FI504 Superconductor

Module name:	Superconductor	
Module-level, if applicable:	Undergraduate	
Code:	FI504	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	6th	
Module coordinator:	Yuyu Rachmat Tayubi	
Lecturer(s):	Yuyu Rachmat Tayubi, Wiendartun	
Language:	Bahasa Indonesia	
Classification within the curriculum:	Elective Course	
Type of Teaching:	Contact hours per week during the semester	Class Size
1. Lecture (conceptual, contextual and problem-solving approaches through expository, discussions and practical methods). 2. Structured activities (assignments based on conceptual, contextual and problem-solving approaches, Presentation) 3. Self-study (simulation and presentation)	1 hour 40 minutes	25
Workload:	The total workload is 91 hours/5440 minutes (3.2 ECTS) per semester, consisting of 25 hour 20 minutes/1400 minutes lectures (0.82 ECTS), 28 hours/1680 minutes structured activities (0.98 ECTS) and 28 hours/1680 minutes self-study (0.98 ECTS) per week for 14 weeks, 11 hour 54 minutes/714 minutes for two exams (0.42 ECTS).	
Credit points:	3.2 ECTS	
Pre-requisites course(s):	Material Physics, Modern Physics	

<table>
<tr><td>Course Learning Outcomes (CLO):</td><td>After taking this course the students have ability to:
CLO1. Explain conceptual knowledge of the basic properties of superconductors, such as zero resistivity, critical temperature, and the Meissner effect.
CLO2. Explain procedural knowledge of the theory and laws that apply to the formation of superconducting materials.
CLO3. Explain conceptual knowledge about Cuprite-based superconducting materials with high critical temperature Tc.
CLO4. Explain conceptual knowledge about the different types of organic and inorganic superconducting materials.
CLO5. Explain conceptual and procedural knowledge for the manufacture of superconducting materials, both electron doping and hole doping.
CLO6. Explain conceptual and procedural knowledge of the use of characterization tools such as XRD and Four Point Probe.
CLO7. Explain conceptual and procedural knowledge about data analysis methods from XRD and Four Point Probe measurements</td></tr>
<tr><td>Content:</td><td>BCS theory, electron pairs, coherence length, electrical resistivity, Meissner effect, magnetic susceptibility, Mott oscillator, type 1 and 2 superconductors, electron and hole doping theory, electron, and hole doping phase diagrams, VRH (Variable Rang Hoping) X-ray diffraction theory, and solid reaction theory.</td></tr>
<tr><td>Study/exam achievements:</td><td>The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CLO</th><th>Assessment Object</th><th>Assessment Techniques</th><th>Weight</th></tr>
<tr><td>1</td><td>CLO1-4

CLO1-2
CLO3-4
CLO5-7</td><td>Subject specific competences:
a. Assignment
b. Exam:
- Mid exam
- Final exam
c. Presentation</td><td>Written

Written Test
Written Test
Performance</td><td>15%

30%
30%
25%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Forms of media:</td><td>LCD Projector, Laptop/Computer</td></tr>
<tr><td>Literature:</td><td>1. Philippe Mangin, Rémi Kahn (2017). Superconductivity An introduction, Springer International Publishing
2. J. Robert Schrieffer Editor James S. Brook (2007), Handbook of High-Temperature Superconductivity Theory and Experiment, Springer Science + Business Media, LLC
3. Kristian Fossheim and Asle Sudbø (2004), Superconductivity Physics and Applications, John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England</td></tr>
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PLO and CLO mapping

	PLO1	PLO 2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
CLO1		√										
CLO2		√										
CLO3		√										
CLO4		√										
CLO5		√										
CLO6		√										
CLO7		√										