MODULE HANDBOOK

Course:	**Biomaterial Design**
Module Level:	Undergraduate
Code:	FIM308
Sub-heading, if applicable:	-
Courses included in the module, if applicable:	-
Semester/Term:	Third year
Module Coordinator(s):	
Lecturer(s):	A. Zaidan and Dyah Hikmawati
Language:	Bahasa Indonesia
Classification within the Curriculum	~~Compulsory Course~~ / Elective Course
Teaching format / class hours per week during semester:	2 hours of lectures, 2 hours of tutorial
Workload:	2 hours of lectures, 2 hours of tutorial and structured activities, 2 hours of individual study, 13 weeks per semester, and total of 78 hours per semester ~ 2.6 ECTS*
Credit Points:	2
Requirement(s):	-
Learning Goals/Competencies:	**General Competence (Knowledge):** 1. Ability to understand fundamental background of Density Functional Theory (DFT). 2. Understand the concepts of Hohenberg-Kohn theorems and their application. 3. Understand the Kohn-Sham equations and density functionals, such as Local Density Approximation (LDA). **Specific Competence:** 1. Able to identify the areas within computational physics where DFT generally performs well and areas where the theory fails in predicting properties of bulk materials or molecules. 2. Able to determine, from a physical context, whether the properties of a certain material can be studied by means of DFT or any other correlated method, and if so, select the method which is the more suitable.
Contents:	This course uses the theory and application of atomistic computer simulations (Density functional theory/*ab initio*) to model, understand, and predict the properties of real materials. Specific topics include: energy models from classical potentials to first-principles approaches; density functional theory, errors and accuracy of quantitative predictions, and molecular dynamics simulations; The course employs case studies from medical applications. Experimental design of materials: metals, ceramics, polymer composites, calculation of material properties experimentally also part of this course.
Soft Skill Attribute:	Effort and ethic

Study/Exam Achievements:	Final score is calculated as follow: 15% assignment 1 + 15% assignment 2 + 35% midterm exam + 35% final exam Final grade is defined as follow: A : 75 – 100 AB : 70 - 74.99 B : 65 - 69.99 BC : 60 - 64.99 C : 55 - 59.99 D : 40 - 54.99 E : 0 - 39.99
Forms of Media:	Powerpoint slides, LCD projectors and whiteboards
Learning Methods	Lecture, assessments and group discussion
Literature(s):	1. Martin, R. *Electronic Structure: Basic Theory and Practical Methods*. Cambridge, UK: Cambridge University Press, 2004. ISBN: 9780521782852. 2. Robert G. Parr, Weitao Yang, Density-Functional Theory of Atoms and Molecules, Oxford University Press, (1989) 3. Wolfram Koch, Max C. Holthausen, Chemist's Guide to Density Functional Theory; Wiley-VCH Verlag GmbH, (2001). 4. Kojic, Milos, 2008, *Computer Modelling in Bioengineering Theoretical Background, Example and* software, Wiley.
Notes:	*Total ECTS ={(total hours workload x 50min)/60 min)/25 hours each ECTS is equals with 25 hours