Course	:	**Computational Physics I**
Module Level	:	Undergraduate
Code	:	FIK303
Sub-heading, if applicable:	:	-
Courses included in the module, if applicable:	:	-
Semester/Term	:	4th / Second Year
Module Coordinator(s):	:	Dr. Khusnul Ain, S.T., M.Si.
Lecturer(s):		Dr. Khusnul Ain, S.T., M.Si. and Dr. Ir. Soegianto Soelistiono, M.Si.
Classification within the Curriculum	:	Compulsory Course / ~~Elective Course~~
Workload	:	3 hours of lectures, 3 hours of structural activities, 3 hours of individual study,13 weeks per semester, and total 117 hours per semester~3.9 ECTS*
Credit Points	:	3
Requirement(s)	:	(FIT 201) Mathematical Physics I and (FIT 202) Mathematical Physics
Learning Outcome	:	LO1 : They have knowledge of classical and modern physics with their relevant problems LO2 : They have ability to apply mathematical methods to solve problems in physics LO6 : They are familiar with information technology and able to apply them on relevant physics problems
Learning Goals/Competences	:	**General Competence (Skill):** Students are able to: a. To know evolution a variety of programming languages from the beginning until today b. Identify and recognize fundamental techniques for developing programming using flowchart and algorithm to solve the physics problems c. Understand the basic concept of programming d. Understand to build programming structure using language programming (open source: GNU Octave) to solve the physics problems e. Understand the basic concept of numerical method. **Specific Competence:** Students are able to: a. Identify and recognize fundamental techniques for developing simple programming using pseudo-code, flowchart and algorithm b. understand structure of squential algorithm, conditional, recursion and its combination, array 1D and 2D c. develop simple programming to solve root equation and integration using numerical method
Contents	:	Introduction of programming language, algorithm and flowchart, data

		structure, data type, recursion, Function and Procedure, Array 1D, Array 2D, summation and multiplication matrix, Error Analysis, Root of polynomial: Bracket method (Bisection, Regular False) Open method (Newton's, Secant, Brent), Numerical Integration (Simpson's, Simpson's 3/8th), Romberg.
Soft Skill Attribute	:	Dicipline, can access and process the information.
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: 20% assignment 1 + 20%assignment 2 + 30% midterm + 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	:	Powerpoint slides, LCD projectors and whiteboards
Learning Methods	:	Lecture, assessments and group discussion
Referensi	:	a. Capra,S.C. and R.P Canale, 2009, Numerical Methods for Engineers, 6 th Ed., Mc. Graw Hill. b. Gilbert Strang, 2015, Differential Equation and Linear Algebra, Wellesley-Cambridge Press, U.S. c. Stephen W. Goode, Scott A.Annin, 2015, Differential Equations and Linear Algebra, pearson. d. Jesus Rogel Salazar, 2013, Essential mathlab and octav, Taylor and Prancis CRC Press.
Notes	:	*Total ECTS={(total hours workloadx50 min)/60 min}/25 hours Each ECTS is equals with 25 hours