Development of Physics Learning Media

Module Name :	Development of Physics Learning Media	
Module Level :	Undergraduate	
Code :	32151153	
Sub-heading, if applicable :		
Classes, if applicable :		
Semester :	5st	
Module coordinator :	Dr.Firmanul Catur Wibowo, M.Pd.	
Lecturer(s) :	Dr. Firmanul Catur Wibowo, M.Pd. Lari A Sanjaya, M.Pd.	
Language :	Indonesian	
Classification within the curriculum :	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class Size
Lecture (Expository, discussion, exercise)	100 minutes	40
Workload	Total workload of this course 90,6 hours (3 ECTS) per semester which consist of 26,67 hours (0,89 ECTS) classroom activity, 32 hours (1.06 ECTS) structured task, and 32 hours (1.06 ECTS) per semester.	
Credit points :	3 ECTS	
Prerequisite course(s) :	-	
Course Outcomes :	After taking this course the student has ability to : CLO7. Students are able to design learning based on the development model CLO8. Students are able to understand the General Information Nature, role and function of teaching aids CLO9. Students are able to understand the types, characteristics of teaching aids media that are in accordance with the demands in practicing 21st-century skills CLO10. Students are able to develop high school physics teaching aids	
Content :	1. General Information • The nature of instructional media tools • The role of instructional media tools • The functions of instructional media tools 2. Types and characteristics of instructional media tools suitable for training 21st-century skills • Types of 21st-century instructional media tools • Characteristics of 21st-century instructional media tools	

	3. Development of Physics Learning Media a. Lesson planning b. Media selection c. Media utilization d. Media evaluation • Lesson planning using instructional media tools • Selection of instructional media tools • Utilization of instructional media tools • Evaluation of instructional media tools 4. Development of Instructional Media (Mechanics) • Measurement of Length • Measurement of Density • Force Table and Vector Addition of Forces • Analysis of the journal "Emerging Practices and Issues of New Media and Learning" 5. Development of Instructional Media (Mechanics) • Uniformly Accelerated Motion • Uniformly Accelerated Motion Using a Photogate • Uniformly Accelerated Motion on the Air • Analysis of the journal "DoWe Really Need Media Education 2.0? Teaching Media in the Age of Participatory Culture" 6. Development of Instructional Media (Mechanics) • Kinematics in Two Dimensions on the Air • Coefficient of Friction • Coefficient of Friction Using a Force Sensor and a Motion Sensor • Analysis of the journal "Learning, Becoming, Embodying: A Review of Embodiment in an Era of Learning with Contemporary Media" 7. Development of Instructional Media (Mechanics) • Newton's Second Law on the Air • Newton's Second Law on the Atwood Machine • Torques and Rotational Equilibrium of a Rigid Body • Analysis of the journal "Games-to-Teach or Games-to-Learn: Addressing the Learning Needs of Twenty-First Century Education Through Performance" 8. Development of Instructional Media (Mechanics) • Conservation of Spring and Gravitational Potential Energy • Energy Variations of a Mass on a Spring Using a Motion Sensor • The Ballistic Pendulum and Projectile Motion • Analysis of the journal "Game Adaptation and Personalization Support serta Issues and

	Challenges of Enacting Game-Based Learning in Schools" 9. Development of Instructional Media (Fluids) • Static Fluids • Dynamic Fluids • Archimedes' Principle • Analysis of the journal "Peer Group Formation for Learning serta The Digital Textbook in South Korea: Opportunities and Challenges" 10. Development of Instructional Media (Mechanics) • The Pendulum-Approximate Simple Harmonic Motion • Simple Harmonic Motion- Mass on a Spring Using a Motion Sensor • Standing Waves on a String • Analysis of the journal "The Digital Textbook in South Korea: Opportunities and Challenges" 11. Development of Instructional Media (Thermodynamics) • Temperature and Heat Transfer • Specific Heat of Metals • Linear Thermal Expansion and The Ideal Gas Law • Analysis of the journal "Implemented Scenarios and Evaluation Results serta mengkaji The Construction of Media in Education Policies: A Comparative Study of Singapore and Taiwan" 12. Development of Instructional Media (Electricity) • Equipotentials and Electric Fields • Measurement of Electrical Resistance and Ohm's Law • Analysis of the journal "Effects of Digital Gaming Among Children and Adolescents in Singapore: A Summary of Research Findings" 13. Development of Instructional Media (Electricity) • Wheatstone Bridge and Bridge Measurement of Capacitance • Voltmeters and Ammeters • Analysis of the journal "Multimedia Learning Using Social Media for Peer Education in Single-Player Educational Games" 14. Development of Instructional Media (Electricity) • Potentiometer and Voltmeter Measurements of the emf of a Dry Cell • Kirchhoff's Rules

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Analysis of the journal "Learning in the Twenty-First Century Interactive Multimedia Technology"
15. Development of Instructional Media (Magnetic)
Magnetic Induction of a Solenoid
Magnet and Electromagnetism
Analysis of the journal "Shepherd, Student-Generated Digital Media in Science Education: Learning, Explaining and Communicating Content"
16. Development of Instructional Media (Optics)
Reflection and Refraction with the Ray Box
Focal Length of Lenses
Diffraction Grating Measurement of the Wavelength of Light
Analysis of the journal "Interactive Multimedia Learning Environments
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<tr><td>Study/exam achievements:</td><td>Examination are conducted as unit test, as following
<table>
<tr><th>No</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>Case-based learning</td><td>Project Assessment (for group project assignments)</td><td>55%</td></tr>
<tr><td>2</td><td>Midterm Test</td><td>Written test</td><td>15%</td></tr>
<tr><td>3</td><td>Final Test</td><td>Written test</td><td>20%</td></tr>
<tr><td>4</td><td>Attendance</td><td>Presence list</td><td>10%</td></tr>
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<tr><td>Media :</td><td>Laptop/Computer, Smartphone, Camera, Tripod/Other Support, and Rigid Body</td></tr>
<tr><td>Literatures :</td><td>

Sanjaya Mishra, Ramesh C. Sharma. Interactive Multimedia in Education and Training. Idea Group Inc (IGI), 2005.
David H. Loyd. Physics Laboratory Manual Third Edition. Thomson Higher Education 10 Davis Drive Belmont: USA: 2008.
Stan Gibilisco. Electricity Experiments You Can Do at Home. The McGraw-Hill: USA. 2010.
Johannes Konert. Interactive Multimedia Learning Using Social Media for Peer Education in Single-Player Educational Games. Springer: New York London. 2014.
Tzu-Bin Lin, Victor Chen, Ching Sing Chai. New Media and Learning in the 21st Century: A Socio-Cultural Perspective. Springer Science+Business Media Singapore 2015.
Hoban, G., W. Nielsen, and A. Shepherd. Student-Generated Digital Media in Science Education: Learning,

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	Explaining, and Communicating Content. Taylor & Francis Group. 2015. 7. Marc J. de Vries. International Handbook of Technology Education: Reviewing the Past Twenty Years. Rotterdam & Taipei: Sense Publishers. 2016.