Module Descriptions

Module designation (kode MK)	8420303081
Semester(s) in which the module is taught	3
Person responsible for the module	*Dr. Frida Ulfah Ermawati, M.Sc.*
Language	Indonesian
Relation to curriculum	*Compulsory ~~/ elective / specialisation~~*
Teaching methods	*Lecture, Lesson, Discussion, case study ~~lab works~~, ~~project~~, ~~seminar~~*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 136 work hours per-semester* *Contact hours:* *a) Lecture, exercise: 26.7 work hours per-semester ,* *b) Laboratory session: 45.3 work hours per-semester* *Private study including examination preparation: 64 work hours per-semester*
Credit points	4.77 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	*Key question: what learning outcomes should students attain in the module?* *E.g. in terms of:* - *Attitude: -* - *Competences: -* - *Knowledge:* *a) Masters and demonstrates the principles of classical and modern physics theory.* *b) Formulates physical symptoms and problems based on the results of observations and experiments, and model them using mathematics and computing for appropriate decision making in both familiar and new problems.* - *Skills:* *a) Develops self sustainably and collaborate.*

Content	*This Thermodynamics course discusses the fundamental macroscopic and microscopic concepts of thermodynamics, thermal equilibrium, the Zeroth Law of Thermodynamics, equations of state, and thermodynamic processes (quasi-static, reversible and irreversible, and cyclic). It also covers the First Law of Thermodynamics, the relationship among internal energy, heat, and work in ideal gas systems, as well as isolated, closed, and open systems, along with their applications in everyday life. The course further includes isothermal, isochoric, isobaric, and adiabatic processes; heat engines; the Carnot cycle in ideal gas systems; entropy in thermodynamic systems; enthalpy; the Gibbs function; the Helmholtz function; the Second Law of Thermodynamics; and its real-life applications through PROJECT activities, such as: (1) the working principles of gasoline and diesel engines, (2) investigating the relationship between cylinder size in gasoline and diesel engines and vehicle engine displacement (cc), (4) the working principle of refrigerators, and (5) analyzing potential system failures.*
Examination forms	*Essay*
Study and examination requirements	***Requirements for successfully passing the module:*** *a) Minimum attendance of 75%* *b) Minimum score of 55 out of 100*
Reading list	*a) Mark W. Zemansky and Richard H. Dittman. 1982. Heat andThermodynamics, Sixth Edition, McGraw- Hill,Inc. Diterjemahkan kedalamBahasa Indonesia oleh The Houw Liong. 1986. Kalor dan termodinamika, terbitan* *b) ke enam, Bandung, Institut Teknologi Bandung (ITB). 2. F W Sears and G L Salinger, Thermodynamics, Kinetic Theory and Statistical Thermodynamics. Addison Wesley. ISBN-13: 978-0201068948. (for explanations and problems).* *c) Yunus A. Çengel and Michael A. Boles ,2015,,Thermodynamics: An Engineering Approach, 8th edition,ISSN: 978-981-4595-29-2.*