

Pre-Engineering

Pre-Engineering (PENG)

The Pre-Engineering program provides students with the academic foundation needed for transfer to a bachelor's degree program in engineering science, such as electrical, chemical, civil, mechanical, computer, or environmental engineering. Students earn an Associate of Science degree and are prepared to enter their bachelor's degree program with half of the required credits already completed.

Students must consult with their academic advisor before choosing electives, to ensure that elective courses meet the requirements of the college or university where they will complete their bachelor's degree.

Pre-Engineering (PENG)

Semester 1		Lec	Lab	Credits
CIT 120	Introductory Mathematics for Engineering Applications (B)	4	2	5
CHE 131	General Chemistry 1 Lab (G)	0	3	1
ENG 101	English Composition 1 (G)	3	0	3
CHE 121	General Chemistry 1 (G)	4	0	4
FYE 1XX First Year Experience Elective (B)		1	0	1
XXX XXX Arts/Humanities Elective 1 (G)		3	0	3
Semester 2				
PHY 201	Physics 1: Calculus-Based (G)	4	2	5
MAT 251	Calculus 1 (G)	5	0	5
ENG 10X English Composition Elective (G)		3	0	3
XXX XXX Technical Elective (T)		2	2	3
Semester 3				
COMM 110	Public Speaking (G)	3	0	3
PHY 202	Physics 2: Calculus-Based (G)	4	2	5
MAT 252	Calculus 2 (B)	5	0	5
XXX XXX Arts/Humanities Elective 2 (G)		3	0	3
Semester 4				
CIT 130	Engineering Programming with MATLAB (T)	2	3	3
MAT 253	Calculus 3 (B)	5	0	5
XXX XXX Social Science Elective 1 (G)		3	0	3
XXX XXX Social Science Elective 2 (G)		3	0	3
Total Credits:		57	14	63

Electives

First Year Experience Elective

FYE 100	College Survival Skills	1
FYE 105	College Success Strategies	2
FYE 110	Community College Experience	3

English Composition Elective

ENG 102	English Composition 2: Contemporary Issues	3
ENG 103	English Composition 2: Topics in Literature	3

ENG 104	English Composition 2: Technical Communication	3
ENG 105	English Composition 2: Business Communication	3
Arts/Humanities Electives		6
Any Transfer Module course from ART, CULT, LIT, MUS, PHI, REL, THE		
Technical Elective ¹		3
Any CET, CMT, BMET, EET, EMET, EVS, EVT, MET, PSET, SET		
Social Science Electives		12
Any Transfer Module course from ECO, GEO, HST, LBR, POL, PSY, SOC		

¹ Program Chair consent required

CHE Courses

CHE 100 Basic Chemistry

3 Credits. 2 Lecture Hours. 2 Lab Hours.

An introductory course on concepts in chemistry. Topics include: dimensional analysis and problem solving, physical and chemical properties of matter, organization of the periodic table, writing and manipulating formulas, stoichiometry, gas laws, equilibrium, and acids and bases.

Prerequisites: AFL 085 and MAT 120, or appropriate placement test scores

CHE 105 Chemistry for Consumers

3 Credits. 2 Lecture Hours. 2 Lab Hours.

A course for non-science majors on the relevance of basic principles of chemistry to daily life. Topics include: laboratory/data analysis, matter classification, the periodic table, compound formation, chemical reactions, synthesis/analysis of consumer products, and the global impact of consumerism.

Prerequisites: AFL 085 and AFM 095, or appropriate placement test scores

CHE 110 Fundamentals of Chemistry

4 Credits. 3 Lecture Hours. 3 Lab Hours.

A college-level general chemistry course for non-majors. Topics include: atomic structure, bonding, chemical reactions, properties and states of matter, acids and bases, and equilibrium.

Prerequisites: AFL 085, and AFM 095 (minimum grade B) or MAT 105 (minimum grade C) or MAT 120 (minimum grade C), or appropriate placement test scores

CHE 111 Bio-Organic Chemistry

4 Credits. 3 Lecture Hours. 3 Lab Hours.

Study of foundational concepts of organic chemistry and biochemistry. Topics include: types of organic compounds and representative reactions, and biochemical compounds and reactions.

Prerequisites: CHE 110 (minimum grade C) or CHE 121 and CHE 131 (minimum grade C)

CHE 115 General, Organic, and Biological Chemistry

4 Credits. 3 Lecture Hours. 3 Lab Hours.

A survey of basic general, organic, and biological chemistry. Topics include: dimensional analysis, problem-solving strategies, atomic structure, chemical bonding, reactions, acid-base chemistry, attractive forces, functional groups, structure/reactions of major macromolecules, and metabolism.

Prerequisites: AFM 095 (minimum grade B) and AFL 085 (minimum grade C), or appropriate placement test scores

CHE 121 General Chemistry 1

4 Credits. 4 Lecture Hours. 0 Lab Hour.

A general chemistry course for science majors. Topics include: measurement systems; composition, properties, and reactions of elements and compounds; states of matter; atomic structure and bonding; and solution chemistry.

Prerequisites: AFL 085 and High School Chemistry (within three years, minimum grade B) or CHE 100 (minimum grade B) or CHE 110 (minimum grade C) and MAT 121 or MAT 150 (minimum grade C for both), or appropriate placement test score

CHE 122 General Chemistry 2

4 Credits. 4 Lecture Hours. 0 Lab Hour.

A continuation of CHE 121. Topics include: kinetics, chemical equilibrium, acid-base chemistry, acid-base and solubility equilibrium, thermodynamics, electrochemistry, and chemistry of transition elements.

Prerequisites: CHE 121 and CHE 131 (minimum grade C for both) and MAT 125 or MAT 151 or MAT 153 (minimum grade C for all)

CHE 131 General Chemistry 1 Lab

1 Credit. 0 Lecture Hour. 3 Lab Hours.

A laboratory course that accompanies CHE 121.

Prerequisites: CHE 100 or CHE 110 (minimum grade C) and MAT 150 or appropriate placement test score

CHE 132 General Chemistry 2 Lab**1 Credit. 0 Lecture Hour. 3 Lab Hours.**

A laboratory course that accompanies CHE 122.

Prerequisites: CHE 121 and CHE 131 (minimum grade C for both)

CHE 198 First Year Special Topics in Chemistry**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Chemistry, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Vary by section

CHE 199 First Year Independent Project in Chemistry**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Chemistry that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Chemistry faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section

CHE 201 Organic Chemistry 1**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

An organic chemistry course for students preparing for science-related employment or additional science education. Topics include: principles of carbon chemistry including bonding, structure, mechanisms, properties, reactions, synthesis, acids, and bases.

Prerequisites: CHE 122 and CHE 132 (minimum grade C for both)

CHE 202 Organic Chemistry 2**3 Credits. 3 Lecture Hours. 0 Lab Hour.**

A continuation of CHE 201. Topics include: mass spectrometry; infrared, ultraviolet/visible, and NMR spectroscopies; aromaticity; chemistry of benzene, carboxylic acids, amines, aldehydes, and ketones; and oxidation and reduction.

Prerequisites: CHE 201 and CHE 211 (minimum grade C for both)

CHE 211 Organic Chemistry 1 Lab**2 Credits. 0 Lecture Hour. 4 Lab Hours.**

A laboratory course that accompanies CHE 201. Laboratory experiences include: general organic laboratory techniques; isolation, purification, and identification of organic compounds; simple synthesis; and determination of unknowns.

Prerequisites: CHE 122 and CHE 132 (minimum grade C for both)

CHE 212 Organic Chemistry 2 Lab**2 Credits. 0 Lecture Hour. 4 Lab Hours.**

A laboratory course that accompanies CHE 202. Laboratory experiences include: simple, complex, and multistep synthesis; and isolation, purification, analysis, and identification of organic compounds.

Prerequisites: CHE 201 and CHE 211 (minimum grade C for both)

CHE 298 Second Year Special Topics in Chemistry**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Chemistry, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Vary by section

CHE 299 Second Year Independent Project in Chemistry**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Chemistry that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Chemistry faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section

MAT Courses**MAT 105 Science Mathematics****3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A project-based course that emphasizes problem-solving and model-building. Topics include: dimensional analysis, measurement and the metric system, estimation, significant figures, data collection and analysis, graphing, algebraic manipulation of formulas, and review of essential arithmetic.

Prerequisites: AFM 090 (minimum grade C) or appropriate placement test score

MAT 111 Business Mathematics**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

An algebra-based course on practical applications of mathematics. Topics include: review of arithmetic, algebra, and percents; payroll; banking; taxes; insurance; financial math, and elementary statistics. Students need a scientific calculator.

Prerequisites: AFM 090 (minimum grade C) or appropriate placement test score

MAT 120 Technical Mathematics**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on practical applications of algebra, geometry, and trigonometry. Topics include: percents, fractions, measurement, unit conversions, scientific notation, pre-algebra, basic algebra, plane and solid geometry, and right and oblique triangle trigonometry. Students need a scientific calculator.

Prerequisites: AFM 090 (minimum grade C) or appropriate placement test score

MAT 121 Technical Algebra and Geometry with Statistics**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on technical applications of algebra, geometry, and statistics. Topics include: simplifying algebraic expressions, solving equations (linear, quadratic, rational, and radical), graphing equations in two variables, inequalities, elementary statistics, right triangle trigonometry, and vectors. Students need a graphing calculator.

Prerequisites: AFM 095 (minimum grade C) or MAT 120 (minimum grade C) or appropriate placement test score

MAT 125 Algebra and Trigonometry**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A course on applications of algebra, geometry, and trigonometry. Topics include: simplifying algebraic expressions, right and oblique triangles, and solving equations (linear, quadratic, rational, and trigonometric). Students need a graphing calculator.

Prerequisites: AFM 095 (minimum grade A) or MAT 120 (minimum grade A) or MAT 121 (minimum grade C) or appropriate placement test score

MAT 126 Functions and Calculus**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A continuation of MAT 125. Topics include: functions (linear, exponential, logarithmic, trigonometric, polynomial, and rational), complex numbers, graphing, solving equations, and applications of differential and integral calculus. Students need a graphing calculator.

Prerequisites: MAT 125 (minimum grade C) or appropriate placement test score

MAT 130 Intermediate Algebra for Statistics**4 Credits. 3 Lecture Hours. 2 Lab Hours.**

A course on mathematical modeling and its applications. Topics include: linear, quadratic, exponential, and square root functions; systems of equations; and one- and two-variable inequalities. Students need a graphing calculator.

Prerequisites: AFM 095 (minimum grade C) or appropriate placement test score

MAT 131 Statistics 1**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on descriptive and inferential statistics. Topics include: the purpose of statistics, univariate and bivariate descriptive statistics, probability, normality and sampling distributions, confidence intervals, and hypothesis testing.

Prerequisites: MAT 121, MAT 130, or MAT 150 (minimum grade C) or appropriate placement test score

MAT 132 Statistics 2**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A continuation of MAT 131. Topics include: confidence intervals and hypothesis tests for two-sample means and proportions, contingency tables, one-way analysis of variance, and multiple regression.

Prerequisites: MAT 131 (minimum grade C)

MAT 150 Intermediate Algebra**5 Credits. 5 Lecture Hours. 0 Lab Hour.**

A course on mathematical modeling and problem solving. Topics include: linear, polynomial, exponential, radical, and rational functions; systems of equations; inequalities; and plane and solid geometry. Students need a graphing calculator.

Prerequisites: AFM 095 (minimum grade B) or appropriate placement test score

MAT 151 College Algebra**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on concepts and applications of algebra. Topics include: representing linear, exponential, logarithmic, power, polynomial, and rational functions numerically, graphically, and algebraically. Students need a graphing calculator.

Prerequisites: MAT 150 (minimum grade C) or appropriate placement test score

MAT 152 Trigonometry**4 Credits. 4 Lecture Hours. 0 Lab Hour.**

A course on concepts and applications of trigonometry. Topics include: trigonometric functions and identities, inverse of trigonometric functions, vectors, complex numbers, and parametric equations. Students need a graphing calculator.

Prerequisites: MAT 151 (minimum grade C) or appropriate placement test score

MAT 153 Pre-Calculus**6 Credits. 6 Lecture Hours. 0 Lab Hour.**

A course on concepts and applications of pre-calculus. Topics include: review of linear, exponential, power, polynomial, and rational functions; trigonometric functions; trigonometry; vectors; complex numbers; and parametric equations. Students need a graphing calculator.

Prerequisites: MAT 150 (minimum grade B) or appropriate placement test score or instructor consent

MAT 198 First Year Special Topics in Mathematics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Mathematics, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Vary by section

MAT 199 First Year Independent Project in Mathematics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Mathematics that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Mathematics faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section

MAT 215 Business Calculus**6 Credits. 6 Lecture Hours. 0 Lab Hour.**

A course on calculus emphasizing business applications. Topics include: analysis of functions using limits, the derivative and derivative function, rules of differentiation, applications of derivative calculus, and the definite integral. Students need a graphing calculator.

Prerequisites: MAT 151 (minimum grade C)

MAT 251 Calculus 1**5 Credits. 5 Lecture Hours. 0 Lab Hour.**

A course on concepts and applications of calculus. Topics include: the library of functions, analysis of functions with limits, the derivative and the derivative function, interpretations of the derivative, rules of differentiation, and introduction to integral calculus. Students need a graphing calculator.

Prerequisites: MAT 126 or MAT 152 or MAT 153 (minimum C grade) or appropriate placement test score

MAT 252 Calculus 2**5 Credits. 5 Lecture Hours. 0 Lab Hour.**

A continuation of MAT 251. Topics include: methods of integration (substitution, parts, tables, numerical and CAS) with modeling applications, sequences and series, Taylor series approximations, and solutions to differential equations. Students need a graphing calculator.

Prerequisites: MAT 251 (minimum grade C) or appropriate placement test score

MAT 253 Calculus 3**5 Credits. 5 Lecture Hours. 0 Lab Hour.**

A continuation of MAT 252. Topics include: vectors and vector-valued functions; functions of several variables; partial derivatives and directional derivatives with gradients; tangent planes and local linearization; and optimization methods with Lagrange multipliers, iterated integration, and calculus of vector fields. Students need a graphing calculator.

Prerequisites: MAT 252 (minimum grade C) or appropriate placement test score

MAT 298 Second Year Special Topics in Mathematics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Mathematics, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Vary by section

MAT 299 Second Year Independent Project in Mathematics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Mathematics that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Mathematics faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section

PHY Courses**PHY 105 Fire Service Physics****2 Credits. 1 Lecture Hour. 3 Lab Hours.**

A course on concepts and principles of physics that are applied in public safety technologies. Topics include: the kinematics and dynamics of linear motion, machines, fluid mechanics, thermodynamics, electricity, and electrical safety.

Prerequisites: AFM 095 or appropriate placement test score

PHY 110 Health Physics**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on concepts and principles of physics that are applied in health technologies. Topics include: math for physics, the kinematics and dynamics of linear motion, machines, fluid mechanics, temperature, electricity and electrical safety, waves, and light.

Prerequisites: AFM 095 or appropriate placement test score

PHY 115 Aviation Maintenance Physics**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on concepts and principles of physics applied in aviation technologies. Topics include: kinematics and dynamics of one- and two-dimensional motion, work, power, conservation laws, machines, fluid mechanics, and thermodynamics.

Prerequisites: MAT 120 or appropriate placement test score

PHY 121 Technical Physics 1**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A course on concepts and principles of physics that are applied in engineering technologies. Topics include: the kinematics and dynamics of linear motion, machines, fluid mechanics, and thermodynamics.

Prerequisites: MAT 120 or appropriate placement test score

PHY 122 Technical Physics 2**3 Credits. 2 Lecture Hours. 3 Lab Hours.**

A continuation of PHY 121. Topics include: rotational motion; physical properties; AC, DC, and digital electronics; circuit analysis; waves; and optics.

Prerequisites: PHY 121 or BMT 151

PHY 150 Introduction to Physics**3 Credits. 2 Lecture Hours. 2 Lab Hours.**

A course on fundamentals of physics. Topics include: laboratory procedures, the controlled experiment, methods of measurement, data collection and analysis techniques, and interpreting experimental results.

Prerequisites: MAT 120 or appropriate placement test score

PHY 151 Physics 1: Algebra and Trigonometry-Based**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A course on concepts and principles of algebra-and-trigonometry-based physics. Topics include: kinematics, dynamics, statics, heat, and thermodynamics.

Prerequisites: PHY 150 or MAT 125 or appropriate math placement score

PHY 152 Physics 2: Algebra and Trigonometry-Based**4 Credits. 3 Lecture Hours. 3 Lab Hours.**

A continuation of PHY 151. Topics include: waves, electromagnetic radiation, geometrical optics, physical optics, photometry, basic forces in physics, AC and DC circuits, quantum mechanics, and atomic and nuclear physics.

Prerequisites: PHY 151

PHY 198 First Year Special Topics in Physics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Physics, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Vary by section

PHY 199 First Year Independent Project in Physics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Physics that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Physics faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section

PHY 201 Physics 1: Calculus-Based**5 Credits. 4 Lecture Hours. 2 Lab Hours.**

A course on concepts and principles of calculus-based physics. Topics include: the kinematics and dynamics of linear and rotational motion, gravity, oscillatory motion, waves, and fluid mechanics.

Prerequisites: MAT 126 or MAT 152 or MAT 153 or appropriate placement test score

PHY 202 Physics 2: Calculus-Based**5 Credits. 4 Lecture Hours. 2 Lab Hours.**

A continuation of PHY 201. Topics include: thermodynamics, electric and magnetic fields, dc and ac circuit analysis, electromagnetic radiation, optics including interference and diffraction, and modern physics.

Prerequisites: PHY 201

PHY 298 Second Year Special Topics in Physics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A course on selected topics related to Physics, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.

Prerequisites: Vary by section

PHY 299 Second Year Independent Project in Physics**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**

A project related to Physics that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Physics faculty. Grades issued are Satisfactory or Unsatisfactory.

Prerequisites: Vary by section