

Degree Description

Preparatory classes leading into a Associate of Science in Biomedical Engineering.

Students should work carefully with an advisor in course planning and selection.

Email enr@mclennan.edu for additional information.

Engineering Marketable Skills are based on required objectives from the Accreditation Board for Engineering and Technology (ABET). ABET accredits 4-year engineering schools, so all engineering schools must establish they meet these objectives (among others).

Marketable Skills

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
3. An ability to function on multidisciplinary teams
4. An ability to identify, formulate, and solve engineering problems
5. An ability to communicate effectively

Semester I	Hours
ENGR 1201 Introduction to Engineering ¹	2 hours
BIOL 1406 Biology for Science Majors I	4 hours
CHEM 1411 General Chemistry I OR CHEM 1409 General Chemistry for Engineering Majors	4 hours
MATH 2413 Calculus I	4 hours
Texas Core Curriculum elective ²	3 hours
	17 hours
Semester II	Hours
ENGR 2304 Programming for Engineers	3 hours
PHYS 2425 University Physics I	4 hours
CHEM 1412 General Chemistry II	4 hours
MATH 2414 Calculus II	4 hours
	15 hours
Semester III	Hours
ENGR 2301 Engineering Mechanics: Statics	3 hours
PHYS 2426 University Physics II	4 hours
CHEM 2423 Organic Chemistry I	4 hours
Texas Core Curriculum elective ²	3 hours
	14 hours
Semester IV	Hours
ENGR 2305 Electrical Circuits I Lecture	3 hours
ENGR 2105 Electrical Circuits I Laboratory	1 hours
MATH 2415 Calculus III	4 hours
MATH 2320 Differential Equations	3 hours
Texas Core Curriculum elective ²	3 hours
	14 hours

Total hours: 60 hours

¹ All engineering courses require a minimum of Math 1314 (College Algebra) or equivalent. Speak with an advisor for details, including information about math placement. All courses in the degree plan must be completed with a C or better. All first time in college students are required to complete a Learning Framework Course. Students who are TSI exempt or must complete one section of developmental education should enroll in PSYC 1100 or EDUC 1100. All other first time in college students should enroll in PSYC 1300 or EDUC 1300. See your advisor for more information. PSYC/EDUC 1100 is a one-hour course, and PSYC/EDUC 1300 is a three-hour course, which makes the total number of hours required 61 or 63 hours respectively.

² In addition to the technical coursework above, students also need to complete 9 hours (3 courses) of core coursework. These courses can be taken at any time. Some recommended core courses for engineering students: ENGL 1301 - Composition I, GOVT 2305 - National Government, GOVT 2306 - Texas Government, HIST 1301 - History of US to 1877, HIST 1302 - History of US from 1877.

Electives/General Education Courses

Texas Core Curriculum

ENGL 1301 Composition I	3 hours
ENGL 2311 Technical & Business Writing	3 hours
COMM 1307 Introduction to Mass Communication	3 hours
SPCH 1311 Introduction to Speech Communication	3 hours
SPCH 1315 Public Speaking	3 hours
SPCH 1321 Business & Professional Communication	3 hours
MATH 1314 College Algebra	3 hours
MATH 1316 Plane Trigonometry	3 hours
MATH 1324 Mathematics for Business & Social Sciences	3 hours
MATH 1325 Calculus for Business & Social Sciences	3 hours
MATH 1332 Contemporary Mathematics (Quantitative Reasoning)	3 hours
MATH 1342 Elementary Statistical Methods	3 hours
MATH 2412 Pre-Calculus Mathematics	4 hours
MATH 2413 Calculus I	4 hours
PHIL 2303 Introduction to Formal Logic	3 hours
BIOL 1406 Biology for Science Majors I	4 hours
BIOL 1407 Biology for Science Majors II	4 hours
BIOL 1408 Biology for Non-Science Majors I	4 hours
BIOL 1409 Biology for Non-Science Majors II	4 hours
BIOL 1411 General Botany	4 hours
BIOL 1413 General Zoology	4 hours
BIOL 2401 Anatomy & Physiology I	4 hours
BIOL 2402 Anatomy & Physiology II	4 hours
BIOL 2404 Anatomy & Physiology (specialized)	4 hours
CHEM 1405 Introductory Chemistry I	4 hours
CHEM 1409 General Chemistry for Engineering Majors	4 hours
CHEM 1411 General Chemistry I	4 hours
CHEM 1412 General Chemistry II	4 hours
ENVR 1101 Environmental Science I (lab)	1 hours
ENVR 1301 Environmental Science I (lecture)	3 hours
ENVR 1102 Environmental Science II (lab)	1 hours
ENVR 1302 Environmental Science II - Lecture	3 hours
ENVR 1401 Environmental Science I (lecture + lab)	4 hours
ENVR 1402 Environmental Science II	4 hours
GEOL 1101 Earth Sciences I for Non-Science Majors (lab)	1 hours
GEOL 1301 Earth Sciences I for Non-Science Majors (lecture)	3 hours
GEOL 1102 Earth Sciences II for Non-Science Majors (lab)	1 hours
GEOL 1302 Earth Sciences II for Non-Science Majors (lecture)	3 hours
GEOL 1103 Physical Geology Laboratory	1 hours
GEOL 1303 Physical Geology (lecture)	3 hours
GEOL 1104 Historical Geology Laboratory	1 hours
GEOL 1304 Historical Geology (lecture)	3 hours
GEOL 1401 Earth Sciences I for Non-Sciences Majors (lecture + lab)	4 hours
GEOL 1402 Earth Sciences II for Non-Science Majors (lecture + lab)	4 hours
GEOL 1403 Physical Geology (lecture + lab)	4 hours
GEOL 1404 Historical Geology (lecture + lab)	4 hours
PHYS 1401 College Physics I	4 hours
PHYS 1402 College Physics II	4 hours
PHYS 1403 Stars and Galaxies	4 hours
PHYS 1404 Solar System	4 hours
PHYS 1405 Elementary Physics I	4 hours
PHYS 1407 Elementary Physics II	4 hours
PHYS 2425 University Physics I	4 hours
PHYS 2426 University Physics II	4 hours
ENGL 2321 British Literature	3 hours
ENGL 2322 British Literature I	3 hours
ENGL 2323 British Literature II	3 hours
ENGL 2326 American Literature	3 hours
ENGL 2327 American Literature I: Up to the Civil War	3 hours
ENGL 2328 American Literature II: Civil War to the Present	3 hours
ENGL 2331 World Literature	3 hours
ENGL 2332 World Literature I: Up to the 17th Century	3 hours
ENGL 2333 World Literature II: 17th Century to the Present	3 hours
ENGL 2341 Forms of Literature	3 hours
FREN 2311 Intermediate French I	3 hours
GERM 2311 Intermediate German I	3 hours
HUMA 1301 Introduction to Humanities I	3 hours
HUMA 1302 Introduction to Humanities II	3 hours
PHIL 1301 Introduction to Philosophy	3 hours
PHIL 2306 Introduction to Ethics	3 hours
SPAN 2311 Intermediate Spanish I	3 hours

Texas Core Curriculum

SGNL 2301 Intermediate ASL I	3 hours
ARTS 1301 Art Appreciation	3 hours
ARTS 1303 Art History I (Prehistoric to the 14th Century)	3 hours
ARTS 1304 Art History II (14th Century to the Present)	3 hours
DRAM 1310 Theater Appreciation	3 hours
DRAM 2361 History of Theater I	3 hours
DRAM 2362 History of Theater II	3 hours
HUMA 1315 Fine Arts Appreciation	3 hours
MUSI 1306 Music Appreciation	3 hours
MUSI 1308 Music Literature I	3 hours
MUSI 1309 Music Literature II	3 hours
MUSI 1310 American Music	3 hours
HIST 1301 United States History I	3 hours
HIST 1302 United States History II	3 hours
GOVT 2305 Federal Government	3 hours
GOVT 2306 Texas Government	3 hours
ANTH 2351 Cultural Anthropology	3 hours
CRIJ 1301 Introduction to Criminal Justice	3 hours
ECON 2301 Principles of Macroeconomics	3 hours
ECON 2302 Principles of Microeconomics	3 hours
ENGR 2308 Engineering Economics	3 hours
PSYC 2301 General Psychology	3 hours
SOC1 1301 Introduction to Sociology	3 hours
SOC1 1306 Social Problems	3 hours
SOC1 2326 Social Psychology	3 hours
SOCW 2361 Introduction to Social Work	3 hours

Course Descriptions

ENGR 1201 Introduction to Engineering

An introduction to the engineering profession with emphasis on technical communication and team-based engineering design. Prerequisite: Math 1314 or equivalent preparation. Semester Hours 2 (1 lec/3 lab)

BIOL 1406 Biology for Science Majors I

Fundamental principles of living organisms will be studied, including physical and chemical properties of life, organization, function, evolutionary adaptation, and classification. Concepts of cytology, reproduction, genetics, and scientific reasoning are included. NOTE: Must have passed the reading and writing portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 4 (3 lec/3 lab)

CHEM 1411 General Chemistry I

Fundamental principles of chemistry for majors in the sciences, health sciences, and engineering; topics include measurements, fundamental properties of matter, states of matter, chemical reactions, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, and an introduction to thermodynamics and descriptive chemistry. Includes basic laboratory experiments supporting theoretical principles presented in CHEM 1411, as well as an introduction of the scientific method, experimental design, data collection and analysis, and preparation of laboratory reports. Prerequisite: MATH 1314 with a minimum grade of C, passing score on non-credit equivalency exam for MATH 1314, or consent of division chair. High school chemistry is strongly recommended. Semester Hours 4 (3 lec/3 lab)

CHEM 1409 General Chemistry for Engineering Majors

Fundamental principles of chemistry for engineering majors; topics include measurements, fundamental properties of matter, states of matter, chemical reactions, acid-base concepts, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, phase-diagrams, introduction to chemical equilibrium, chemical thermodynamics, electrochemistry, and an introduction to descriptive inorganic chemistry and organic chemistry. Basic laboratory experiments supporting theoretical principles presented in CHEM 1309; introduction of the scientific method, experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports. Prerequisites: MATH 1314 with a minimum grade of C or equivalent preparation. Semester Hours 4 (3 lec/4 lab)

MATH 2413 Calculus I

Limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental functions, with an application to calculation of areas. Graphing calculator required. Prerequisite: MATH 2412 with a minimum grade of C, or both MATH 1314 and MATH 1316 with minimum grades of C, or passing score on non-credit equivalency exam for MATH 2412, or consent of division chair. Semester Hours 4 (4 lec)

ENGR 2304 Programming for Engineers

Programming principles and techniques for matrix and array operations, equation solving, and numeric simulations applied to engineering problems and visualization of engineering information. Platforms include spreadsheets, symbolic algebra packages, engineering analysis software, and laboratory control software. Prerequisite: MATH 2413 Semester Hours 3 (3 lec/2 lab)

PHYS 2425 University Physics I

Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical mechanics, including harmonic motion, physical systems and thermodynamics; and emphasis on problem solving. Basic laboratory experiments supporting theoretical principles involving the principles and applications of classical mechanics, including harmonic motion and physical systems; experimental design, data collection and analysis, and preparation of laboratory reports. Prerequisite: MATH 2413 with a grade of C or better. Semester Hours 4 (3 lec/3 lab)

CHEM 1412 General Chemistry II

Chemical equilibrium, phase diagrams and spectrometry, acid-base concepts, thermodynamics, kinetics, electrochemistry, nuclear chemistry, an introduction to organic chemistry and descriptive inorganic chemistry. Includes basic laboratory experiments supporting theoretical principles presented in CHEM 1412, as well as an introduction of the scientific method, experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports. Prerequisite: CHEM 1411 with a grade of C or better. Semester Hours 4 (3 lec/4 lab)

MATH 2414 Calculus II

Differentiation and integration of transcendental functions; parametric equations and polar coordinates; techniques of integration; sequences and series; improper integrals. Graphing calculator required. Prerequisite: MATH 2413 with a grade of C or better or consent of division chair. Semester Hours 4 (4 lec)

ENGR 2301 Engineering Mechanics: Statics

Basic theory of engineering mechanics, using calculus, involving the description of forces, moments, and couples acting on stationary engineering structures; equilibrium in two and three dimensions; free-body diagrams; friction; centroids; centers of gravity; and moments of inertia. Prerequisite: PHYS 2425, concurrent enrollment in MATH 2414 (calculus II) or previous completion of MATH 2414. Semester Hours 3 (3 lec/1 lab)

PHYS 2426 University Physics II

Principles of physics for science, computer science, and engineering majors, using calculus, involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics. Laboratory experiments supporting theoretical principles involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics; experimental design, data collection and analysis, and preparation of laboratory reports. Prerequisites: PHYS 2425 and MATH 2414 with a grade of C or better. Semester Hours 4 (3 lec/3 lab)

CHEM 2423 Organic Chemistry I

Fundamental principles of organic chemistry will be studied, including the structure, bonding, properties, and reactivity of organic molecules, as well as properties and behavior of organic compounds and their derivatives. Emphasis is on organic synthesis and mechanisms. Includes study of covalent and ionic bonding, nomenclature, stereochemistry, structure and reactivity, reaction mechanisms, functional groups, and synthesis of simple molecules. Methods of purification and identification of organic compounds will be examined. This course is intended for students in science or pre-professional programs. Prerequisite: CHEM 1411 and 1412 with a grade of C or better. Semester Hours 4 (3 lec/4 lab)

ENGR 2305 Electrical Circuits I Lecture

Principles of electrical circuits and systems. Basic circuit elements (resistance, inductance, mutual inductance, capacitance, independent and dependent controlled voltage, and current sources). Topology of electrical networks, Kirchhoff's laws, node and mesh analysis, DC circuit analysis, operational amplifiers, transient and sinusoidal steady-state analysis, AC circuit analysis, first- and second-order circuits, Bode plots, and use of computer simulation software to solve circuit problems. Prerequisite: PHYS 2426 or MATH 2320. Corequisite: ENGR 2105. Semester Hours 3 (3 lec)

ENGR 2105 Electrical Circuits I Laboratory

Laboratory experiments supporting theoretical principles presented in ENGR 2305 involving DC and AC circuit theory, network theorems, time, and frequency domain circuit analysis. Introduction to principles and operation of basic laboratory equipment; laboratory report preparation. Prerequisite: PHYS 2426. Corequisite: ENGR 2305. Semester Hour 1 (4 lab)

MATH 2415 Calculus III

Advanced topics in calculus, including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, and Jacobians; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem. Graphing calculator required. Prerequisite: MATH 2414 with a grade of C or better or consent of division chair. Semester Hours 4 (4 lec)

MATH 2320 Differential Equations

Ordinary differential equations, including linear equations, systems of equations, equations with variable coefficients, existence and uniqueness of solutions, series solutions, singular points, transform methods, and boundary value problems; application of differential equations to real-world problems. Graphing calculator required. Prerequisite or corequisite: MATH 2414 minimum grade of C. Semester Hours 3 (3 lec)

ENGL 1301 Composition I

Intensive study of and practice in writing processes, from invention and researching to drafting, revising, and editing, both individually and collaboratively. Emphasis is on effective rhetorical choices, including audience, purpose, arrangement, and style. Focus is on writing the academic essay as a vehicle for learning, communication, and critical analysis. Prerequisite: TSI complete in Writing or the equivalent. Semester Hours 3 (3 lec)

ENGL 2311 Technical & Business Writing

Intensive study of and practice in professional settings. Focus on the types of documents necessary to make decisions and take action on the job, such as proposals, reports, instructions, policies and procedures, e-mail messages, letters, and descriptions of products and services. Practice of individual and collaborative processes involved in the creation of ethical and efficient documents. Prerequisite: TSI complete in Writing or the equivalent. Semester Hours 3 (3 lec)

COMM 1307 Introduction to Mass Communication

Survey of basic content and structural elements of mass media and their functions and influences on society. Semester Hours 3 (3 lec)

SPCH 1311 Introduction to Speech Communication

Introduces basic human communication principles and theories embedded in a variety of contexts, including interpersonal, small group, and public speaking. Semester Hours 3 (3 lec)

SPCH 1315 Public Speaking

Application of communication theory and practice to the public speaking context, with emphasis on audience analysis, speaker delivery, ethics of communication, cultural diversity, and speech organizational techniques to develop students' speaking abilities, as well as ability to effectively evaluate oral presentations. Semester Hours 3 (3 lec)

SPCH 1321 Business & Professional Communication

Study and application of communication within the business and professional context. Special emphasis will be given to communication competencies in presentations, dyads, teams, and technologically mediated formats. Semester Hours 3 (3 lec)

MATH 1314 College Algebra

In-depth study and applications of polynomial, rational, radical, exponential and logarithmic functions, and systems of equations using matrices. Additional topics such as sequences, series, probability, and conics may be included. Graphing calculator required. Prerequisite: TSI math complete or MATH 0311. Semester Hours 3 (3 lec)

MATH 1316 Plane Trigonometry

In-depth study and applications of trigonometry including definitions, identities, inverse functions, solutions of equations, graphing, and solving triangles. Additional topics such as vectors, polar coordinates and parametric equations may be included. Graphing calculator required. Prerequisite: MATH 1314 with a minimum grade of C, or passing score on non-credit equivalency exam for MATH 1314, or consent of division chair. Semester Hours 3 (3 lec)

MATH 1324 Mathematics for Business & Social Sciences

The application of common algebraic functions, including polynomial, exponential, logarithmic and rational, to problems in business, economics and the social sciences are addressed. The applications include mathematics of finance, including simple and compound interest and annuities; systems of linear equations; matrices, linear programming; and probability, including expected value. Prerequisite: TSI math complete or MATH 0311. Semester Hours 3 (3 lec)

MATH 1325 Calculus for Business & Social Sciences

This course is the basic study of limits and continuity, differentiation, optimization and graphing, and integration of elementary functions, with emphasis on applications in business, economics and social sciences. This course is not a substitute for MATH 2313 or 2413 - Calculus I. Prerequisite: MATH 1314 or MATH 1324, minimum grade C. Semester Hours 3 (3 lec)

MATH 1332 Contemporary Mathematics (Quantitative Reasoning)

Intended for Non- STEM (Science, Technology, Engineering, and Mathematics) majors. Topics include introductory treatments of sets and logic, financial mathematics, probability and statistics with appropriate applications. Number sense, proportional reasoning, estimation, technology, and communication should be embedded throughout the course. Additional topics may be covered. Graphing calculator required. Prerequisite: TSI math complete or MATH 0308 or consent of division chair. Semester Hours 3 (3 lec)

MATH 1342 Elementary Statistical Methods

Collection, analysis, presentation and interpretation of data, and probability. Analysis includes descriptive statistics, correlation and regression, confidence intervals and hypothesis testing. Use of appropriate technology is recommended. Graphing calculator required. Prerequisite: TSI math complete or MATH 0308 or completion of college-level math course or consent of division chair. Semester Hours 3 (3 lec)

MATH 2412 Pre-Calculus Mathematics

In-depth combined study of algebra, trigonometry, and other topics for calculus readiness. Prerequisite: MATH 1314 with a minimum grade of C, or passing score on non-credit equivalency exam for MATH 1314, or consent of division chair. Semester Hours 4 (4 lec)

MATH 2413 Calculus I

Limits and continuity; the Fundamental Theorem of Calculus; definition of the derivative of a function and techniques of differentiation; applications of the derivative to maximizing or minimizing a function; the chain rule, mean value theorem, and rate of change problems; curve sketching; definite and indefinite integration of algebraic, trigonometric, and transcendental functions, with an application to calculation of areas. Graphing calculator required. Prerequisite: MATH 2412 with a minimum grade of C, or both MATH 1314 and MATH 1316 with minimum grades of C, or passing score on non-credit equivalency exam for MATH 2412, or consent of division chair. Semester Hours 4 (4 lec)

PHIL 2303 Introduction to Formal Logic

The purpose of the course is to introduce the student to symbolic logic, including syllogisms, propositional and predicate logic, and logical proofs in a system of rules. Semester Hours 3 (3 lec)

BIOL 1406 Biology for Science Majors I

Fundamental principles of living organisms will be studied, including physical and chemical properties of life, organization, function, evolutionary adaptation, and classification. Concepts of cytology, reproduction, genetics, and scientific reasoning are included. NOTE: Must have passed the reading and writing portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 4 (3 lec/3 lab)

BIOL 1407 Biology for Science Majors II

The diversity and classification of life will be studied, including animals, plants, protists, fungi, and prokaryotes. Special emphasis will be given to anatomy, physiology, ecology, and evolution of plants and animals. Prerequisite: BIOL 1406 with a minimum grade of C. Semester Hours 4 (3 lec/3 lab)

BIOL 1408 Biology for Non-Science Majors I

Provides a survey of biological principles with an emphasis on humans, including chemistry of life, cells, structure, function, and reproduction. Semester Hours 4 (3 lec/3 lab)

BIOL 1409 Biology for Non-Science Majors II

This course will provide and reinforce a survey and of biological principles with an emphasis on humans, including evolution, ecology, plant and animal diversity, and physiology. Semester hours 4 (3 lec/3 lab)

BIOL 1411 General Botany

Fundamental biological concepts relevant to plant physiology, life cycle, growth and development, structure and function, and cellular and molecular metabolism. Includes the role of plants in the environment, evolution, and phylogeny of major plant groups, algae, and fungi. This course is intended for science majors. Semester Hours 4 (3 lec/3 lab)

BIOL 1413 General Zoology

Fundamental biological concepts relevant to animals, including systematics, evolution, structure and function, cellular and molecular metabolism, reproduction, development, diversity, phylogeny, and ecology. This course is intended for science majors. Semester Hours 4 (3 lec/3 lab)

BIOL 2401 Anatomy & Physiology I

Anatomy and Physiology I is the first part of a two-course sequence. It is a study of the structure and function of the human body including cells, tissues and organs of the following systems: integumentary, skeletal, muscular, and nervous and special senses. Emphasis is on interrelationships among systems and regulation of physiological functions involved in maintaining homeostasis. NOTE: Must have passed the reading and writing portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 4 (3 lec/3 lab)

BIOL 2402 Anatomy & Physiology II

Anatomy and Physiology II is the second part of a two-course sequence. It is a study of the structure and function of the human body including the following systems: endocrine, cardiovascular, immune, lymphatic, respiratory, digestive (including nutrition), urinary (including fluid and electrolyte balance), and reproductive (including human development and genetics). Emphasis is on interrelationships among systems and regulation of physiological functions involved in maintaining homeostasis. Prerequisite: BIOL 2401 with a grade of C or better. Semester Hours 4(3 lec/3 lab)

BIOL 2404 Anatomy & Physiology (specialized)

Study of the structure and function of human anatomy, including the neuroendocrine, integumentary, musculoskeletal, digestive, urinary, reproductive, respiratory, and circulatory systems. Content may be either integrated or specialized. Semester Hours 4 (3 lec/3 lab)

CHEM 1405 Introductory Chemistry I

Survey course introducing chemistry. Topics may include inorganic, organic, biochemistry, food/physiological chemistry, and environmental/consumer chemistry. Designed for allied health students and for students who are not science majors. Semester Hours 4 (3 lec/3 lab)

CHEM 1409 General Chemistry for Engineering Majors

Fundamental principles of chemistry for engineering majors; topics include measurements, fundamental properties of matter, states of matter, chemical reactions, acid-base concepts, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, phase-diagrams, introduction to chemical equilibrium, chemical thermodynamics, electrochemistry, and an introduction to descriptive inorganic chemistry and organic chemistry. Basic laboratory experiments supporting theoretical principles presented in CHEM 1309; introduction of the scientific method, experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports. Prerequisites: MATH 1314 with a minimum grade of C or equivalent preparation. Semester Hours 4 (3 lec/4 lab)

CHEM 1411 General Chemistry I

Fundamental principles of chemistry for majors in the sciences, health sciences, and engineering; topics include measurements, fundamental properties of matter, states of matter, chemical reactions, chemical stoichiometry, periodicity of elemental properties, atomic structure, chemical bonding, molecular structure, solutions, properties of gases, and an introduction to thermodynamics and descriptive chemistry. Includes basic laboratory experiments supporting theoretical principles presented in CHEM 1411, as well as an introduction of the scientific method, experimental design, data collection and analysis, and preparation of laboratory reports. Prerequisite: MATH 1314 with a minimum grade of C, passing score on non-credit equivalency exam for MATH 1314, or consent of division chair. High school chemistry is strongly recommended. Semester Hours 4 (3 lec/3 lab)

CHEM 1412 General Chemistry II

Chemical equilibrium, phase diagrams and spectrometry, acid-base concepts, thermodynamics, kinetics, electrochemistry, nuclear chemistry, an introduction to organic chemistry and descriptive inorganic chemistry. Includes basic laboratory experiments supporting theoretical principles presented in CHEM 1412, as well as an introduction of the scientific method, experimental design, chemical instrumentation, data collection and analysis, and preparation of laboratory reports. Prerequisite: CHEM 1411 with a grade of C or better. Semester Hours 4 (3 lec/4 lab)

ENVR 1101 Environmental Science I (lab)

This laboratory-based course accompanies ENVR 1301 Environmental Science (lecture). Activities will cover methods used to collect and analyze environmental data. Prerequisite: Credit for or concurrent enrollment in ENVR 1301. Semester Hour 1 (3 lab)

ENVR 1301 Environmental Science I (lecture)

A survey of the forces, including humans, that shape our physical and biologic environment, and how they affect life on Earth. Introduction to the science and policy of global and regional environmental issues, including pollution, climate change, and sustainability of land, water, and energy resources. Semester Hours 3 (3 lec)

ENVR 1102 Environmental Science II (lab)

General interest course requiring a minimum of previous science background and relating scientific knowledge to problems involving energy and the environment. Lab exercises relate scientific knowledge to problems involving energy and the environment. Includes research projects related to the historical development of current environmental practices and concerns. May include other research projects dealing with current or potential environmental concerns. Prerequisite: Credit for or concurrent enrollment in ENVR 1302. Semester Hour 1 (3 lab)

ENVR 1302 Environmental Science II - Lecture

General interest course requiring a minimum of previous science background and relating scientific knowledge to problems involving energy and the environment. Semester Hours 3 (3 lec)

ENVR 1401 Environmental Science I (lecture + lab)

A survey of the forces, including humans, that shape our physical and biologic environment, and how they affect life on Earth. Introduction to the science and policy of global and regional environmental issues, including pollution, climate change, and sustainability of land, water, and energy resources. The laboratory activities will cover methods used to collect and analyze environmental data. Semester Hours 4 (3 lec/3 lab)

ENVR 1402 Environmental Science II

General interest course requiring a minimum of previous science background and relating scientific knowledge to problems involving energy and the environment. Lab exercises relate scientific knowledge to problems involving energy and the environment. Includes research projects related to the historical development of current environmental practices and concerns. May include other research projects dealing with current or potential environmental concerns. Semester Hours 4 (3 lec/3 lab)

GEOL 1101 Earth Sciences I for Non-Science Majors (lab)

This laboratory-based course accompanies GEOL 1301 Earth Sciences I. Activities will cover methods used to collect and analyze data in geology, meteorology, oceanography and astronomy. Prerequisite: GEOL 1301. Semester Hours 1 (3 lab)

GEOL 1301 Earth Sciences I for Non-Science Majors (lecture)

Survey of geology, meteorology, oceanography and astronomy. Semester Hours 3 (3 lec)

GEOL 1102 Earth Sciences II for Non-Science Majors (lab)

This laboratory-based course accompanies GEOL 1302 Earth Sciences II. Activities will focus on methods used to collect and analyze data related to natural resources, hazards and climate variability. Prerequisite: Credit for or concurrent enrollment in GEOL 1302. Semester Hour 1 (3 lab)

GEOL 1302 Earth Sciences II for Non-Science Majors (lecture)

Extension of the study of geology, astronomy, meteorology and oceanography, focusing on natural resources, hazards and climate variability. Prerequisite: GEOL 1401, 1403 or 1404. Semester Hours 3 (3 lec)

GEOL 1103 Physical Geology Laboratory

This laboratory-based course accompanies GEOL 1303 Physical Geology. Laboratory activities will cover methods used to collect and analyze earth science data. Prerequisite: GEOL 1303 or concurrent enrollment. Semester Hour 1 (3 lab)

GEOL 1303 Physical Geology (lecture)

Introduction to the study of the materials and processes that have modified and shaped the surface and interior of Earth over time. These processes are described by theories based on experimental data and geologic data gathered from field observations. Semester Hours 3 (3 lec)

GEOL 1104 Historical Geology Laboratory

This laboratory-based course accompanies GEOL 1304 Historical Geology. Laboratory activities will introduce methods used by scientists to interpret the history of life and major events in the physical development of earth from rocks and fossils. Prerequisite: GEOL 1304. Semester Hour 1 (3 lab)

GEOL 1304 Historical Geology (lecture)

A comprehensive survey of the history of life and major events in the physical development of Earth as interpreted from rocks and fossils. Prerequisites: GEOL 1303 or 1403. Semester Hours 3 (3 lec)

GEOL 1401 Earth Sciences I for Non-Sciences Majors (lecture + lab)

Survey of geology, meteorology, oceanography, and astronomy. The lab activities will cover methods used to collect and analyze data in geology, meteorology, oceanography and astronomy. Semester Hours 4 (3 lec/3 lab)

GEOL 1402 Earth Sciences II for Non-Science Majors (lecture + lab)

Extension of the study of geology, astronomy, meteorology and oceanography, focusing on natural resources, hazards and climate variability. Lab activities will focus on methods used to collect and analyze data related to natural resources, hazards and climate variability. Prerequisite: GEOL 1401, 1403 or 1404. Semester Hours 4 (3 lec/3 lab)

GEOL 1403 Physical Geology (lecture + lab)

Introduction to the study of the materials and processes that have modified and shaped the surface and interior of Earth over time. These processes are described by theories based on experimental data and geologic data gathered from field observations. Laboratory activities will cover methods used to collect and analyze earth science data. Semester Hours 4 (3 lec/3 lab)

GEOL 1404 Historical Geology (lecture + lab)

A comprehensive survey of the history of life and major events in the physical development of Earth as interpreted from rocks and fossils. Laboratory activities will introduce methods used by scientists to interpret the history of life and major events in the physical development of earth from rocks and fossils. Prerequisite: GEOL 1303 or 1403. Semester Hours 4 (3 lec/3 lab)

PHYS 1401 College Physics I

Fundamental principles of physics, using algebra and trigonometry; the principles and applications of classical mechanics and thermodynamics, including harmonic motion, mechanical waves and sound, physical systems, Newton's Laws of Motion, and gravitation and other fundamental forces; with emphasis on problem solving. Prerequisite: MATH 1316, 2412 or 2413 with a grade of C or better. Semester Hours 4 (3 lec/3 lab)

PHYS 1402 College Physics II

Fundamental principles of physics, using algebra and trigonometry; the principles and applications of electricity and magnetism, including circuits, electrostatics, electromagnetism, waves, sound, light, optics, and modern physics topics; with emphasis on problem solving. Prerequisite: PHYS 1401. Semester Hours 4 (3 lec/3 lab)

PHYS 1403 Stars and Galaxies

Study of stars, galaxies, and the universe outside our solar system. Semester Hours 4 (3 lec/3 lab)

PHYS 1404 Solar System

Study of the sun and its solar system, including its origin. Semester Hours 4 (3 lec/3 lab)

PHYS 1405 Elementary Physics I

Conceptual level survey of topics in physics intended for liberal arts and other non-science majors. Semester Hours 4 (3 lec/3 lab)

PHYS 1407 Elementary Physics II

Conceptual level survey of topics in physics intended for liberal arts and other non-science majors. Semester Hours 4 (3 lec/3 lab)

PHYS 2425 University Physics I

Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical mechanics, including harmonic motion, physical systems and thermodynamics; and emphasis on problem solving. Basic laboratory experiments supporting theoretical principles involving the principles and applications of classical mechanics, including harmonic motion and physical systems; experimental design, data collection and analysis, and preparation of laboratory reports. Prerequisite: MATH 2413 with a grade of C or better. Semester Hours 4 (3 lec/3 lab)

PHYS 2426 University Physics II

Principles of physics for science, computer science, and engineering majors, using calculus, involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics. Laboratory experiments supporting theoretical principles involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics; experimental design, data collection and analysis, and preparation of laboratory reports. Prerequisites: PHYS 2425 and MATH 2414 with a grade of C or better. Semester Hours 4 (3 lec/3 lab)

ENGL 2321 British Literature

A survey of the development of British literature from the Anglo-Saxon period to the present. Students will study works of prose, poetry, drama, and fiction in relation to their historical, linguistic, and cultural contexts. Texts will be selected from a diverse group of authors and traditions. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2322 British Literature I

A survey of the development of British literature from the Anglo-Saxon period to the Eighteenth Century. Students will study works of prose, poetry, drama, and fiction in relation to their historical, linguistic, and cultural contexts. Texts will be selected from a diverse group of authors and traditions. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2323 British Literature II

A survey of the development of British literature from the Romantic period to the present. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from a diverse group of authors and traditions. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2326 American Literature

A survey of American literature from the period of exploration and settlement to the present. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from among a diverse group of authors for what they reflect and reveal about the evolving American experience and character. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2327 American Literature I: Up to the Civil War

A survey of American literature from the period of exploration and settlement through the Civil War. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from among a diverse group of authors for what they reflect and reveal about the evolving American experience and character. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2328 American Literature II: Civil War to the Present

A survey of American literature from the Civil War to the present. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from among a diverse group of authors for what they reflect and reveal about the evolving American experience and character. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2331 World Literature

A survey of world literature from the ancient world to the present. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from a diverse group of authors and traditions. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2332 World Literature I: Up to the 17th Century

A survey of world literature from the ancient world through the 16th century. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from a diverse group of authors and traditions. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2333 World Literature II: 17th Century to the Present

A survey of world literature from the 17th century to the present. Students will study works of prose, poetry, drama, and fiction in relation to their historical and cultural contexts. Texts will be selected from a diverse group of authors and traditions. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

ENGL 2341 Forms of Literature

The study of one or more literary genres including, but not limited to, poetry, fiction, drama, and film. Prerequisite: ENGL 1301 or ENGL 2311. Semester Hours 3 (3 lec)

FREN 2311 Intermediate French I

Review and application of skills in listening comprehension, speaking, reading, and writing. Emphasizes conversation, vocabulary acquisition, reading, composition, and culture. Prerequisite: FREN 1412, three years of high school French, or consent of instructor or division chair. Students with three years of high school French are encouraged to see a French instructor prior to enrolling. Semester Hours 3 (3 lec)

GERM 2311 Intermediate German I

Review and application of skills in listening comprehension, speaking, reading, and writing. Emphasizes conversation, vocabulary acquisition, reading, composition, and culture. Prerequisite: GERM 1412, three years of high school German, or consent of instructor or division chair. Students with three years of high school German are encouraged to see a German instructor prior to enrolling. Semester Hours 3 (3 lec)

HUMA 1301 Introduction to Humanities I

This stand-alone course is an interdisciplinary survey of cultures focusing on the philosophical and aesthetic factors in human values with an emphasis on the historical development of the individual and society and the need to create. Team taught by faculty from diverse departments as a colloquium (academic seminar led by a different lecturer and on a different topic at each session). Works may include studies, journals, novels, poems, treatises, graphic novels, films, plays, paintings, musical compositions, etc. Semester Hours 3 (3 lec)

HUMA 1302 Introduction to Humanities II

This stand-alone course is an interdisciplinary survey of cultures focusing on the philosophical and aesthetic factors in human values with an emphasis on the historical development of the individual and society and the need to create. Team taught by faculty from diverse departments as a colloquium (academic seminar led by a different lecturer and on a different topic at each session). Works may include studies, journals, novels, poems, treatises, graphic novel films, plays, paintings, musical compositions, etc. Semester Hours 3 (3 lec)

PHIL 1301 Introduction to Philosophy

A study of major issues in philosophy and/or the work of major philosophical figures in philosophy. Topics in philosophy may include theories of reality, theories of knowledge, theories of value, and their practical applications. Semester Hours 3 (3 lec)

PHIL 2306 Introduction to Ethics

The systematic evaluation of classical and/or contemporary ethical theories concerning the good life, human conduct in society, morals, and standards of value. Semester Hours 3 (3 lec)

SPAN 2311 Intermediate Spanish I

The consolidation of skills acquired at the introductory level. Further development of proficiency in listening, speaking, reading and writing. Emphasis is on comprehension, appreciation, and interpretation of the cultures of the Spanish-speaking world. Prerequisite: SPAN 1412, three years of high school Spanish, or consent of instructor or division chair. Students with three years of high school Spanish are encouraged to see a Spanish instructor prior to enrolling. Semester Hours 3 (3 lec)

SGNL 2301 Intermediate ASL I

Review and application of conversational skills in American Sign Language and interpreting from signing to voice as well as from voice to signing. Introduction to American Sign Language literature and folklore. Prerequisite: SGNL 1402 with a grade of C or better or consent of the program director. Semester Hours 3 (3 lec)

ARTS 1301 Art Appreciation

A general introduction to the visual arts designed to create an appreciation of the vocabulary, media, techniques, and purposes of the creative process. Students will critically interpret and evaluate works of art within formal, cultural, and historical contexts. Semester Hours 3 (3 lec)

ARTS 1303 Art History I (Prehistoric to the 14th Century)

A chronological analysis of the historical and cultural contexts of the visual arts from prehistoric times to the 14th century. Semester Hours 3 (3 lec)

ARTS 1304 Art History II (14th Century to the Present)

A chronological analysis of the historical and cultural contexts of the visual arts from the 14th century to the present day. Semester Hours 3 (3 lec)

DRAM 1310 Theater Appreciation

Survey of theater including its history, dramatic works, stage techniques, production procedures, and relation to other art forms. Participation in major productions may be required. Applies as a required Humanities or Visual & Performing Arts course for all students. Semester Hours 3 (3 lec)

DRAM 2361 History of Theater I

Study of the history of the theater from primitive times through the Renaissance. Required of theatre majors; open to non-theatre majors. Semester Hours 3 (3 lec)

DRAM 2362 History of Theater II

Study of the history of the theater from the Renaissance through today. Required of theatre majors; open to non-theatre majors. Semester Hours 3 (3 lec)

HUMA 1315 Fine Arts Appreciation

This course is an exploration of the purposes and processes in the visual and performing arts (such as music, painting, architecture, drama, and dance) and the ways in which they express the values of cultures and human experience. Semester Hours 3 (3 lec)

MUSI 1306 Music Appreciation

Understanding music through the study of cultural periods, major composers, and musical elements. Illustrated with audio recordings and live performances. (Does not apply to a music major degree.) Applies as a required humanities or fine arts course for all students. Semester Hours 3 (3 lec)

MUSI 1308 Music Literature I

Survey of the principal musical forms and cultural periods as illustrated in the literature of major composers. Surveys music literature from Gregorian chant to the early classical period. Emphasis is on music materials and listening skills through recorded music and scores. Required for music majors and minors. Semester Hours 3 (3 lec)

MUSI 1309 Music Literature II

Survey of the principal musical forms and cultural periods as illustrated in the literature of major composers. Surveys music literature from the classical period to the present. Emphasis is on music materials and listening skills through recorded music and scores. Required for music majors and minors. Semester Hours 3 (3 lec)

MUSI 1310 American Music

General survey of various styles of music in America. Topics may include jazz, ragtime, folk, rock, and contemporary art music. Satisfies general humanities elective requirements. Semester Hours 3 (3 lec)

HIST 1301 United States History I

A survey of the social, political, economic, cultural, and intellectual history of the United States from the pre-Columbian era to the Civil War/Reconstruction period. United States History I includes the study of pre-Columbian, colonial, revolutionary, early national, slavery and sectionalism, and the Civil War/Reconstruction eras. Themes that may be addressed in United States History I include: American settlement and diversity, American culture, religion, civil and human rights, technological change, economic change, immigration and migration, and creation of the federal government. NOTE: Must have passed the reading portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 3 (3 lec)

HIST 1302 United States History II

A survey of the social, political, economic, cultural, and intellectual history of the United States from the Civil War/Reconstruction era to the present. United States History II examines industrialization, immigration, world wars, the Great Depression, Cold War and post-Cold War eras. Themes that may be addressed in United States History II include: American culture, religion, civil and human rights, technological change, economic change,immigration and migration, urbanization and suburbanization, the expansion of the federal government, and the study of U.S. foreign policy. NOTE: Must have passed the reading portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 3 (3 lec)

GOVT 2305 Federal Government

Origin and development of the U.S. Constitution; structure and powers of the national government including the legislative, executive, and judicial branches; federalism; political participation; the national election process; public policy; civil liberties; and civil rights. NOTE: Must have passed the reading portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 3 (3 lec)

GOVT 2306 Texas Government

Origin and development of the Texas constitution, structure and powers of state and local government, federalism and inter-governmental relations, political participation, the election process, public policy, and the political culture of Texas. NOTE: Must have passed the reading portion of the TSI Assessement or have credit for INRW 0402. Semester Hours 3 (3 lec)

ANTH 2351 Cultural Anthropology

The study of human cultures. Topics may include social organization, institutions, diversity, interactions between human groups, and ethics in the discipline. Prerequisite: Must have passed the reading portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 3 (3 Lec)

CRIJ 1301 Introduction to Criminal Justice

This course provides a historical and philosophical overview of the American criminal justice system, including the nature, extent, and impact of crime; criminal law; and justice agencies and processes, and an overview of the criminal justice system, including law enforcement and court procedures. Semester Hours 3 (3 lec)

ECON 2301 Principles of Macroeconomics

Analyzes the economy as a whole including measurement and determination of aggregate demand and aggregate supply, national income, inflation, and unemployment. Other topics include international trade, economic growth, business cycles, fiscal policy and monetary policy. Prerequisite: Must have passed the TSI Assessment or be concurrently enrolled in INRW 0402. Semester Hours 3 (3 lec)

ECON 2302 Principles of Microeconomics

Analyzes the behavior of individual economic agents, including consumer behavior and demand, producer behavior and supply, price and output decisions by firms under various market structures, factor markets, market failures, and international trade. Prerequisite: Must have passed the TSI Assessment or be concurrently enrolled in INRW 0402. Semester Hours 3 (3 lec)

ENGR 2308 Engineering Economics

Methods used for determining the comparative financial desirability of engineering alternatives. Provides the student with the basic tools required to analyze engineering alternatives in terms of their worth and cost, an essential element of engineering practice. The student is introduced to the concept of the time value of money and the methodology of basic engineering economy techniques. The course will address some aspects of sustainability and will provide the student with the background to enable them to pass the Engineering Economy portion of the Fundamentals of Engineering exam. Prerequisite: MATH 2413 with a grade of C or better. Semester Hours 3 (3 lec)

PSYC 2301 General Psychology

General Psychology is a survey of the major psychological topics, theories and approaches to the scientific study of behavior and mental processes. NOTE: Must have passed the reading portion of the TSI Assessment or have credit for INRW 0402. Semester Hours 3 (3 lec)

SOCI 1301 Introduction to Sociology

The scientific study of human society, including ways in which groups, social institutions, and individuals affect each other. Causes of social stability and social change are explored through the application of various theoretical perspectives, key concepts, and related research methods of sociology. Analysis of social issues in their institutional context may include topics such as social stratification, gender, race/ethnicity, and deviance. Semester Hours 3 (3 lec)

SOCI 1306 Social Problems

Application of sociological principles and theoretical perspectives to major social problems in contemporary society such as inequality, crime and violence, substance abuse, environmental issues, deviance, or family problems. Semester Hours 3 (3 lec)

SOCI 2326 Social Psychology

Study of individual behavior within the social environment. May include topics such as the socio-psychological process, attitude formation and change, interpersonal relations, and group processes. Cross-listed as PSYC 2319. NOTE: Credit will not be given for both PSYC 2319 and SOCI 2326. Prerequisite: PSYC 2301 or SOCI 1301. Semester Hours 3 (3 lec)

SOCW 2361 Introduction to Social Work

An overview of the history and development of social work as a profession. The course is designed to foster a philosophical, historical, and critical understanding of the social work profession, including social work values, ethics, and areas of practice utilized under a Generalist Intervention Model. Prerequisite: TSI complete in Writing or have credit for INRW 0402 Semester Hours 3 (3 lec)
