MODULE HANDBOOK

Course:	**Computational Physics II (Experimental)**
Module Level:	Undergraduate
Code:	FIK306
Sub-heading, if	-
Courses included in module, if applicable:	-
Semester/Term:	5 th / Third Year
Module Coordinator(s):	Dr. Khusnul Ain, S.T. M.Si.
Lecturer(s):	Dr. Khusnul Ain, S.T., M.Si.; Endah Purwanti, S.Si, M.Si
Classification within Curriculum:	Compulsory Course / ~~Elective Course~~
Teaching format / class hours per week during semester:	2 hours of lectures (50 min / hour)
Workload:	2 hours of doing worksheet and pretest preparation, 2 hours of laboratory work, 2 hours of group discussion, searching literature and writing report, 13 weeks per semester, and total of 78 hours per semester 2,6 ECTS*
Credit Points:	1
Requirement(s):	(FIT 201) Mathematical Physics I and (FIT 202) Mathematical Physics II, Fisika Komputasi I
Learning Goals/Competences:	**General Competence (Skill):** 1. To solve physics problem with numerical method 2. To implement algorithm for solving physics problems by using in the source code of programming. **Specific Competence:** 1. Encode program to solve linear equation system with Gauss elimination, Gauss Jordan, inverse, Jacobi and Gauss-Seidel methods 2. Encode program to solve interpolation and data fitting problems 3. Encode program to Solve ordinary differential equation by Euler, Heun, polygon, and runge-kutta methods 4. Encode program to Solve numerical of laplace and poisson equation with finite difference method 5. Encode program to Solve numerical heat transfer equation with Cranck-Nicolson method 6. Encode program to apply fourier transform principles to solve physics problems 7. Encode program to apply monte-carlo method in integral cases

Contents:	linear equation system (Gauss elimination methods, Gauss Jordan, inverse, Jacobi, Gaus-Seidel) interpolation, fitting data ordinary differential equation (Euler, Heun, polygon repaired, Runge Kutta) partial differential equation (Crank-Nicolson methods, Laplace equation, Poisson equation, parabolic equation, hyperbolic equation, diffusion equation) Fourier transform, introduction of monte carlo methods by random generator, integral solution with monte carlo.
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 score for the exams (midterm test and final exam), structured activity(group discussion). Final score is calculated as follow: 10% activity + 30% assignment (algoritm and program code) + 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:	Computer, Powerpoint slides, LCD projectors and whiteboards
Learning Methods:	Lecture, assessments and group discussion
Literature(s):	1. Sandeep Nagar, 2017, Introduction to Octave: For Engineers and Scientists, Aprees. 2. Jesus Rogel Salazar, 2013, Essential mathlab and octave, Taylor and Prancis CRC Press 3. Capra, S.C., 2012, Applied Numerical Methods with Mathlab for Engineers and sciences, 6 th Ed., Mc. Graw Hill. 4. Capra,S.C. and R.P Canale, 2009, Numerical Methods for Engineers, 6 th Ed., Mc. Graw Hill.
Notes:	*Total ECTS={(total hours workloadx50 min)/60 min}/25 hours Each ECTS is equals with 25 hours