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: http://s1-fisika.fmipa.unesa.ac.id/, email: s1-fisika@unesa.ac.id

Module Name :	*Fisika Tsunami* Physics of Tsunami
Module level :	Bachelor degree/Undergraduate Programme
Course Code :	4520102246
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	6/Third Year
Module coordinator(s)	Prof. Tjipto Prastowo, Ph.D.
Lecturer(s):	Prof. Tjipto prastowo, Ph.D Prof.Dr. Madlazim, M.Si. Muhammad Nurul Fahmi, M.Si.
Language:	*Bahasa Indonesia* (Indonesian Language)
Classification within the curriculum:	~~Compulsory~~/ Elective
Teaching format/class hours per week during the semester:	2 contact hours of lectures (*sks* or credit unit*)
Workload :	Lecture: 2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester. 79.33 total hours per semester ~ 3.18 ECTS **
Credit Point:	2 sks (3.18 ECTS)
Requirements:	Earth Physics Mathematical Physics I Mathematical Physics II
Learning goals/competencies:	1. Demonstrating independent, creative and honest characters in doing student assignments, mid and final exams. 2. Understanding the concepts and zones of generation, propagation, and mitigation of a tsunami wave. 3. Understanding possible tsunami sources of seismotectonic and non-seismotectonic origin. 4. Understanding the concepts of non-dispersive tsunamis and the corresponding wave speed in the open ocean. 5. Understanding the concepts of dispersive tsunamis and the corresponding wave speed in the open ocean. 6. Understanding the effects of ocean floor deformation, ocean water compressibility on the long wave speed.

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<tr><td></td><td>7. Understanding the concepts of tsunami onset time, travel time, arrival time, and time delay.
8. Understanding the concepts of tsunami wave height, tsunami run-up, and horizontal inundation.</td></tr>
<tr><td>Content</td><td>The Physics of Tsunamis examines tsunamis as a series of surface long waves in the ocean generated by an impulsive geophysical disturbance that abruptly, vertically displaces the ocean water column. This course discusses earthquakes, submarine landslides, and volcanic eruptions that are considered as the most possible sources of tsunami excitation in the ocean. During its propagation from the source to coastal regions far away, the wave speed may or may not be influenced by ocean topography or ocean water characteristics. In this context, class discussions include shallow-water and deep-water approximation, non-dispersive and dispersive tsunamis, and time and spatial analysis of a tsunami wave arrival at shorelines. Tsunami hazard analysis is also discussed, emphasizing on important aspects of tsunami mitigation.</td></tr>
<tr><td>Attribute Soft skill:</td><td>Scientific report, public speaking, and team work</td></tr>
<tr><td>Study/exam achievements:</td><td>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:
<table>
<tr><th>Assessment Components</th><th>Percentage of 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>
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<tr><td>Learning Methods :</td><td>Student-centered approach, lecture and discussion, and presentations (structured activities)</td></tr>
<tr><td>Form of Media:</td><td>Power Point slides, e-book file, and multimedia.</td></tr>
<tr><td>Literature (primary references):</td><td>1. Ward, S. N. 2011. Encyclopedia of Solid Earth Geophysics: Tsunami. Edited by Harsh K. Gupta. National Geophysical Research Institute (NGRI). Council 52 of Scientific and Industrial Research (CSIR). Dordrecht, Netherlands: Springer, pp. 1-1539. e-ISBN: 978-90-481-8702-7.
2. Kundu, P. K. and Cohen, I. M. 2002. Fluid Mechanics. 2nd Edition. San Diego, US: Academic Press, pp. 1-730. ISBN-13: 978-0121782511.</td></tr>
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	3. Pain, H. J. 2005. The Physics of Vibrations and Waves. 6th Edition. West Sussex, UK: John Wiley & Sons, pp. 1-557. ISBN: 978-0-470-01295-6. 4. orensen, R. M. 2006. Basic Coastal Engineering. 3rd Edition. New Delhi, India: Springer US, pp. 1-324. e-ISBN: 978-0-387-23333-8. 5. 5. Levin, B. W. and Nosov, M. A. 2016. Physics of Tsunamis. 2nd Edition. Heidelberg, Germany: Springer, pp. 1-388. eISBN: 978-3-319-24037-
Notes:	*1 credit unit or *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.
	**1 credit unit or *sks* = 1.59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/UN38/HK/AK/2019