First Year Courses

2019/2020

Fall

APSC 100 - Module 1: Problem Analysis & Modelling
APSC 100 - Module 2: Experimentation
APSC 111 - Physics I
APSC 131 - Chemistry I
APSC 143 - Computer Programming
APSC 151 - Geology
APSC 171 - Calculus I

Winter

APSC 100 - Module 3: Engineering Design
APSC 112 - Physics II
APSC 132 - Chemistry II
APSC 162 - Engineering Graphics
APSC 172 - Calculus II
APSC 174 - Linear Algebra
APSC 182 - Applied Mechanics

Engineering Practice: APSC 100

Module 1

- Problem analysis and modelling
- Team dynamics
- Oral and written communication skills

Module 2

- Laboratory skills
- Laboratory data collection
- Numeric computation

Module 3

- Oral and written communication
- Project management
- Engineering design
- Career development and professional skills

Physics

APSC 111

- Vectors
- Motion of a particle
- Particle dynamics
- Work and energy
- Statics and dynamics of rigid bodies
- Conservation of energy
- Momentum and collisions

APSC 112

- Oscillation and waves
- Electric charge
- Electrical current and resistance
- Electromagnetic fields (EMF)
- D.C. circuits and electrical measurements
- Electric field and potential
- Magnetic fields
- Electromagnetic induction

Calculus

APSC 171

- Graphs and derivatives of vector-valued functions
- Implicit derivatives and related rates
- Fundamental Theorem of Calculus
- Application problems
- Methods of integration
- Second-order differential equations and complex numbers

APSC 172

- Space curves and several variable functions
- Partial derivatives and gradient
- Double and triple integrals
- Polar and cylindrical coordinates
- Real world applications
- Power series and Taylor series

Chemistry

APSC 131

- The first law of thermodynamics
- Gas laws in ideal and non-ideal systems
- Phase equilibria in one component systems
- Properties of metals, polymers, semiconductors, and ceramics
- Characterizing materials

APSC 132

- Entropy and the second law of thermodynamics
- Chemical equilibrium
- Electrochemistry
- Chemical kinetics
- Organic chemistry
- Environmental issues

Computer Programming

APSC 143

- Languages used are C and Matlab
- Concepts, theory, and practice of computer programming
- Develop programming as a tool for solving engineering problems
- Memory structure, handling files, binary, data types, data structures, and basic program structure

Geology

APSC 151

- Introduction to the complex Earth System (the solid earth, hydrosphere, atmosphere, and biosphere)
- Connection between the Earth System and human activity, including local and global-scale impacts
- Sources of geo-materials used in engineering
- Technical, social, economic, and environmental impacts
- Contamination, biodiversity loss, and climate change

Linear Algebra

APSC 174

$$\begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 1 \\ 1 & 3 & 2 \end{bmatrix}$$

- Systems of linear equations
- Real vector spaces and subspaces
- Solving systems of linear equations using Gaussian elimination
- Bases and dimension of real vector spaces
- Matrix representation of a linear transformation
- Composition of linear transforms and matrix multiplication
- Eigenvalues and eigenvectors of square matrices

Engineering Graphics

APSC 162

- Develop the ability to visualize and communicate three-dimensional shapes
- Orthographic projection
- Isometric sketching
- Auxiliary and section views
- Dimensioning drawings
- CAD software is used to create models

Applied Mechanics

APSC 182

- Analysis of forces within statically determinate structures and systems
- Two- and three-dimensional force equilibrium of rigid bodies
- Force distribution within simple trusses, frames, and machines
- Internal shear forces and bending moments
- Engineering stress and strain

English Proficiency

APSC 199

- Preparing written engineering documents from oral reports
- No required class, but workshops are available to assist students with English skills