Missouri University of Science and Technology

CHEM 1100 Introduction To Laboratory Safety & Hazardous Materials
A systematic study of safe laboratory operations and pertinent regulations of state and federal agencies.

CHEM 1319 General Chemistry Laboratory
The laboratory work accompanying general chemistry consists of experiments designed to supplement lectures in Chem 1310. Prerequisite: Preceded or accompanied by both Chem 1310 and Chem 1100.

CIV ENG 2003 Engineering Communications and Computations
Programming and software tools (including computer aided design and drafting, computer-based mathematics, word processing, spreadsheet, and presentation software) with application to and emphasis on written, graphical, and oral communication in professional civil and architectural engineering practice. (Co-listed with Arch Eng 2003).

CIV ENG 2200 Statics
Application of the principles of mechanics to engineering problems of equilibrium. Topics include resultants, equilibrium, friction, trusses, center of gravity and moment of inertia. Prerequisites: Physics 1135 or Physics 1111 with a grade of "C" or better; Math 1215 or Math 1221 with a grade of "C" or better; preceded or accompanied by Math 2222.

CIV ENG 2210 Mechanics Of Materials
Application of the principles of mechanics to engineering problems of strength and stiffness. Topics include stress, strain, thin cylinders, torsion, beams, and combined stresses at a point. Prerequisite: Civ Eng 2200 with grade of "C" or better.

CIV ENG 2211 Materials Testing
Designed to assist in the teaching of mechanics of materials. Topics include strain measurement, testing machines and properties of materials. Prerequisite: Preceded or accompanied by Civ Eng 2210.

CIV ENG 2401 Fundamentals Of Surveying
Surveying fundamentals: leveling, directions, angles, distances, errors, traverse calculations and basic adjustments. Fundamentals of horizontal curves. Lab exercises include leveling, traversing, horizontal circular curve layout and building layout. Prerequisite: Preceded or accompanied by Math 1214 (or 1208).

CIV ENG 2601 Fundamentals Of Environmental Engineering And Science
Course discusses fundamental chemical, physical, and biological principles in environmental engineering and science. Topics include environmental phenomena, aquatic pollution and control, solid waste management, air pollution and control, water and wastewater treatment systems, sustainability and life cycle analyses. Prerequisites: Chem 1310, Chem 1301, or Chem 1351; Math 1214, Math 1212, or Math 1208. (Co-listed with Env Eng 2601).

CIV ENG 3116 Construction Materials, Properties And Testing
A study of the origin, production, uses and general properties of construction materials accompanied by selected laboratory tests and demonstrations. Prerequisites: Civ Eng 2211 or Min Eng 3812; Civ Eng 2210 or both Geo Eng 1150 and Min Eng 3412.

CIV ENG 3201 Structural Analysis I
Loads on Structures. Analysis of statically determinate and indeterminate beams, frames and trusses. Influence lines and moving loads. Computation of deflections. Development and use of theorems of displacement methods including slope-deflection and moment distribution to analyze statically indeterminate structures. Computer solutions. Prerequisites: Civ Eng 2200, 2210 each with a grade of "C" or better. (Co-listed with Arch Eng 3201).

CIV ENG 3210 Structural Design in Metals
The analysis and design of structural elements and connections for buildings, bridges and specialized structures utilizing structural metals. Both elastic and plastic designs are considered. Prerequisite: Civ Eng 3201 with a grade of "C" or better. (Co-listed with Arch Eng 3210).

CIV ENG 3220 Reinforced Concrete Design
The analysis and design of reinforced concrete beams, slabs, columns, retaining walls and footings by the elastic and ultimate strength methods, including an introduction to the design of prestressed concrete. Introduction to use of

computers as a design aid tool. Prerequisite: Civ Eng 3201 with grade of "C" or better. (Co-listed with Arch Eng 3220).

CIV ENG 3330 Engineering Fluid Mechanics
Study of fluids at rest and in motion. Topics include fluid properties, statics of fluids, and the control volume approach to conservation of mass, momentum and energy. Applications include flow in pipes, pipe systems, external flow, and fluid flow measurements. Prerequisites: A grade of "C" or better in Math 3304 and in one of Mech Eng 2340, Mech Eng 2350 or Mech 2360.

CIV ENG 3334 Water Resources Engineering
An introduction to the engineering of water resources; flow in closed conduits, pumps, flow in open channels, surface water hydrology, rainfall analysis, hydrograph analysis, flow routing; and ground-water hydrology. Prerequisites: A grade of "C" or better in Civ Eng 3330 and in one of Stat 3111, Stat 3113, Stat 3115, or Stat 3117.

CIV ENG 3500 Transportation Engineering
A study of operating characteristics of transportation modes including highways, railways, inland waterways, airways, and pipelines. Consideration of traffic control devices, safety, system capacity, design of routes, planning of urban transportation systems, and economic evaluation of transportation alternatives. Prerequisites: Civ Eng 2401 and Civ Eng 2003.

CIV ENG 3715 Fundamentals of Geotechnical Engineering
Analysis of geotechnical systems including soil classification, index properties, permeability, compressibility and shear strength. Basic geotechnical engineering design principles as they apply to civil constructed facilities, such as analysis of foundations and earth structures. Laboratory determination of the basic properties of soils. Prerequisite: Geo Eng 1150 or Geology 1110; Civ Eng 2210; and preceded or accompanied by Civ Eng 3330.

CIV ENG 3842 Fundamentals of Building Systems
An examination of building life support systems and technology of interest to civil engineers in the planning, operation, and maintenance of buildings. Topics include human comfort, electrical, mechanical, water and waste, transportation, lighting, and other systems necessary for building utilization. Prerequisites: Physics 2135, Math 2222, and Junior Standing.

CIV ENG 4010 Senior Seminar: Engineering In A Global Society
Discussion of contemporary issues: public safety, health, and welfare; the principles of sustainable development; lifelong learning; impact of engineering solutions in a global and societal and political context; relationships with owners, contractors, and the public; public service; the Code of Ethics; and the Missouri licensing Statutes and Board Rules. Prerequisite: Senior standing. (Co-listed with Arch Eng and Env Eng 4010).

CIV ENG 4097 Senior Design Project
Open-ended design projects involving one or more areas of engineering. Planning design projects, philosophy of design, and application of engineering principles to design problems. Prerequisite: Civ Eng 4448 or Arch Eng 4448. (Co-listed with Arch Eng 4097 and Env Eng 4097).

CIV ENG 4448 Fundamentals Of Contracts And Construction Engineering
A study of the concepts and techniques used in large construction projects for the preparation of engineer service contracts, the development of a project manual, detailed and conceptual cost estimating, and construction scheduling analysis. Prerequisite: Junior Standing. (Co-listed with Arch Eng 4448).

CIV ENG 4448 Fundamentals Of Contracts And Construction Engineering
A study of the concepts and techniques used in large construction projects for the preparation of engineer service contracts, the development of a project manual, detailed and conceptual cost estimating, and construction scheduling analysis. Prerequisite: Junior Standing. (Co-listed with Arch Eng 4448).

CIV ENG 4729 Foundation Engineering
The effect of subsoil conditions on the behavior and choice of foundations. Topics include geotechnical explorations and the design of foundations, which includes the selection of foundation types, the analysis of bearing capacity and settlement of shallow/deep foundations, and retaining walls. Prerequisite: Civ Eng 3715.

CIV ENG 5001 Special Topics: Wind Engineering
This course is designed to give the department an opportunity to test a new course. This course will introduce wind engineering to advanced undergraduate and graduate students through structural engineering and atmospheric science fundamentals. The overarching goal of the course is to provide students with a basic knowledge of the (a) atmospheric boundary layer winds, (b) design wind loads, (c) structural responses to wind loading, and (d) experimental and numerical methods specific to wind engineering practice, including wind tunnel modeling and computational fluid dynamics. Prerequisite: Civ Eng 3201 with a grade of “C” or better.

CIV ENG 5203 Applied Mechanics In Structural Engineering
A study of the basic relationships involved in the mechanics of structures. Topics include basic elasticity, failure criteria, fundamental theories of bending and buckling of plates and cylindrical shells for practical application in analysis and design of bridge, building floors, and shell roofs. Prerequisite: Civ Eng 3201 with grade of "C" or better. (Co-listed with Arch Eng 5203).

CIV ENG 5205 Structural Analysis II
Classical displacement and force methods applied to structures of advanced design. Analysis of indeterminate structures such as continuous beams, arches, cables, and two and three dimensional frames, and trusses. Analysis of indeterminate structures involving temperature and support settlements effects. Prerequisites: Civ Eng 3201 or Arch Eng 3201. (Co-listed with Arch Eng 5205).

CIV ENG 5206 Low-Rise Building Analysis and Design
Characterization of various design loads, load combinations, general methodology of structural designs against lateral loads, code-oriented design procedures, distribution of lateral loads in structural systems, application of the International Building Code in design of loadbearing wall systems, building frame system and moment-resisting frame systems. Prerequisite: Preceded and/or accompanied by Civ -Arch Eng 3210 or Civ-Arch Eng 3220. (Co-listed with Arch Eng 5206).

CIV ENG 5260 Analysis And Design Of Wood Structures
A critical review of theory and practice in design of modern wood structures. Effect of plant origin and physical structure of wood on its mechanical strength; fasteners and their significance in design; development of design criteria and their application to plane and three dimensional structures. Prerequisite: Civ Eng 3201 with grade of "C" or better. (Co-listed with Arch Eng 5260).

CIV ENG 5270 Structural Masonry Design
Review of the theory and practice of analyzing low-rise masonry structures, materials and assembly types, constructability considerations, structural masonry components, repair and strengthening, and model code requirements to ensure adequate load resisting buildings. Prerequisites: Arch Eng 3201 or Civ Eng 3201. (Co-listed with Arch Eng 5270).

CIV ENG 5333 Intermediate Hydraulic Engineering
Application of fluid mechanics principles to the design. Kinematics of fluid motion, conservation of mass, linear and angular momentum, and energy. Requirements for similarity of fluid flow. Introduction to dynamics of fluid flows and viscous incompressible flows. Prerequisite: Civ Eng 3330 with a grade of "C" or better.

CIV ENG 5445 Construction Methods
Introduction to construction planning, selection of equipment and familiarization with standard methods for horizontal and vertical construction. Application of network analysis and schedules to project control. Prerequisite: Civ Eng 4448 with a grade of "C" or better. (Co-listed with Arch Eng 5445).

CIV ENG 6211 Plastic Analysis And Design Of Metal Structures
Behavior of engineering materials in the inelastic stress range. Analysis and design of elementary structural members and frames.

CIV ENG 6213 Advanced Design in Steel and Lightweight Structures
A critical evaluation of the theories of design and actual behavior of metal components and their connections. The basis of the development of the pertaining codes will be considered. Prerequisite: Preceded or accompanied by Civ Eng 5207.

CIV ENG 6221 Advanced Behavior Of Reinforced And Prestressed Concrete

Behavior of reinforced and prestressed concrete sections, members and wall/shell-type elements subjected to bending, axial load, shear and torsion. Confinement of concrete. Various truss model theories applicable to main members and strut-tie model applicable to disturbed regions, joints, and connections. Prerequisite: Civ Eng 3220 with grade of "C" or better.

ECON 1100 Principles Of Microeconomics
An examination of how resources and products are priced and how income is distributed within various types of market structures.

ENG MGT 1210 Economic Analysis of Engineering Projects
Engineering project analysis from an engineering economics perspective. Topics include: interest, equivalent worth, comparing alternatives, rate of return methods, depreciation and taxes, inflation and price changes, benefit-cost analysis and risk analysis. Prerequisites: Math 1214.

ENGLISH 1120 Exposition And Argumentation*
Practice in college level essay writing.

FRENCH 1101 Elementary French I*
Introduction to reading, conversation, and grammar. Prerequisite: Entrance requirements.

FRENCH 1102 Elementary French II*
A continuation of French 1101. Prerequisite: French 1101.

FRENCH 4000 Special Problems
Problems or readings on specific subjects or projects in the department. Consent of instructor required.

FRENCH 4311 Advanced French Conversation
Advanced conversation and oral practice. Prerequisite: French 2170.

FR ENG 1100 Study And Careers In Engineering
Examination of engineering degree programs available at Missouri S&T and career opportunities in engineering. Introduction to non-engineering majors and minors at Missouri S&T. Academic, professional and ethical expectations of the student and engineering professional. Introduction to campus facilities and resources for assisting in student success.

GEOLOGY 1150 Introduction to Physical Geology
(LEC) Materials, structure, and surface features of the Earth and planets are studied in the context of the processes that continuously transform the Earth and affect management of Earth resources, hazards, engineering problems, and environmental challenges. Prerequisite: Entrance requirements. (Co-listed with Geo Eng 1110).
(LAB) A study of Earth materials, surface features, internal structures and processes. Particular attention is paid to Earth resources, geological hazards, engineering and environmental problems. Prerequisite: Entrance requirements.

HISTORY 1200 Modern Western Civilization*
A continuation of History 1100 to the present with special emphasis on the philosophical, political, social, and economic backgrounds of modern society.

MATH 1160 Trigonometry
A study of the trigonometric functions, radian measure, graphing trigonometric functions, identities, trigonometric equations and inverse trigonometric functions. Solutions of general triangles and trigonometric representation of complex numbers are included. Prerequisite: Math 1120 or 1140 with a grade of "C" or better; or by placement exam.

MATH 1214 Calculus For Engineers I*
Introduction to limits, continuity, differentiation and integration of algebraic and elementary transcendental functions. Applications in physical science and engineering. Credit will be given for only one of Math 1208 or Math 1214. Math 1214 may be accompanied by Math 1160 with Math department approval. Prerequisites: A grade of "C" or better in both Math 1160 and one of Math 1120 or Math 1140; or by placement exam.

MATH 1215 Calculus For Engineers II*
Continuation of Math 1214. Transcendental functions, techniques of integration, sequences, series including power series, polar coordinates, polar and parametric equations. Applications in physical science and engineering. Credit

will be given for only one of Math 1215 or Math 1221. Prerequisites: Math 1160 and either Math 1208 or Math 1214 both with a grade of "C" or better; or by placement exam.

MATH 2222 Calculus with Analytic Geometry III
An introduction to multivariable calculus. Vector valued functions, curves and surfaces in two and three dimensions, partial differentiation, multiple integration, line and surface integrals, the major theorems of vector calculus, and applications of these ideas are studied. Prerequisites: Math 1215 or Math 1221 with a grade of "C" or better.

MATH 3304 Elementary Differential Equations
First order differential equations and linear differential equations of higher order are studied. The Laplace transform and systems of linear equations as well as selected physical applications are covered. Credit will not be given for both Math 3329 and Math 3304. Prerequisite: Math 2222 with a grade of "C" or better.

MECH ENG 1720 Introduction to Engineering Design
Introduction to a systematic approach to engineering design (problem clarification, concept generation, concept selection, prototyping methods, engineering ethics) and fundamental design communication techniques. Computer aided design tools are introduced to assist in design analysis.

MECH ENG 5212 Introduction to Finite Element Analysis
Variational formulation of the governing equations. Finite element model, interpolation functions, numerical integration, assembly of elements and solution procedures. Applications to solid mechanics, fluid mechanics and heat transfer problems. Two-dimensional problems. Computer implementation and use of commercial finite element codes. Prerequisites: Math 3304; senior or graduate standing. (Co-listed with Aero Eng 5212).

MECH ENG 5234 Stability of Engineering Structures
Solution of stability problems with applications to columns, plates and shell structures. Torsional and lateral buckling of columns. Buckling under high temperatures. Effect of imperfections introduced by a technological process on stability. Design issues related to stability requirements. Prerequisites: Civ Eng 2210; Math 3304; and Mech Eng 2350 or Mech Eng 2360 or Aero Eng 2360. (Co-listed with Aero Eng 5234).

MECH ENG 5236 Fracture Mechanics
Linear elastic and plastic mathematical models for stresses around cracks; concepts of stress intensity; strain energy release rates; correlation of models with experiment; determination of plane stress and plane strain parameters; application to design. Prerequisite: Civ Eng 2210. (Co-listed with Aero Eng 5236).

PHYSICS 1135 Engineering Physics I*
An introduction to mechanics, with an emphasis on topics needed by engineering students, including kinematics, dynamics, statics, and energetics. Prerequisite: Math 1208 or 1214.

PHYSICS 2135 Engineering Physics II
An introduction to electricity, magnetism, and light, with emphasis on topics needed by engineering students. Prerequisites: Physics 1135 or Physics 1111, Math 1221 or Math 1215.

SP&M S 1185 Principles Of Speech
A study of the arts of expression, oral communication, and listening (theory and practice); effective interaction of speech, speaker, listener, and occasion. Prerequisite: Entrance requirements.

STAT 3113 Applied Engineering Statistics
An introduction to applied statistical methods in engineering dealing with basic probability, estimation, tests of hypotheses, regression, design of experiments and control charts. Statistical computer packages will be used in connection with some of the material studies. Credit will be given for only one of Stat 3111, 3113, 3115 or 3117. Prerequisite: Math 1215 or 1221 with a grade of "C" or better.

St. Louis Community College

CHM 105 – General Chemistry I

General Chemistry I is a one-semester course designed for science-related majors that emphasizes the fundamental principles of chemistry. Topics include measurement, physical and chemical processes, nomenclature, atomic structure, quantum theory, stoichiometry, molecular structure, bonding theory, physical properties of gases, thermochemistry, and properties of solutions. Upon completion of the course, students should be able to demonstrate an understanding of the fundamental chemical laws and concepts and will obtain prerequisite chemical knowledge needed for advancement to General Chemistry II. Additional lab hours required. Prerequisites: MTH:140 (or at least one and a half years of high school algebra) and CHM:101 with a minimum grade of “C” or one year of high school chemistry, and Reading Proficiency.

University of Missouri – Saint Louis

ENGR 2320 - Dynamics
Review of vector algebra and calculus. Kinematics of a particle. Newton's laws and the kinetics of a particle. Work and energy. Impulse and momentum. Kinematics of rigid bodies. General theorems for systems of particles. Kinetics of rigid bodies. The inertia tensor. Prerequisites: MATH 2000 and ENGR 2310.

FRENCH 1001 - French Language and Culture I
Students will develop communicative skills in French, including listening, speaking, reading, and writing. Introduction to Francophone culture through discussion of readings and visual media. Intended for students with no previous French experience. Students with previous French experience are expected to contact the department for placement advising.

FRENCH 1002 - French Language and Culture II
Students will continue to develop communicative skills in French, including listening, speaking, reading, and writing. Continued exploration of Francophone culture through discussion of readings and visual media. Prerequisite: FRENCH 1001 or equivalent.

FRENCH 2101 - French Language and Culture III
Students will further develop the four language skills through meaningful communicative interaction. Students will advance their understanding of Francophone culture through discussion of readings and visual media. Students who have successfully completed this course may advance to FRENCH 2170 and FRENCH 2180.