourier Series and Wavelets (3-0) 3 credits – Fourier series and wavelets with applications to data compression and signal processing. Prerequisites: MATH 304, MATH 309, MATH 311 or MATH 323.

MATH 442  Mathematics Modeling (3-0) 3 credits – The construction of mathematical models from areas such as economics, game theory, integer programming, mathematical biology and mathematical physics. Prerequisites: MATH 304, MATH 309, MATH 311 or MATH 323; MATH 308 or equivalent.

MATH 470  Communications and Cryptography I (3-0) 3 credits – Introduction to coded communications, digital signatures, secret sharing, one-way functions, authentication, error control and data compression. Prerequisites: MATH 304 or MATH 309 or MATH 311 or MATH 323; CSCE 110 or CSCE 111 or CSCE 121 or CSCE 206 or ENGR 112; approval of Instructor.

MATH 471  Communications and Cryptography II (3-0) 3 credits – Additional topics in coded communications; information and entropy, elliptical curves, error corrections, quantum methods. Prerequisites: MATH 470 or consent of instructor.

MEEN 221  Statics and Particle Dynamics (3-0) 3 credits – Application of the fundamental principles of Newtonian mechanics to the statics and dynamics of particles; equilibrium of trusses, frames, beams, and other rigid bodies. Prerequisites: Admission to upper division in an engineering major; MATH 251 or 253 or registered therein; PHYS 218.

MEEN 222  Materials Science (3-0) 3 credits – Mechanical, optical, thermal, magnetic and electrical properties of solids; differences in properties of metals, polymers, ceramics and composite materials in terms of bonding and crystal structure. Prerequisites: CHEM 102 or CHEM 104 and CHEM 114 or CHEM 107 and CHEM 117; PHYS 218.

MEEN 315  Principles of Thermodynamics (3-0) 3 credits – Theory and application of energy methods in engineering; conservation of mass and energy; energy transfer by heat, work, and mass; thermodynamic properties; analysis of open and closed systems; the second law of thermodynamics and entropy; gas, vapor and refrigeration cycles. Prerequisites: MEEN 221; MATH 251 or 253; U3 or U4 classification.

MSEN 201(289)  Engineering Materials: From Structure to Property (3-0) 3 credits – Origin of material properties from material structure and defects; electronic structure, atomic structure, crystal symmetry, and microstructure; emphasis on both functional and mechanical properties. Prerequisites: CHEM 102, 104, or 107; PHYS 218.

MSEN 460(489)  Electronic, Optical, and Magnetic Properties of Metal (3-0) 3 credits – Origins of functional materials properties from their electronic and molecular structure; electron theory in solids; electronic transport and dielectric behavior; atomic and mesoscopic origins of magnetism; optical properties; current applications of functional materials. Prerequisites: Intro to Materials Science course (MSEN 201, MEEN 222, CHEN 313, etc.) or approval of instructor; junior or senior classification.

PHYS 221  Optics and Thermal Physics (3-0) 3 credits – Wave motion and sound, geometrical and physical optics, kinetic theory of gases, laws of thermodynamics. Prerequisites: PHYS 208; MATH 152 or 172; registration in MATH 221, 308.

Note: AERO 320 approved as an Engineering Elective for ELEN majors prior to fall 2014

Updated 3/30/15