MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF NATURAL SCIENCES
Ketintang Campus, Jl. Ketintang C12 Building, Surabaya 60231
Phone (031)18296427
Website http://pendidikan-sains.fmipa.unesa.ac.id

Module Name:	*Atom dan Radioaktivitas* (Atom and Radioactivity)
Module Level:	Bachelor degree/Undergraduate Programme
Course Code:	8420103171
Abbreviation, if applicable:	
Courses included in the module, if applicable:	Not applicable
Semester/term	Elective
Module coordinator(s):	Wahono Widodo
Lecturer(s):	Wahono Widodo Ernita Vika Aulia
Language:	Bahasa Indonesia (Indonesian language)
Classification within the curriculum:	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, 119 total hours per semester ~ 4.77 ECTS**
Credit point:	3 *sks* (4.77 ECTS)
Requirements:	- General Physics - General Chemistry
Learning goals/competencies:	**General Competencies (Knowledge):** Students can explain Dalton's atomic model, Thomson's atomic model, Rutherford's experiments on scattering alpha particles, Rutherford's atomic model, Bohr's atomic model, Bohr's hydrogen energy level and spectrum, modern atomic model (wave mechanics), radioactivity symptoms, decay, half-life, binding energy, reactions fission and fusion, and elementary particles. **Specific Competence:** 1. Mendeskripsikan konsep atom menurut Dalton, Thomson, Rutherford, Bohr, dan model atom menurut Teori Atom Modern. 2. Melakukan analisis keterkaitan sifat-sifat komponen penyusun inti atom dengan radioaktivitas. 3. Menganalisis sifat-sifat sinar radioaktif berdasarkan interaksinya dengan bahan yang dapat diobservasi. 4. Menganalisis model matematis peluruhan radioaktif. 5. Menganalisis energi yang dihasilkan atau yang diperlukan pada suatu reaksi inti. 6. Mendeskripsikan karakteristik utama partikel-partikel kosmik. 7. Mendeskripsikan partikel-partikel elementer dan interaksinya.

<table>
<tr><td></td><td>8. Menjelaskan pemanfaatan sinar radioaktif.
9. Menjelaskan konstruksi PLTN</td></tr>
<tr><td>Content:</td><td>This course examines the Dalton atomic model, Thomson atomic model, Rutherford experiment on alpha particle scattering, Rutherford atomic model, Bohr atomic model, energy levels and the spectrum of the Bohr hydrogen atom, modern atomic models (wave mechanics), radioactivity symptoms, decay, time. beaks, binding energy, fission and fusion reactions, and elementary particles.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Discipline, collaboration, responsibility, and argumentation in the natural classroom setting</td></tr>
<tr><td>Study/exam achievements:</td><td>University students are considered to be competent and pass if at least get 40% of the maximum final grade. The final grade (NA) is calculated based on following weight:
<table>
<tr><th>Assessment Components</th><th>Percentage Contribution</th></tr>
<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>
<tr><td>Total</td><td>100%</td></tr>
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<tr><td>Learning Methods</td><td>Student-centered approach, deductive learning, lecturing, discussion, and presentation (structured activities), and flip learning</td></tr>
<tr><td>Form of Media:</td><td>LCD, PowerPoint, hand out, simulation, e-learning Vinesa, and whiteboard</td></tr>
<tr><td>Literature:</td><td>1. Arthur Beiser. 1987. Fisika Modern, EdisiKeempat. Jakarta: Erlangga. (BukuTerjemahan)
2. Michael F. L'Annunziata. 2007. Radioactivity: Introduction and History. Amsterdam: Elservier.
3. S.B. Pate. 1991. Nuclear Physics: An Introduction. New Delhi: New Age International Ltd.
4. Timberlake and Timberlake. 2011. Basic Chemistry, 3rd Edition. US: Pearson.</td></tr>
<tr><td>Notes:</td><td>*1 sks in learning process = three contact hours that consist of: (a) scheduled instruction in 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.
**1 sks = 1,59 ECTS</td></tr>
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