UIN SUNAN KALIJAGA YOGYAKARTA
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Undergraduate Programme in Physics

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MODULE HANDBOOK

Module Name	Material Characterization
Module level, if applicable	Bachelor
Code, if applicable	FIS424060
Subtitle, if applicable	-
Courses, if applicable	Material Characterization
Semester(s) in which the module is taught	6th (sixth)
Person responsible for the module	Dr. Widayanti, M.Si
Lecturer(s)	Dr. Widayanti, M.Si
Language	Indonesia
Relation to curriculum	Elective course in the third year (6th semester) Bachelor Degree
Type of teaching, contact hours	150 minutes lectures and 180 minutes structured activities per week.
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam
Credit points	3
Requirements according to the examination regulations	Minimum attendance 75% All assignments submitted Attendance on time
Recommended prerequisites	No prerequisites stated on
Module objectives/intended learning outcomes	After completing this course, the students: CO 1. able to understand and explain physics concept of material characterization CO 2. able to explain various techniques for material characterization including mechanical, thermal, structural, compositional, optical, and electrical characterization of a material CO 3. able to analysis the result of material characterization
Content	Introduction to Characterization Techniques: Spectroscopy, Microscopy, Diffraction and Scattering, Thermal Analysis, Characterization Methods for Determining Material Properties: Mechanical Properties (Compression-Tension Strength, Elasticity), Electrical Properties (4-probe, Conventional), Thermal Properties, Magnetic Properties Spectroscopy Methods: UV-Vis-NIR, Raman, NMR, EDS-EDX, XRF Diffraction and Scattering Methods: X-Ray, Synchrotron, SANS, SAXS, Neutron Scattering, PSA Electron Microscopy Methods: SEM, TEM, AFM

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	Thermal Analysis Methods: TGA, DTA, DSC.
Study and examination requirements and forms of examination	The final mark will be weighted as follows:

NO	Assessment methods (components, activities)	Weight (percentage)
1	Final Examination	40%
2	Mid-Term Examination	30%
3	Class Activities : Quiz, Homework, etc.	30%

The final assessment is expressed in the form of a letter value converted from a number value with the following categories:

NO	Number Value	Letter Value	NO	Number Value	Letter Value
1	≥ 95	A	7	65-69.99	B/C
2	90-94.99	A-	8	60-64.99	C+
3	85-89.99	A/B	9	55-59.99	C
4	80-84.99	B+	10	50-54.99	C-
5	75-79.99	B	11	55-34.99	D
6	70-74.99	B-	12	<35	E

Media employed	White-board, Lcd Projector, e-learning (https://daring.uin-suka.ac.id/)
Reading list	1. Ruth E Whan, coordinator, *ASM Handbook of Materials Characterization*, Vol. 10, 3rd printing, 1992, US. 2. Skoog, D. A dan West, D.M., 1980. *Principles of Instrumental Analysis*. Sounders College, Philadelphia. 3. Mool Chand Gupta. 2001. *Atomic and Molecular Spectroscopy*. New Age International (P) Limited. Publishers. **4.** Cullity, B.D. 1959. *Elements of X-Ray Diffraction, 2 Edition*. Addison Wasley Publishing Company Inc. Notre Dame. 5. Oliver Howarts. 1973. *Theory of Spectroscopy an Elementary Introduction*. London : Thomas Nelson and Sons Ltd. 6. Dinnerbier, R.E dan Billinge. S. J. L. 2008. *Powder Diffraction Theory and Practice*. UK : RSC Publisher.

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9
CO 1			√						
CO 2				√					
CO 3					√				