豊田工業高等専門学校	開講年度	令和02年度 (2020年度)	授業科目	科学英語基礎ＩB

科目基礎情報

科目番号	03228	科目区分	一般 / 必履修，選択必修（英）
授業形態	講義	単位の種別と単位数	履修単位: 1
開設学科	機械工学科	対象学年	3
開設期	後期	週時間数	2
教科書/教材	MYP Physical and Earth Sciences Years 1-3: A Concept-Based Approach by William Heathcote (ISBN-13: 978-0198369981)		
担当教員	サルマサン. レジーナ.マデロ		

到達目標

At the end of the course, the students should be able to:
A. Solve simple physical science word problems;
B. Properly explain the solutions to simple physical science word problems; and
C. Perform a simple demonstration and explain the underlying scientific principles.

ルーブリック

	理想的な到達レベルの目安	標準的な到達レベルの目安	未到達レベルの目安
Objective A	The student is able to provide solutions to applied physical science word problems without the need for any kind of intervention from the teacher.	The student is able to provide solutions to simple physical science problems with minimal intervention from the teacher.	The student is unable to provide solutions to simple physical science problems even with various forms of intervention.
Objective B	The student is able to properly explain the solutions to applied physical science word problems in his/her own words without the need for any kind of intervention from the teacher.	The student is able to explain the solutions to simple physical science word problems with minimal intervention from the teacher.	The student is unable to explain the solutions to simple physical science word problems even with various forms of intervention.
Objective C	The student is able to confidently perform a simple demonstration and explain the underlying scientific principles in his/her own words in a way that is engaging to the intended audience without the need for any kind of intervention from the teacher.	The student is able to present a simple demonstration and explain the underlying scientific principles with minimal intervention from the teacher.	The student is unable to present a simple demonstration and explain the underlying scientific principles even with various forms of intervention.

学科の到達目標項目との関係

本校教育目標 ④ コミュニケーション能力

教育方法等

概要	In this course, the students will utilize knowledge obtained from previous Science and English courses to properly state scientific laws, theories, etc. using the English language. They will also analyze physical science word problems and explain their possible solutions.
授業の進め方・方法	This course involves lectures, demonstrations, board works and oral presentations.
注意点	Homework, oral examinations and quizzes will be regularly conducted in class. A project will be presented as a culminating activity for the course.

選択必修の種別・旧カリ科目名

授業計画

		週	授業内容	週ごとの到達目標
後期	3rdQ	1週	Mass relationships in chemical reactions	Calculate the average atomic mass of an element and the molecular weight or formula weight of compounds. Solve problems involving Avogadro’s number and molar mass. Determine the percent composition of an element in a compound. Determine the empirical and molecular formula of a compound.
		2週	Chemical reactions and their quantitative relationships	Write, balance and interpret a chemical reaction. Calculate the amount of product formed in a reaction. Identify the excess and limiting reagent in a reaction. Calculate the percent yield.
		3週	Gas Laws: Boyle’s Law, Charles’s Law and Avogadro’s Law	Explain the relationship between gas pressure, temperature, and volume, and number of moles.
		4週	Ideal Gas Law	Use the ideal gas equation to determine the pressure, temperature, volume, density and number of moles of an ideal gas. Solve problems involving gas stoichiometry.
		5週	Dalton’s Law of Partial Pressures	Calculate the partial pressure of a gas in a mixture. Explain the difference between a dry gas and a wet gas.
		6週	The Solution Process	Explain the molecular view of the solution process. Differentiate electrolytes from non-electrolytes.

		7週	Concentration of Solutions	Explain the differences and perform calculations involving percent by mass, mole fraction, molarity and molality.
		8週	Project presentation planning	
	4thQ	9週	Effect of Temperature on the Solubility of Gases and Solids	Explain the effect of temperature on the solubility of solids and gases.
		10週	Effect of Pressure on the Solubility of Gases	Explain the effect of pressure on the solubility of gases. Solve problems involving Henry's Law.
		11週	Colligative Properties of Non-electrolyte Solutions Vapor Pressure Lowering Boiling Point Elevation Freezing Point Depression	Explain Raoult's Law. Calculate the vapor pressure of a solution. Perform calculations involving boiling point elevation and freezing point depression.
		12週	Colligative Properties of Non-electrolyte Solutions Osmotic Pressure	Perform and explain calculations involving osmotic pressure.
		13週	Colligative Properties of Electrolyte Solutions	Differentiate electrolyte from non-electrolyte solutions. Describe the van't Hoff factor. Solve problems involving the colligative properties of electrolyte solutions.
		14週	Project presentation	
		15週	Review	
		16週	Term-End Examination	

モデルコアカリキュラムの学習内容と到達目標

分類		分野	学習内容	学習内容の到達目標	到達レベル	授業週
基礎的能力	人文・社会科学	英語	英語運用能力向上のための学習	関心のあるトピックや自分の専門分野に関する論文やマニュアルなどの概要を把握し、必要な情報を読み取ることができる。	3	後1,後2,後3,後4,後11,後12,後13,後14
				英文資料を、自分の専門分野に関する論文の英文アブストラクトや口頭発表用の資料等の作成にもつながるよう、英文テクニカルライティングにおける基礎的な語彙や表現を使って書くことができる。	3	後5,後6,後7,後8,後9,後10
	工学基礎	グローバリゼーション・異文化多文化理解	グローバリゼーション・異文化多文化理解	それぞれの国や地域の経済的・社会的な発展に対して科学技術が果たすべき役割や技術者の責任ある行動について説明できる。	3	後15

評価割合

	Examination	Presentation	Task	合計
総合評価割合	50	30	20	100
基礎的能力	50	30	20	100