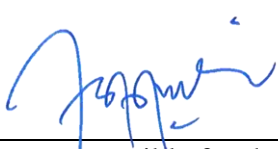






Faculty of Natural Sciences and Mathematics
Chemistry Department
Chemistry Education Study Program

Module name		Physical chemistry		
Module level, if applicable		1 st Year		
Code, if applicable		SPK – 211		
Semester(s) in which the module is taught		2 nd semester		
Person responsible for the module		Prof. Dr. Is Fatimah		
Lecturer		Prof. Dr. Is Fatimah Imam Sahroni, M.Sc.		
Language		Indonesia		
Relation to curriculum		Compulsory		
Teaching methods	Class size	Forms of active participation	Workload 136 hours	
Problem based learning	50-60	Discussion	Lecture: 150 (min) x 16 (meeting)	40 hours
			Assignment: 180 (min) x 16 (week)	48 hours
			Independent study: 180 (min) x 16 (week)	48 hours
ECTS Credit		4.86		
Credit points		3 SCU		
Requirements according to the examination regulations		Minimum attendance at lectures is 75% (according to UII regulation)		
Recommended prerequisites		N/A		
Related course		Physical chemistry lab work		
Module objectives/intended learning outcomes		On successful completion of the course students should be able to: 1. Explain theoretical concepts about the Zeroth Law of Thermodynamics 2. Explain theoretical concepts about the First Law of Thermodynamics 3. Explain theoretical concepts about the First Thermodynamic Equation, reaction enthalpy, thermodynamic relationship of temperature, pressure and volume to enthalpy and internal energy, Joule–Thompson effect.		

	4. Explain the application of the first law of thermodynamics		
Content	<ul style="list-style-type: none">• Zeroth Law of Thermodynamics: Properties of Gases, Equations of State, Ideal Gases and Real Gases, Gas Mixtures, Theory of Molecular Kinetics of Gases, Rate Distribution, Diffusion and Effusion, Collisions Between Molecules, Critical Points, Boyle Temperature, Real Gases: Van der Waals, virial equations, gas liquefaction.• First Law of Thermodynamics: Work, heat and internal energy, conservation of energy in relation to the first law, understanding of systems and the environment, exact and inexact equations with respect to equations of state and equations of paths and examples of energy variables from equations of state, reversible and irreversible changes, isolated systems, isothermal vs adiabatic processes,• First thermodynamic equation, enthalpy of reaction, Thermodynamic relationship of temperature, pressure and volume to enthalpy and internal energy, Joule–Thompson effect.• Application of the first law: thermochemistry, standards of formation, Hess's law, enthalpy at temperature variations.		
Study and examination requirements and forms of examination	Final score (NA) is calculated as follows:		
	Intended learning outcomes	Weight (%)	Technique of assessment
	1	20	Written test: Assignment
	2	20	Written test (midterm)
	3	20	Written test (midterm)
	4	40	Written test (Final Examination)
Media employed	Power point slide presentation, video, Google classroom		
Reading list	Cutnell, J.D., and Johnson, K.W., 2012, Physics, John Wiley and Sons Inc., New York. Giancoli, D.C., 2004, Physics: Principles with Applications, John Wiley and Sons Inc., New York. Halliday, David and R.Resnik, 1990, Fisika Jilid I, 3 rd edition, Translation: Pantur Silaban & Erwin Sucipto, Erlangga, Jakarta. Halliday, D., 2007, Fundamentals of Physics (Regular Edition), Jearl Walker.		

Prepared by:	Verified by:	Authorized by:
		
Person responsible for the module	Student representative	Coordinator Program