Module Descriptions

Module designation	Intergrated Science *Sains terintegrasi*
Course Code	8420803199
Semester/Term	2nd Semester
Person responsible for the module	Prof.Dr. Wahono Widodo, M.Si. Dr. Mohammad Budiyanto, S.Pd., M.Pd. Aris Rudi Purnomo, S.Si., M.Pd., M.Sc. Wahyu Budi Sabtiawan, S.Si., M.Pd., M.Sc. Fasih Bintang Ilhami, S.Kep., M.T., Ph.D. Dr. Sapti Puspitarini, S.Si., M.Si.
Language	Bahasa Indonesia (Indonesian language)
Relation to curriculum	Compulsory course
Teaching methods	Lecture
Workload	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 90 total hours per semester ~ 4.77 ECTS**
Credit Point	3 CU(4.77 ECTS)
Required and recommended prerequisites for joining the module	
Module Objectives/intended learning outcomes	After taking this course, students will be: 1. Understanding the human movement system and its application in everyday life 2. Applying energy sources and alternative energy (including EFL experiments on solar cells) to biology 3. Applying the concepts of the properties of matter and thermodynamics to biology 4. Analyzing the concepts of electricity and magnetism in living things 5. Analyzing the energy sources needed by living things 6. Understanding the process of food digestion as an energy source 7. Understanding energy metabolism from various energy sources for movement in living things
Content	The Integrated Science course is a compulsory course in the study program designed to equip students with a conceptual and

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<td>applied understanding of the integration of physics, chemistry, and biology concepts to explain phenomena in living things. Learning emphasizes the study of the principles of motion, energy, electricity, magnetism, and energy metabolism in biological systems, linked to the context of everyday life and sustainability issues (SDGs).
The course begins with a study of translational and curvilinear motion (projectile and rotational) in living things, including analysis of kinematics and motion dynamics using a biogeophysical approach and application-based media and artificial intelligence (AI). Next, students study the human movement system, including the structure and function of muscles, joints, and sarcomeres, as well as biomechanical principles in daily activities and sports.
In the energy section, this course discusses energy sources for living things, the digestive process, energy metabolism (aerobic and anaerobic), and energy conversion to support movement. The concepts of the properties of matter and thermodynamics in biological systems are also analyzed to understand energy changes within the body and their application in the context of sustainability.
Subsequent topics include electricity and magnetism in living organisms, both static and dynamic, Coulomb's law, electric fields, electrical circuits (series, parallel, Wheatstone bridge), Kirchhoff's laws, magnetic induction, and electromagnetic induction. Learning integrates fundamental physics concepts with biological phenomena and technology (e.g., sensors and AI-based applications).</td>
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<td>Study and examination requirements and forms of examination</td>
<td>Students are eligible for the final semester test if they have at least 75% attendance in class.

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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Grade Conversion of 0-100 scale into 0-4 scale is set as below:

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<tr><th>Letter</th><th>Number</th><th>Grade interval</th></tr>
<tr><td>A</td><td>4.00</td><td>85 ≤ A ≤ 100</td></tr>
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	A-	3.75	80 ≤ A- <85
	B+	3.50	75 ≤ B+ < 80
	B	3.00	70 ≤ B < 75
	B-	2.75	65 ≤ B- < 70
	C+	2.50	60 ≤ C+ < 65
	C	2.00	55 ≤ C < 60
	D	1.00	40 ≤ D < 55
	E	0.00	0 ≤ E < 40
Reading List	1. Kappen, Bert. 2008. Introduction to Biophysics, Handout. Radboud University Nijmegen. 2. Nölting Bengt. 2006. Methods in Modern Biophysics. Berlin: Springer. 3. Tuszynski, Jack A., dan Kurzynski, Michal. 2003. Introduction to Molecular Biophysics. London: CRC Press. 4. Waigh, Tom A.. 2007. Applied Biophysics . London: John Wiley and Sons, Ltd. 5. Carl J. Payton and Roger M. Bartlett. 2008. Biomechanical Evaluation of Movement in Sport and Exercise . The British Association of Sport and Exercise Sciences Guideline 6. Duane Knudson. 2019. Fundamentals of Biomechanics . New York: Springer. 7. Lubert, Styer. 2000. Biokomia Vol I Edisi 4. Jakarta: EGC.		