Module Handbook

Course:	**Introduction to Biophotonics**
Module Level:	Undergraduate
Code:	FIO 202
Sub-heading, if applicable:	-
Courses included in the module, if applicable:	-
Semester/Term:	4th / Second Year
Module Coordinator:	Prof. Dr. Retna Apsari, M.Si.
Lecturer(s):	Prof. Dr. Retna Apsari, M.Si. ; Prof. Moh. Yasin and Pujiyanto M.Si.
Language:	Bahasa Indonesia
Classification within the curriculum:	~~Compulsory Course~~ / Elective Course
Teaching format / class hours per week during semester:	2 hours of lectures (50 min / hour)
Workload:	2 hours of lectures, 2 hours of structural 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):	(BID 105) General Biology II and (FID 201) Modern Physics
Learning Goals/Competencies:	**General Competence (Knowledge):** After following this course, the students are able to explain basic principle about interactions between light / photon and biological matter and also able to implement it in biophotonic and medical researches. Students are expected to develop research as their focus to biophotonic or medical scope, theoritically and even experimentally. **Specific Competences:** 1. Students are able to explain the basic principles of biophotonics, biosensor optics, flow cytometer,photobiology, photodynamic therapy 2. Students are able to solve the biophotonics problems

Contents:	**Basic Principles:** Basic principles of interactions between light and matter, basic principles of laser technology and its characterizations, non linear optics and its applications, laser tweezers, laser scissors. **Biosensor Optics:** Principle. technique and biosensor optics applications **Flow Cytometer:** Principle. technique and flow cytometer applications. **Photobiology:** Tissue engineering with light based, biology basic principles, photobiology principle, technique and its applications, microarray technology for genomics and proteomics, bionanophotonics, biomaterial for photonics. **Photodynamic Therapy:** Principle, Light-Activated Technique, and its applications.
Soft Skill Attribute:	Effort and ethic.
Study/Exam Achievements:	Students are considered competent and eligible to pass the course upon obtaining at least 40% of maximum mark of the midterm test, final examination, quizzes and home work. Final score is calculated as follow: 20% Homework +20% Quizzes + 30% Midterm test +30% 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	Powerpoints slides, LCD projectors and whiteboards
Learning Method:	Lecture and tutorial
Literature(s):	1. Paras N. Prasad, 2003, *Introduction to Biophotonics*, John Wiley & Sons 2. Leonard Grossweiner, 2005, *The Science of Phototherapy : An Introduction*, Springer-Jerman 3. Vo Dinh, 2003, *Biomedical Photonics Handbook*, CRC Press, New York 4. Niemz M.H., 1996, *Laser-Tissue Interaction*, Springer. 5. Kai Chang, 2011, *Advances In Optical imaging for Clinical Medicine*, John wiley and Sons 6. Tobias M. N. Tuli, 2012, *Apoptosis and Medicine*, In Tech 7. Others supporting books and the newest international journals.
Notes:	*Total ECTS = {(total hours workload × 50 min) / 25 hours Each ECTS is equals with 25 hours.