

B.A.S. Engineering Technology

Area A: Essential Skills		
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
MATH 1113	Precalculus Mathematics	3
Area B: Institutional Options		
COMM 1110	Fundamentals of Speech	3
One of the following electives:		1
COMM 1120	Argumentation and Advocacy	
ENGL 1105	Intro to Greek Mythology	
ENGL 1110	Creative Writing	
GEOL 1000	Natural Hazards	
HIST 1050	Appalachian History	
HIST 1051	Sports Hist & Amer Character	
HUMN 1000	Mystery Fiction in Pop Culture	
HUMN 1100	Political and Social Rhetoric	
HUMN 1300	Christian Fiction/Pop Culture	
PHED 1030	Health & Wellness Concepts	
SOCI 1000	Race and Ethnicity in America	
Area C: Humanities/Fine Arts		6
Choose one or two ENGL course(s):		
ENGL 2111	World Literature I	
ENGL 2112	World Literature II	
ENGL 2120	British Literature I	
ENGL 2121	British Literature II	
ENGL 2130	American Literature I	
ENGL 2131	American Literature II	
ENGL 2201	Intro to Film as Literature	
If only one ENGL course chosen add one of the following:		
ARTS 1100	Art Appreciation	
HUMN 1201	Expressions of Culture I	
HUMN 1202	Expressions of Culture II	
MUSC 1100	Music Appreciation	
MUSC 1110	World Music	
MUSC 1120	American Music	
THEA 1100	Theatre Appreciation	
Area D: Science/Mathematics/Technology		
PHYS 2211K	Principles of Physics I	4
MATH 1401	Elementary Statistics	3
CHEM 1211K	Principles of Chemistry I	4

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Area E: Social Sciences		
HIST 2111 or HIST 2112	United States History to 1877 or United States Hist since 1877	3
POLS 1101	American Government	3
Social Science Elective		3
Social Science Elective		3
Area F: Major Related		
MATH 2253	Calculus and Analytic Geom I	4
MATH 2254	Calculus and Analytic Geom II	4
ENGR 2205	Statics	3
Technical Electives		7*
Engineering Concentration		
ENGR 3072K	Electrical Energy Systems	4
ENGR 3131K	Strength of Materials	4
ENGR 3317	Industrial Economics and Financial Analysis	3
ENGR 3343K	Fluid Mechanics	4
ENGR 3410	Thermodynamics	3
ENGR 3420	Industrial and Environmental Safety	3
ENGR 4101	Materials Science and Engineering	3
ENGR 4440	Heat Transfer	3
ENGR 4456	Introduction to Systems Engineering	3
ENGR 4860 or MNGT 3051	Internship or Principles of Management	3
ENGR 4900	Capstone	3
Math 4502	Statistical Quality Control	3
Technical Electives		21*
Total Hours		120

*Required Technical Electives for Students who begin at DSC		
ENGR 2240	Dynamics	3
ENGR 3301K	Circuits I	4
ENGR 3302K	Circuits II	4
PHYS 2212K	Principles of Physics II	4
CMPS 1371	Computing for Scientist & Engineer	3
Electives (choose 3 – 4 courses)	ACCT 2101, ACCT 2102, BUSA 2106, CHEM 1212K, ECON 2105, ECON 2106, ECON 4101, ENGR 4860, MATH 2255, MATH 2256, MATH 2403, MGNT 3051	10

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ACCT 2101. Principles of Accounting I. 3-0-3 Units.

Examines the underlying theory and application of accounting concepts for reporting financial information to outside users. Stresses the relationship between the rules by which financial statements are prepared and the use of financial information for decision making.(F,S,M)

Prerequisites: [MATH 1101](#) or 1111 with a "C" or better.

ACCT 2102. Principles of Accounting II. 3-0-3 Units.

Examines the underlying theory and application of managerial accounting concepts. Stresses the study of financial and non-financial information for use by internal decision makers and the role of managerial accounting in a business environment.(F,S,M)

Prerequisites: [ACCT 2101](#) with a "C" or better.

BUSA 2106. The Environment of Business. 3-0-3 Units.

Introduces the political, social, legal, ethical, environmental, and technological issues that affect or are affected by business decisions. Topics include stakeholder analysis, social responsibility, ethics, globalization, business-government relations, and fair trade.(F,S,M)

CHEM 1212K. Principles of Chemistry II. 3-3-4 Units.

Continues the exploration of the discipline of chemistry begun in CHEM 1211. Focuses on the more quantitative aspects of chemistry including chemical equilibria, kinetics, acid-base, solubility product, electrochemistry and coordination compounds. Requires laboratory development of techniques necessary to identify common metallic and non-metallic ions.(F,S,M)

Prerequisites: [CHEM 1211K](#).

CMPS 1371. Computing for Scien & Engineer. 3-0-3 Units.

Introduces skills and concepts which are needed to use the computer in scientific and engineering work. Topics include design and analysis of algorithms, methods and techniques of scientific computation, and the organization of software.(F,S)

Corequisites: [MATH 2253](#).

ECON 2105. Principles of Macroeconomics. 3-0-3 Units.

Describes and analyzes macroeconomic principles. Topics covered include the scope and method of economics, national income/output analysis, employment/ unemployment, inflation, fiscal policy, monetary policy, and international finance.(F,S,M)

Prerequisites: [MATH 1101](#) or 1111 with a grade of "C" or better.

ECON 2106. Principles of Microeconomics. 3-0-3 Units.

Describes and analyzes microeconomic principles. Topics covered include demand and supply theory, output and price determination, market structure, income distribution, government regulation of business, labor organizations, and international trade.(F,S,M)

Prerequisites: [MATH 1101](#) or 1111 with a grade of "C" or better.

ECON 4101. Applied Econometrics. 3-0-3 Units.

Standard econometric techniques are applied to various topics in economics. Techniques include models for cross-section data, such as limited dependent variable models, selectivity techniques, count data models, and models for panel data. Students will conduct statistical analyses and model evaluation.(S)

Prerequisites: Upper Division Eligibility, BUSA 2050, [BUSA 2850](#), [BUSA 3050](#), or [MATH 2200](#), all with a "C" or better.

ENGR 2205. Statics.

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisites: [MATH 2253](#) and [PHYS 2211K](#) with a grade of C or better.

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Corequisites: [MATH 2254](#).

A study of elements of statics in two and three dimensions, free-body diagrams, distributed loads, centroids, and friction. (F,S) Prerequisite coursework must be been successfully completed within the past three terms.

ENGR 2240. Dynamics. 3-0-3 Units.

Prerequisites: [ENGR 2205](#).

Kinematics and kinetics of particles and rigid bodies, work-energy and impulse-momentum concepts and principles.(F, S as needed)

ENGR 3072K Electrical Energy Systems

3 Class Hours 3 Laboratory Hours 4 Credit Hours

Prerequisite: Completion of two circuit analysis courses

The study of energy sources. This course introduces non-renewable and renewable/sustainable energy sources, the processes, costs, and environmental impact of converting to electric energy, the delivery and control of electric energy, and electromechanical systems.

ENGR 3131K Strength of Materials

3 Class Hours 3 Laboratory Hours 4 Credit Hours

Prerequisite: [ENGR 2205](#) and [MATH 2254](#)

The study and mathematical modeling of the mechanical behavior of materials under load. Emphasis will be on the elastic conditions of equilibrium, compatibility and material behavior. Includes study of stress and strain in columns, connectors, beams, eccentrically-loaded members, as well as introduction to statically indeterminate members.

ENGR 3301: Circuits I

3 Class Hours 3 Laboratory Hours 4 Credit Hours

Prerequisite: PHYS 2211K

This course introduces basic circuit analysis including resistive circuits, voltage and current sources, analysis methods, network theorems, energy storage elements, and AC steady-state analysis.

Techniques for analyzing resistive networks are heavily emphasized. In addition, the physical mechanisms of capacitance and inductance are examined along with analysis of transient responses in circuits containing resistors, capacitors, and inductors. Laboratory exercises reinforce the theoretical concepts presented in class and provide various opportunities to become proficient with standard instrumentation used in electrical engineering.

ENGR 3302: Circuits II

3 Class Hours 3 Laboratory Hours 4 Credit Hours

Prerequisite: [EE 3301](#) and [PHYS 2212K](#)

A continuation of basic Circuit Analysis I which focuses on RC, RL, and RLC circuits, mutual inductance, series and parallel resonance, two-port networks frequency response, AC power including power factor correction, as well as three phase circuits. Simulation is heavily emphasized using state of the art software such as PSPICE.

ENGR 3317: Industrial Economics & Financial Analysis

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisite: MATH 2253

Students will compare service and manufacturing projects and investments based on their economic value, quantify costs and benefits; analyze projects using present worth, annual worth, and rate of return methods, study simple and compound interest. This course also introduces basic financial accounting concepts, including balance sheets, income statements, change of financial condition, etc.

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ENGR 3343K: Fluid Mechanics

3 Class Hours 3 Laboratory Hours 4 Credit Hours

Prerequisite: [ENGR 2205](#)

This course introduces the fundamentals of fluid statics and dynamics, including hydrostatic forces on submerged plates, continuity of fluid flow and fluid flow principles. The applications of turbulent and laminar flow in conduits are emphasized. The system approach is practiced in analyzing the applications of flow measuring devices, piping, pumps, and turbines.

ENGR 3410: Thermodynamics

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisite: [ENGR 2205](#)

Introduces the fundamentals of thermodynamics, including the concept of energy and the laws governing the transfers and transformations of energy. Emphasis is placed on thermodynamic properties and the first and second law analysis of systems and control volumes. Integration of these concepts into the analysis of basic power cycles is introduced.

ENGR 3420. Industrial & Environmental Safety.

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Introduces the application of safety techniques and principles to identify and correct unsafe situations and practices. Includes the study of system safety, failure modes and effects analysis, fault tree analysis, preliminary hazard analysis, hazardous materials and practices, OSHA, health, and personal protection.

ENGR 4101:Materials Science and Engineering

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisite: [CHEM 1211K](#) and [PHYS 2211K](#)

Introduces the study of metals, ceramics, polymers, and composites as related to material selection in design and manufacturing. Topics will include atomic structure and bonding, crystal structure and defects, mechanical properties and failure, diffusion, dislocation and strengthening, alloying, phase diagrams and transformations/heat treatment, polymers, ceramics and glasses, and composites.

ENGR 4440: Heat Transfer

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisite: [ENGR 3410](#) and [ENGR 3343](#) and Engineering Standing

Introduces the fundamentals and applications of heat transfer. Topics include conduction, convection, and radiation. Students will explore steady state and transient conduction in one and multiple dimensions, forced and free convection with boundary layer theory, radiation properties and radiative heat transfer among black and non-black bodies. Students will calculate heat transfer rates, heating/cooling times, and design of heat exchangers.

ENGR 4456- Introduction to Systems Engineering.

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Introduces students to the concepts needed for successful system planning, designing and building process. Topics will include bringing large-scale systems to completion on schedule and on budget, modeling and cost estimating techniques, risk and variability.

ENGR 4900: Senior Capstone Design Project

1 Class Hour 6 Laboratory Hours 3 Credit Hours

Prerequisite: Senior standing, Instructor approval, Department Chair approval

This course provides comprehensive design experience for students working in small groups and is a culmination of the engineering technology education. Topics covered will include design specifications, evaluation of design alternatives, technical reports and oral presentations. Also covered are topics such

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as intellectual property, industry standards and conventions, engineering economics, reliability, safety, engineering ethics and current topics in the field of engineering technology.

ENGR 4860: Internship

1-4 Credit Hours

Prerequisite: 90 credit hours and permission of the instructor

A structured out of the classroom experience in a supervised setting that is related to the student's major and career interests. Practical experience is combined with scholarly research under the guidance of faculty and the internship supervisor. Internship sites must be secured in advance of the semester of the placement and must be approved by the student's advisor and internship coordinator. Note: Students may enroll multiple times in this course for a total of four credit hours.

MATH 1401. Elementary Statistics. (Existing)

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisite: MATH 1001, MATH 1101, or MATH 1111

This is a non-calculus based introduction to statistics. Course content includes descriptive statistics, probability theory, confidence intervals, hypothesis testing, and other selected statistical topics.

MATH 2255. Calculus and Analytic Geom III. 4-0-4 Units.

Emphasizes calculus in three dimensions. Topics include vectors, parametric equations, partial derivatives, multiple integrals and their applications and topics in vector calculus. The third course in the Calculus sequence.(F,S,M)

Prerequisites: [MATH 2254](#).

MATH 2256. Introduction to Linear Algebra. 3-0-3 Units.

Introduces low-dimensional linear algebra through eigenvalues and eigenvectors. Applications to linear systems, least-square problems, and the calculus, including elementary differential equations.(F,S,M)

Prerequisites: [MATH 2253](#).

Corequisites: [MATH 2254](#).

MATH 2403. Differential Equations. 3-2-4 Units.

A study of differential equations, including first and higher order equations, linear and nonlinear systems of equations, numerical methods to approximate solutions, using Laplace transforms to determine solutions, and methods that yield infinite series solutions.(F,S,M)

Prerequisites: [MATH 2254](#) and Co-requisite: [MATH 2256](#).

MATH 4502. Statistics for Process Control. (Existing)

3 Class Hours 0 Laboratory Hours 3 Credit Hours

Prerequisites: MATH 2181 or MATH2253 and MATH 1401 or MATH 4701.

Introduces application techniques used in quality/process control with particular application to area industries. Topics include probability, sampling distributions, control charts for variables and attributes, lot-by-lot sampling plans, acceptance sampling for variables, elementary reliability calculations, and an introduction to the concept of quality costs

MNGT 3051. Principles of Management. 3-0-3 Units.

Introduces the basic concepts and processes of management including the study of the legal, social, and political environment with an emphasis on the behavioral perspectives in organizations.(F, S, M)

Prerequisites: Upper Division Eligibility and [ECON 2105](#) with a "C" or better.

PHYS 2212K. Principles of Physics II.

3-3-4

Prerequisites: [PHYS 2211K](#).

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An introductory course which will include material from electromagnetism, optics and modern physics. Elementary differential and integral calculus will be used.(F,S)