

# Physical Sciences SLO to PLO Alignment(No Results)\_February 2017

## CAN Program - Physical Sciences

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Use the scientific method and appreciate its importance to the development of scientific thought.

### CAN Dept - Astronomy

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#### CAN ASTR 100 : Introduction To Astronomy

**Skills and Communication:** Demonstrate their astronomical and scientific communication skills through the collection, analysis, or reporting of data

#### CAN ASTR 100 : Introduction To Astronomy

**Observational Evidence:** Demonstrate their understanding of the scientific process by describing how astronomical observations are used to support scientific theories

#### CAN ASTR 101 : Astronomy Laboratory

**Data:** Students will be able to accurately collect and analyze scientific data

#### CAN ASTR 101 : Astronomy Laboratory

**Temperature and Spectra:** Students will be able to identify changes in source temperature based on spectral shifts

#### CAN ASTR 101 : Astronomy Laboratory

**Communication and Reporting:** Demonstrate scientific communication skills through clear, well-organized laboratory and project reports, as well as oral presentations

### CAN Dept - Chemistry

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#### CAN CHEM 192 : Elementary Chemistry

**Matter:** The student will understand the three states of matter as well as the difference between a pure substance and a mixture.

#### CAN CHEM 210 : General Chemistry I

**Stoichiometry:** Balance chemical equations and perform calculations that may involve stoichiometric conversions (e.g., mol-mol, gram-mol, gram-gram, gram-molecules, gram-liters of solution, determine the limiting reactant and the amount of excess reactant(s) remaining after the reaction from stoichiometry etc.).

#### CAN CHEM 210 : General Chemistry I

**Chemical Structure:** Draw Lewis structures of simple and complex molecules including multiple bonds and lone pairs and use VSEPR theory to predict the three-dimensional shape of any molecule (or polyatomic ion) when given the formula.

Use the scientific method and appreciate its importance to the development of scientific thought.

**CAN CHEM 210 : General Chemistry I**

**Gases:** Apply the gas laws to solve for initial or final conditions after changes in temperature, volume, pressure or number of moles.

**CAN CHEM 210 : General Chemistry I**

**Moles:** Recognize chemical reactions and discuss moles and molar mass of elements and compounds.

**CAN CHEM 210 : General Chemistry I**

**Dimensional Analysis:** Perform conversions between units using the metric system, the English system, or between both.

**CAN CHEM 210 : General Chemistry I**

**Lab report:** Write laboratory reports, applying the scientific method.

**CAN CHEM 210 : General Chemistry I**

**Limiting reactant:** Determine the limiting reactant and the amount of excess reactant(s) remaining after the reaction from stoichiometry.

**CAN CHEM 210 : General Chemistry I**

**Unit conversion:** Perform conversions between units using the metric system, the English system, or between both.

**CAN CHEM 220 : General Chemistry II**

**Equilibrium:** Discuss chemical equilibrium and apply the concept to acid-base reactions and buffer solutions

**CAN CHEM 220 : General Chemistry II**

**Acid- Base Equilibrium:** Apply  $K_a$ ,  $K_b$ ,  $pK_a$ ,  $pK_b$ , and pH concepts on complex equilibrium and buffer calculations

**CAN CHEM 220 : General Chemistry II**

**Buffers:** Describe the behavior of buffers

**CAN CHEM 220 : General Chemistry II**

**Thermodynamics:** Describe enthalpy, entropy and free energy as it applies to spontaneous processes

**CAN CHEM 220 : General Chemistry II**

**Voltaic Cells:** Construct simple voltaic cells and perform calculations involving reduction potentials

**CAN CHEM 231 : Organic Chemistry I**

**Reaction mechanisms:** Illustrate reaction mechanisms by using the curved arrow notation

**CAN CHEM 231 : Organic Chemistry I**

**Structure and hybridization:** Predict molecular structure based on molecular orbital hybridization.

**CAN CHEM 231 : Organic Chemistry I**

**Handling Chemicals:** Use appropriate procedures for safe handling and disposal of organic materials.

**CAN CHEM 231 : Organic Chemistry I**

**Solubility:** Predict the solubility of organic compounds in organic and inorganic solvents based on their molecular structure.

Use the scientific method and appreciate its importance to the development of scientific thought.

#### **CAN CHEM 231 : Organic Chemistry I**

**Infrared Spectroscopy:** Collect and interpret infrared spectra.

#### **CAN CHEM 232 : Organic Chemistry II**

**Acidity and Structure:** Justify the relative acid strength of a variety of organic acids using inductive and resonance effects

#### **CAN CHEM 232 : Organic Chemistry II**

**Relative Basicity:** Predict the relative basicity of a series of amine based on molecular structure

#### **CAN CHEM 232 : Organic Chemistry II**

**Synthetic Methods:** Apply a variety of synthetic methods to identify the most appropriate synthetic route to obtain given organic molecules.

#### **CAN CHEM 232 : Organic Chemistry II**

**Organic Reactions:** Carry out a variety of organic chemistry reactions such as electrophilic aromatic substitution reactions, aldol condensation reactions, ester saponification reactions, etc.

#### **CAN CHEM 232 : Organic Chemistry II**

**IR and Functional Groups:** Identify functional groups on infrared spectra.

#### **CAN CHEM 410 : Chem For Health Sciences**

**Compounds:** Identify and name elements, ionic compounds and covalent compounds and differentiate between symbols and formulas.

#### **CAN CHEM 410 : Chem For Health Sciences**

**acid base:** Describe the effect of altering the pH of the environment on a weak acid or weak base.

#### **CAN CHEM 410 : Chem For Health Sciences**

**ID:** Identify functional groups on large complex biochemical molecules.

#### **CAN CHEM 410 : Chem For Health Sciences**

**Reactivity:** Communicate the basic reactivity of the functional groups on biochemical molecules.

#### **CAN CHEM 410 : Chem For Health Sciences**

**Information:** Gather and assess information about the chemical properties of pharmaceutical agents.

#### **CAN CHEM 695 : Independent Study**

**Literature Research:** Gather relevant information on a specific chemistry research topic by critically reading printed and online resources

#### **CAN CHEM 695 : Independent Study**

**Experimental Design:** Design a scientifically sound and experimental testable procedure.

#### **CAN CHEM 695 : Independent Study**

Use the scientific method and appreciate its importance to the development of scientific thought.

#### **CAN CHEM 695 : Independent Study**

**Hypothesis Evaluation:** Apply the scientific method to experimentally evaluate a hypothesis.

#### **CAN CHEM 695 : Independent Study**

**Results Analysis:** Analyze experimental data and make appropriate modifications to the experimental design.

### **CAN Dept - Earth Science**

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#### **CAN GEOL 100 : Introduction to Geology**

**Scientific Method and the Plate Tectonics Theory:** Student will demonstrate an understanding of the application of the Scientific Method in the development of the Theory of Plate Tectonics.

#### **CAN GEOL 101: Geology Laboratory**

**Scientific Method:** Students will be able to use the scientific method to analyze and interpret data.

#### **CAN OCEN 100 : Oceanography**

**Marine Geology and Plate Tectonics:** Students will use an understanding of plate tectonics to explain the formation and evolution of the ocean basins.

#### **CAN OCEN 100 : Oceanography**

**Seawater Chemistry:** Students will use basic ideas of chemistry to describe the formation of salts and the differences between the major and minor components of seawater.

#### **CAN OCEN 100 : Oceanography**

**Physical Oceanography:** Students will demonstrate an understanding of the interaction between the atmosphere and ocean and its implications to the formation of winds, currents, and waves.

#### **CAN OCEN 100 : Oceanography**

**Scientific Method and the Theory of Plate Tectonics:** Students will demonstrate an understanding of the application of the Scientific Method to the development of the Theory of Plate Tectonics.

#### **CAN OCEN 100 : Oceanography**

**Environmental Oceanography:** Students will investigate at least one threat to the health of the oceans and its inhabitants.

#### **CAN OCEN 101 : Oceanography Lab/Field Study**

**Physical Oceanography:** Students will be able to integrate and interpret oceanographic data to investigate real world issues relating to currents, waves, and tides.

#### **CAN OCEN 101 : Oceanography Lab/Field Study**

**Marine Biology:** Students will demonstrate an understanding of food webs, adaptation, and ecosystems through analysis of living organisms and marine biological data.

#### **CAN OCEN 101 : Oceanography Lab/Field Study**

Use the scientific method and appreciate its importance to the development of scientific thought.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**tides:** describe tides and their causes

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Marine Geology and Evolution of the Ocean Basins:** Students will demonstrate an understanding of plate tectonics and its role in the formation and evolution of the ocean basins. Student will also be able to analyze sediments using standard oceanographic tools and effectively communicate their results.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Chemical Nature of Seawater:** Using standard chemical apparatus, students will be able to determine the salinity of seawater samples and apply this knowledge to an understanding of the chemistry of the world's oceans.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Physics of the Ocean:** Students will be able to integrate and interpret oceanographic data to investigate real world issues relating to currents, waves, and tides.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Life in The Ocean:** Students will demonstrate an understanding of food webs, adaptation, and ecosystems through analysis of living organisms and marine biological data.

**CAN Dept - Physics**

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**CAN PHYS 250 : Physics with Calculus I**

**Laboratory Experience:** Setup, perform, analyze, and document an experiment.

Document and communicate their work effectively.

## CAN Dept - Astronomy

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### CAN ASTR 100 : Introduction To Astronomy

**Skills and Communication:** Demonstrate their astronomical and scientific communication skills through the collection, analysis, or reporting of data

### CAN ASTR 101 : Astronomy Laboratory

**Communication and Reporting:** Demonstrate scientific communication skills through clear, well-organized laboratory and project reports, as well as oral presentations

## CAN Dept - Chemistry

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### CAN CHEM 210 : General Chemistry I

**Elements:** Identify and name atoms, elements, ions, molecules, ionic compounds and molecular compounds.

### CAN CHEM 210 : General Chemistry I

**Moles:** Recognize chemical reactions and discuss moles and molar mass of elements and compounds.

### CAN CHEM 210 : General Chemistry I

**Lab report:** Write laboratory reports, applying the scientific method.

### CAN CHEM 231 : Organic Chemistry I

**Reaction mechanisms:** Illustrate reaction mechanisms by using the curved arrow notation

### CAN CHEM 231 : Organic Chemistry I

**IUPAC naming:** Apply the IUPAC system to name several classes of organic compounds

### CAN CHEM 232 : Organic Chemistry II

**Acidity and Structure:** Justify the relative acid strength of a variety of organic acids using inductive and resonance effects

### CAN CHEM 232 : Organic Chemistry II

**Relative Basicity:** Predict the relative basicity of a series of amine based on molecular structure

### CAN CHEM 232 : Organic Chemistry II

**Acid-base Strength:** Predict and justify the relative acid strength and the relative basicity of a variety of organic acids and bases based on molecular structure, inductive effects and resonance effects.

### CAN CHEM 232 : Organic Chemistry II

**Separation Scheme:** Formulate a separation and purification scheme for a given multicomponent mixture of organic compounds.

### CAN CHEM 410 : Chem For Health Sciences

**acid base:** Describe the effect of altering the pH of the environment on a weak acid or weak base.

### CAN CHEM 410 : Chem For Health Sciences

Document and communicate their work effectively.

#### **CAN CHEM 410 : Chem For Health Sciences**

**Reactivity:** Communicate the basic reactivity of the functional groups on biochemical molecules.

#### **CAN CHEM 410 : Chem For Health Sciences**

**Information:** Gather and assess information about the chemical properties of pharmaceutical agents.

#### **CAN CHEM 680CH : Honors Colloquium in Chemistry**

**Discussion Topics:** Select appropriate discussion topics in drug discovery.

#### **CAN CHEM 680CH : Honors Colloquium in Chemistry**

**Literature Research:** Conduct literature research from printed and on-line resources.

#### **CAN CHEM 680CH : Honors Colloquium in Chemistry**

**Critical Evaluation:** Critically evaluate information from literature research employing a chemistry focus.

#### **CAN CHEM 695 : Independent Study**

**Experimental Design:** Design a scientifically sound and experimental testable procedure.

#### **CAN CHEM 695 : Independent Study**

**Reporting:** Write and or present a report based on experimental procedure, data analysis and conclusions.

### **CAN Dept - Earth Science**

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#### **CAN GEOL 101: Geology Laboratory**

**California Geology:** Student will use geologic knowledge to explain the tectonic setting and geologic resources of California.

#### **CAN OCEN 100 : Oceanography**

**Marine Biology:** Students will apply the concepts of food webs, adaptation, and communities to the marine ecosystem.

#### **CAN OCEN 100 : Oceanography**

**Environmental Oceanography:** Students will investigate at least one threat to the health of the oceans and its inhabitants.

#### **CAN OCEN 101 : Oceanography Lab/Field Study**

**Chemical Oceanography:** Using oceanographic and chemical apparatus, students will determine the salinity of seawater samples and apply this knowledge to an understanding of the seawater chemistry of the world's oceans.

#### **CAN OCEN 101 : Oceanography Lab/Field Study**

**Physical Oceanography:** Students will be able to integrate and interpret oceanographic data to investigate real world issues relating to currents, waves, and tides.

Document and communicate their work effectively.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Marine Biology:** Students will demonstrate an understanding of food webs, adaptation, and ecosystems through analysis of living organisms and marine biological data.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**tides:** describe tides and their causes

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Life in The Ocean:** Students will demonstrate an understanding of food webs, adaptation, and ecosystems through analysis of living organisms and marine biological data.

**CAN Dept - Physics**

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**CAN PHYS 250 : Physics with Calculus I**

**Laboratory Experience:** Setup, perform, analyze, and document an experiment.



Demonstrate critical thinking to analyze physical systems in terms of scientific concepts.

## CAN Dept - Astronomy

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### CAN ASTR 100 : Introduction To Astronomy

**Stars:** Students will be able to correctly identify different classes of stars based their position in an HR diagram and accurately describe the appropriate life-cycle stage of each type of star.

### CAN ASTR 100 : Introduction To Astronomy

**Skills and Communication:** Demonstrate their astronomical and scientific communication skills through the collection, analysis, or reporting of data

### CAN ASTR 100 : Introduction To Astronomy

**Characteristics of astronomical objects:** Identify and describe the formation and characteristics of the planets, the properties and evolution of stars, and the structure of the Milky Way galaxy

### CAN ASTR 100 : Introduction To Astronomy

**Observational Evidence:** Demonstrate their understanding of the scientific process by describing how astronomical observations are used to support scientific theories

### CAN ASTR 101 : Astronomy Laboratory

**Solar System:** Students will demonstrate an understanding of the size and scale of the solar system

### CAN ASTR 101 : Astronomy Laboratory

**Data:** Students will be able to accurately collect and analyze scientific data

### CAN ASTR 101 : Astronomy Laboratory

**Temperature and Spectra:** Students will be able to identify changes in source temperature based on spectral shifts

### CAN ASTR 101 : Astronomy Laboratory

**Models of astronomical concepts:** Construct and analyze models, simulations, and other representations of astronomical concepts

### CAN ASTR 101 : Astronomy Laboratory

**Telescopes, spectroscopy and photometry:** Demonstrate their understanding of the nature of light and of telescopes through laboratory exercises and reports

### CAN ASTR 101 : Astronomy Laboratory

**Communication and Reporting:** Demonstrate scientific communication skills through clear, well-organized laboratory and project reports, as well as oral presentations

## CAN Dept - Chemistry

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### CAN CHEM 192 : Elementary Chemistry

**Equations:** Write, balance, and analyze chemical equations to describe chemical processes

### CAN CHEM 192 : Elementary Chemistry

**Density:** The student will understand the concept of density.

Demonstrate critical thinking to analyze physical systems in terms of scientific concepts.

#### CAN CHEM 210 : General Chemistry I

**Moles:** Recognize chemical reactions and discuss moles and molar mass of elements and compounds.

#### CAN CHEM 210 : General Chemistry I

**Dimensional Analysis:** Perform conversions between units using the metric system, the English system, or between both.

#### CAN CHEM 220 : General Chemistry II

**Equilibrium:** Discuss chemical equilibrium and apply the concept to acid-base reactions and buffer solutions

#### CAN CHEM 220 : General Chemistry II

**Acid- Base Equilibrium:** Apply  $K_a$ ,  $K_b$ ,  $pK_a$ ,  $pK_b$ , and pH concepts on complex equilibrium and buffer calculations

#### CAN CHEM 220 : General Chemistry II

**Buffers:** Describe the behavior of buffers

#### CAN CHEM 220 : General Chemistry II

**Thermodynamics:** Describe enthalpy, entropy and free energy as it applies to spontaneous processes

#### CAN CHEM 220 : General Chemistry II

**Gibbs Equation:** Using the Gibbs equation, calculate the free energy change,  $\Delta G$ , from enthalpy,  $\Delta H$ , and entropy,  $\Delta S$ , changes.

#### CAN CHEM 220 : General Chemistry II

**Voltaic Cells:** Construct simple voltaic cells and perform calculations involving reduction potentials

#### CAN CHEM 231 : Organic Chemistry I

**Structure and hybridization:** Predict molecular structure based on molecular orbital hybridization.

#### CAN CHEM 232 : Organic Chemistry II

**Synthetic Methods:** Apply a variety of synthetic methods to identify the most appropriate synthetic route to obtain given organic molecules.

#### CAN CHEM 232 : Organic Chemistry II

**Acid-base Strength:** Predict and justify the relative acid strength and the relative basicity of a variety of organic acids and bases based on molecular structure, inductive effects and resonance effects.

#### CAN CHEM 232 : Organic Chemistry II

**Organic Reactions:** Carry out a variety of organic chemistry reactions such as electrophilic aromatic substitution reactions, aldol condensation reactions, ester saponification reactions, etc.

#### CAN CHEM 232 : Organic Chemistry II

**Separation Scheme:** Formulate a separation and purification scheme for a given multicomponent mixture of organic compounds.

### CAN Dept - Earth Science

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#### CAN GEOL 100 : Introduction to Geology

Demonstrate critical thinking to analyze physical systems in terms of scientific concepts.

### **CAN GEOL 100 : Introduction to Geology**

**Application of the Plate Tectonic Theory to Understanding Geologic Phenomena:** Student will use the Theory of Plate Tectonics to explain the cause of geologic phenomena such as earthquakes, volcanoes, and mountain building.

### **CAN GEOL 100 : Introduction to Geology**

**The hydrologic cycle and its effect on Earth's surface:** Student will apply the concept of the hydrologic cycle to explain the evolution of the present landscape through the work of moving water, landslids, glaciers, and wind.

### **CAN GEOL 100 : Introduction to Geology**

**Minerals and the Rock Cycle:** Students will demonstrate an understanding of the formation of common rocks and minerals, their relationship to geologic phenomena, and how they change as their environment changes.

### **CAN GEOL 100 : Introduction to Geology**

**Geologic Time:** Students will use standard geologic principles to determine the geologic history of a simple geologic cross-section.

### **CAN GEOL 101: Geology Laboratory**

**identification of rocks and minerals:** Using an identification key, handlens, hardness samples, and acid, students will be able to identify and determine the probable mode of origin of common rocks and minerals.

### **CAN GEOL 101: Geology Laboratory**

**Map Skills:** Students will be able to use topographic and geologic maps to solve geologic problems

### **CAN GEOL 101: Geology Laboratory**

**Scientific Method:** Students will be able to use the scientific method to analyze and interpret data.

### **CAN OCEN 100 : Oceanography**

**Marine Geology and Plate Tectonics:** Students will use an understanding of plate tectonics to explain the formation and evolution of the ocean basins.

### **CAN OCEN 100 : Oceanography**

**Seawater Chemistry:** Students will use basic ideas of chemistry to describe the formation of salts and the differences between the major and minor components of seawater.

### **CAN OCEN 100 : Oceanography**

**Physical Oceanography:** Students will demonstrate an understanding of the interaction between the atmosphere and ocean and its implications to the formation of winds, currents, and waves.

### **CAN OCEN 100 : Oceanography**

**Marine Biology:** Students will apply the concepts of food webs, adaptation, and communities to the marine ecosystem.

### **CAN OCEN 100 : Oceanography**

**Environmental Oceanography:** Students will investigate at least one threat to the health of the oceans and its inhabitants.

### **CAN OCEN 101 : Oceanography Lab/Field Study**

**Chart and map skills:** Students will read and analyze maps and nautical charts to obtain oceanographic data.

Demonstrate critical thinking to analyze physical systems in terms of scientific concepts.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Chart and map skills:** Students will read and analyze maps and nautical charts to obtain oceanographic data.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Chemical Oceanography:** Using oceanographic and chemical apparatus, students will determine the salinity of seawater samples and apply this knowledge to an understanding of the seawater chemistry of the world's oceans.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Physical Oceanography:** Students will be able to integrate and interpret oceanographic data to investigate real world issues relating to currents, waves, and tides.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Marine Biology:** Students will demonstrate an understanding of food webs, adaptation, and ecosystems through analysis of living organisms and marine biological data.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**tides:** describe tides and their causes

**CAN OCEN 101 : Oceanography Lab/Field Study**

**identify organisms:** identify marine organisms using a key

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Marine Geology and Evolution of the Ocean Basins:** Students will demonstrate an understanding of plate tectonics and its role in the formation and evolution of the ocean basins. Student will also be able to analyze sediments using standard oceanographic tools and effectively communicate their results.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Chemical Nature of Seawater:** Using standard chemical apparatus, students will be able to determine the salinity of seawater samples and apply this knowledge to an understanding of the chemistry of the world's oceans.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Physics of the Ocean:** Students will be able to integrate and interpret oceanographic data to investigate real world issues relating to currents, waves, and tides.

**CAN OCEN 101 : Oceanography Lab/Field Study**

**Life in The Ocean:** Students will demonstrate an understanding of food webs, adaptation, and ecosystems through analysis of living organisms and marine biological data.

**CAN Dept - Physics**

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**CAN PHYS 210 : General Physics I**

**Newton's Laws:** Perform an analysis of a physical system in terms of forces, velocities displacements and accelerations and time using Newton's laws.

**CAN PHYS 210 : General Physics I**

**Energy:** Analyze the motion of a body (rotational or linear) in terms of momentum, kinetic energy, and potential energy.

Demonstrate critical thinking to analyze physical systems in terms of scientific concepts.

**CAN PHYS 210 : General Physics I**

**Thermodynamics:** Perform an analysis of isobaric, isochoric, isothermal and adiabatic processes in their relation to work, heat transfer, and changes in internal energy.

**CAN PHYS 220 : General Physics II**

**DC Circuits:** Analyze and explain the behavior of simple DC circuits with resistors, capacitors, and batteries.

**CAN PHYS 220 : General Physics II**

**Optics:** Analyze the reflection and refraction of light in terms of geometrical optics in different media.

**CAN PHYS 220 : General Physics II**

**Modern Physics:** Describe the photo-electric effect, the Compton effect, quantization of energy and the Bohr model of the atom.

**CAN PHYS 250 : Physics with Calculus I**

**Newton's Laws:** Perform an analysis of a physical system in terms of forces, velocities displacements and accelerations and time using Newton's laws.

**CAN PHYS 250 : Physics with Calculus I**

**Energy:** Analyze the motion of a body (rotational or linear) in terms of momentum, kinetic energy, and potential energy.

**CAN PHYS 260 : Physics with Calculus II**

**EForce:** Analyze electric forces and fields created by a system of charged particles

**CAN PHYS 260 : Physics with Calculus II**

**ACDC:** Analyze and explain the behavior of simple AC & DC circuits with resistors, capacitors, and inductors

**CAN PHYS 260 : Physics with Calculus II**

**Induction:** Solve problems involving induced electric and magnetic fields

**CAN PHYS 270 : Physics with Calculus III**

**Thermodynamics:** Perform an analysis of isobaric, isochoric, isothermal and adiabatic processes in their relation to work, heat transfer, and changes in internal energy.

**CAN PHYS 270 : Physics with Calculus III**

**Optics:** Analyze the reflection and refraction of light in terms of geometrical optics in different media.

**CAN PHYS 270 : Physics with Calculus III**

**Special Relativity:** Explain the principle assumptions of Special Relativity and able to perform calculations involving relativistic kinematics.

**CAN PHYS 270 : Physics with Calculus III**

**Modern Physics:** Describe the photo-electric effect, the Compton effect, quantization of energy

Demonstrate critical thinking to analyze physical systems in terms of scientific concepts.

**CAN PHYS 270 : Physics with Calculus III**

and the Bohr model of the atom.