MODULE HANDBOOK

Course:	**Finite Element Method**
Module Level:	Bachelor
Code:	FIK308
Sub-heading, if applicable:	-
Courses included in the module, if applicable:	-
Semester/Term:	5th / Third Year
Module Coordinator:	Dr. Soegianto Soelistiono, M.Si.
Lecturer(s):	Dr. Soegianto Soelistiono, M.Si. and Endah Purwanti, S.Si., M.ST.
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 ~ 3.9 ECTS*
Credit Points:	2
Requirement(s):	(FIT202) Mathematical Physics II
Learning Goals/Competences:	**General Competency (Knowledge):** Able to solve / obtain numerical solution of partial differential equations in several fields of physics. **Specific Competences:** 1. Able to clasify the second order of partial differential equations. 2. Able to explain solution of partial differential equations by numerical methods. 3. Able to implement the finite difference method to solve partial differential equations. 4. Able to explain the basic principles of finite element method. 5. Able to distinguish finite difference method with the finite element method. 6. Able to explain the division of the area into the one-dimensional linear elements. 7. Able to divide the area into a one-dimensional element by using nodal point. 8. Able to explain the division of the area into the two-dimensional linear elements. 9. Able to divide the area into a two-dimensional element by using nodal point. 10. Able to Explain the Rayleigh-Ritz method. 11. Able to apply the finite element method on some simple physics. phenomenon such as thermal conduction, viscous fluid flow patterns on the tube, the flow of viscous fluid in open system, electric and magnetic field at some antenna models.

Contents:	Partial differential equations, finite difference method in differential equations, basic of finite element methods, discretization system continuum, discretization domain and equations, elements of linear one-dimensional, elements quadratic one-dimensional, elements of linear two-dimensional, elements triangular, the method of Rayleigh-Ritz. The applications of finite element method, thermal conduction equations one and two-dimensional, fluid flow, applications in electromagnetic field.
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 exams (midterm exam and final exam), structured activity(group discussion). The final score is calculated as follow: 20% assignment + 10% softskill (attendance) + 35% midterm test + 35% final exam The Form of assignment is to Make a paper and presented in class The Form of midtrem exam and final exam are essay test 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:	Lectures, assignments and group discussion
Literature(s):	1. Steven C. Chapra and R.P. Canale . 2002. *Numerical Methods for Engeneering*. McGrahill. HigherEducation. 2. Huebner,K.H.1982. *The finite Element Method for Engineers, Wiley*.New York . 3. Davies, A. J. 2011. *The Finite Element Method, An Ingroduction with Partial Differential Equations,* Oxford University Press 4. Lewis, Roland W , 2004, *Fundamental of Finite Element Method for Heat and Fluid flow*, Wiley. 5. Ochsner, A. 2012. *One Dimensional Finite Elements, An Introduction to FE Method,* Springer-Verlag
Notes:	*Total ECTS = {(total hours workload × 50 min) / 25 hours Each ECTS is equals with 25 hours.