Diponegoro University
Faculty of Science and Mathematics
Undergraduate Program Of Chemistry

Module designation	**Chemical Thermodynamics (Termo)**
Semester(s) in which the module is taught	5
Person responsible for the module	Drs. WH Rahmanto, M.Si Dra. Linda Suyati, M.Si
Language	Indonesian
Relation to curriculum	Compulsory/~~elective~~/~~specialisation~~
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Face to face : 1 x (2 x 50 min); Structured study: 1 x (2 x 60 min); Self study: 1 x (2 x 60 min)
Credit points	2
Required and recommended prerequisites for joining the module	ENG
Module objectives/intended learning outcomes	PP1 Mastering the theoretical concepts of structure, properties, changes, kinetics, and energetics of molecules and chemical systems, identification, separation, characterization, transformation, synthesis of micromolecular chemicals, and their application. PP3 Mastering the basic principles of software for analysis, synthesis, and molecular modeling in general or more specific chemical fields. KU1 Able to apply logical, critical, systematic, and innovative thinking in the development or implementation of science and technology that pays attention to and uses humanities values by their field of expertise. KK3 Able to analyze several alternative solutions in identification, analysis, isolation, transformation, and synthesis of available chemicals and present analysis conclusions for appropriate decision making.

Content	1. Introduction to the molecular concept of internal energy: molecular chemical systems as a quantitative approach 2. Thermal Energy Transformation: a. thermal equilibrium (HK-0), b. thermal, chemical energy central parameter 3. c. TE at constant volume, . Constant pressure TE, adiabatic (SPB3) 4. d. thermal engine system (PB4), HK II, Carnot heat engine, Carnot cyclic process, 5. e. thermal engine system (PB5), Carnot engine efficiency, Clausius theorem, HK III 6. Gibbs and Helmholtz energies: a. Maxwells properties of internal energy and thermodynamic linkages 7. b. Gibbs free energy properties and sensitivity 8. Bolzman distribution: configuration and probability weights 9. Molecular partition function: a. significant partition function, b. partition function contribution and c. molecular energy 10. Canonical embellishment; canonical embellishment concept
Exams and assessment formats	Mid-Semester Exam and Final Exam
Study and examination requirements	Participatory Activities 20% Project Results 30% Task 10% Quiz 10% Mid-semester 15% Final exams 15%
Reading list	1. Atkins dan de Paula, 2010, Physical Chemistry, W. H. Freeman and Company, New York