



UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS EDUCATION
PHYSICS STUDY PROGRAM

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Bachelor of Physics

MODULE HANDBOOK

Module name:	Liquid Crsytal
Module level, if applicable:	Undgraduate
Code:	FSK6358
Sub-heading, if applicable:	-
Classes, if applicable:	-
Semester:	3 th
Module coordinator:	Dr. Supardi, S.Si., M.Si.
Lecturer(s):	Dr. Supardi, S.Si., M.Si, Dr. Warsono, S.pd., M.Si
Language:	Bahasa Indonesia
Classification within the curriculum:	Elective Course
Teaching format / class hours per week during the semester:	120 minutes lectures and 180 minutes structured activities per week.
Workload:	Total workload is 136 hours per semester which consists of 150 minutes lectures, 180 minutes structured activities, and 180 minutes individual study per week for 16 weeks.
Credit points:	3 sks (4.86 ECTS)
Prerequisites course(s):	-
Course Outcomes	After taking this course the students have ability to:

	<p>CO1. Students are able to explain the liquid crystal history, classification, structure of liquid crystals, and physical properties of liquid crystals</p> <p>CO2. Students are able to explain the effect of electric fields on liquid crystals and magnetic fields on liquid crystals.</p> <p>CO3. Students are able to explain the application of liquid crystals in various fields.</p> <p>CO4. Students are able to explain the types and properties of Liquid Crystal Polymers and their applications in everyday life.</p>																					
Content:	<p>This course studies liquid crystals, including the classification and structure of liquid crystals, the regularity and symmetry of materials, the influence of electric and magnetic fields on liquid crystals, the application of liquid crystals in various fields, and liquid crystal polymers.</p>																					
Study / exam achievements:	<p>Attitude assessment is carried out at each meeting by observation and / or self-assessment techniques using the assumption that basically every student has a good attitude. The student is given a value of very good or not good attitude if they show it significantly compared to other students in general. The result of attitude assessment is not a component of the final grades, but as one of the requirements to pass the course. Students will pass from this course if at least have a good attitude.</p> <p>The final mark will be weight as follow:</p> <table border="1"> <thead> <tr> <th>No</th> <th>CO</th> <th>Assessment Object</th> <th>Assessment Technique</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1</td> <td rowspan="4">CO2, CO3 and CO4</td> <td>a. Individual Assignment</td> <td rowspan="4">Presentation / written test</td> <td>15%</td> </tr> <tr> <td>b. Group Assignment</td> <td>20%</td> </tr> <tr> <td>c. Mid</td> <td>25%</td> </tr> <tr> <td>d. Final Exam</td> <td>25%</td> </tr> <tr> <td colspan="3">Total</td> <td></td> <td>100%</td> </tr> </tbody> </table>	No	CO	Assessment Object	Assessment Technique	Weight	1	CO2, CO3 and CO4	a. Individual Assignment	Presentation / written test	15%	b. Group Assignment	20%	c. Mid	25%	d. Final Exam	25%	Total				100%
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		c. Mid		25%																		
		d. Final Exam		25%																		
Total				100%																		
Forms of media:	Board, LCD Projector, Laptop/Computer, online																					
Literature:	<ol style="list-style-type: none"> de Gennes, P.G. dan Prost, J. (1993). <i>The Physics of Liquid Crystals</i>. Oxford: Clarendon Press. Chandrasekhar, S. (1992). <i>Liquid Crystals, Second Editions</i>. Cambridge : Cambridge University Press. Yang, D -K, dan Wu, S-T. (2006). <i>Fundamentals of Liquid Crystal Devices</i>. Chichester : John Wiley and Sons. Khoo, I-C. 2007. <i>Liquid Crystals, Second Edition</i>. Hoboken : John Wiley and Sons. 																					

	<ol style="list-style-type: none"> 5. Warner, M. dan Terenjev, E.M. 2007. <i>Liquid Crystal Elastomers</i>. Oxford : Oxford University Press. 6. Supardi, Harsojo, Y. Yusuf, 2014, Experimental Studies of Thermo-Induced Mechanical Effects in the Main-Chain Liquid Crystal Elastomers, <i>Advanced Materials Research</i> Vol. 896, pp 322-326 7. Supardi, Yusuf, Y., Harsoyo, 2015, Characterization of Main-Chain Liquid Crystal Elastomers by Using Differential Scanning Calorimetry (DSC) Method, <i>Advanced Materials Research</i> Vol. 1123, pp 69-7 8. Supardi, Yusuf, Y., Harsoyo, 2017, Influence of Cross-Linker Concentration on Physical Properties of Main-Chain Liquid Crystalline Elastomers, <i>Materials Research</i>
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PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
CO1	✓	✓			✓			
CO2	✓	✓			✓			
CO3	✓	✓			✓			
CO4	✓	✓			✓			

Physics Study Program's PLO

No.	Program Learning Outcome
PLO1	To show personal characters based on social ethics and academic responsibility
PLO2	To master the concepts of classical and modern physics
PLO3	To be able to use mathematical, computational, and experimental methods in understanding physical concepts
PLO4	To use operational knowledge of physics to carry out research in applied physics
PLO5	To analyze physical phenomena using mathematical, computational, and experimental methods to obtain mathematical or empirical models of the phenomena
PLO6	To be able to use instrumentation skills to solve physical problems
PLO7	To be able to communicate and disseminate the knowledge and research in the field of physics
PLO8	To be able to collaborate in scientific and social community