



MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS

Ketintang Campus, Jalan Ketintang, C3 Building, Surabaya 60231
 Website: <https://pendidikan-fisika.fmipa.unesa.ac.id/>, email: s1-pfis@unesa.ac.id

Undergraduate Programme of Physics Education

Module Handbook

Module Name :	<i>Termodinamika</i> Thermodynamics
Module level :	Bachelor degree/Undergraduate Programme
Course Code :	8420303218
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	3/Second Year
Module coordinator(s)	
Lecturer(s):	Dra. Suliyannah, M.Si Dr. Frida Ulfah Ermawati, M.Sc Lydia Rohmawati, M.Si
Language:	<i>Bahasa Indonesia</i>
Classification within the curriculum:	Compulsory/ Elective
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or sks*)
Workload :	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 135 total hours per semester ~ 4.77 ECTS**
Credit Point:	3 sks (4.77 ECTS)
Requirements:	Basic Physics I
Learning goals/competencies:	<ol style="list-style-type: none"> 1. Mastering structured studies on the concepts and laws of thermodynamics 2. Solve physics problems related to the concepts and laws of thermodynamics through a mathematical approach, either individually or in groups 3. Have a scientific attitude, critical thinking and innovative skills to qualitatively analyze problems or situations that involve the concepts and laws of thermodynamics 4. Able to work in groups in the discussion process related to the law of thermodynamics concepts that are being discussed during the lesson
Content	The thermodynamics course discusses the concepts/principles/theories / basic laws of thermodynamics (physics content knowledge) which underlies thermodynamic study materials in-depth covering temperature and the zero law of thermodynamics, some simple thermodynamic systems, work, heat, and the first law of thermodynamics, ideal gas, the second law of thermodynamics, Carnot cycle and thermodynamic



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	temperature scale, and entropy, and able to communicate scientifically and work effectively both independently and in groups, with assessment in the form of assignments, mid test and final exam.										
Attribute Soft skill:	Scientific report, public speaking, and team work										
Study/exam achievements:	<p>Students are considered to complete the course and pass if they obtain at least 40% of maximum final grade. The final grade (NA) is calculated based on the following ratio:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Assessment Components</th> <th style="text-align: left;">Percentage of contribution</th> </tr> </thead> <tbody> <tr> <td>Participation</td> <td>20%</td> </tr> <tr> <td>Assignment</td> <td>30%</td> </tr> <tr> <td>Mid-semester test</td> <td>20%</td> </tr> <tr> <td>Final semester test</td> <td>30%</td> </tr> </tbody> </table>	Assessment Components	Percentage of contribution	Participation	20%	Assignment	30%	Mid-semester test	20%	Final semester test	30%
Assessment Components	Percentage of contribution										
Participation	20%										
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Learning Methods :	Student-centered approach, lecture and discussion, and presentations (structured activities)										
Form of Media:	<i>Power Point</i> slides, e-book file, and multimedia.										
Literature (primary references):	<ol style="list-style-type: none"> 1. Mark W. Zemansky and Richard H.Dittman. 1997. Heat and Thermodynamics, Seventh Edition, McGraw-Hill,Companies, Inc 2. Darmawan B. 1990. Termodinamika. Jurusan Fisika FMIPA-ITB 3. Yunus A.Cengel and Michael Boles.1994.Thermodynamics An Engineering Approach, Second Edition, McGraw-Hill,Inc 										
Notes:	<p>*1 sks in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.</p> <p>**1 sks = 1,59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/Un38/Hk/Ak/2019</p>										