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MODULE HANDBOOK

Module name	Vector Analysis
Module level, if applicable	Bachelor
Code, if applicable	MMM- 2105
Subtitle, if applicable	
Courses, if applicable	Vector Analysis
Semester(s) in which the module is taught	4th (fourth)
Person responsible for the module	Chair of the Lab. Analysis Laboratory
Lecturer	Prof. Dr. Bambang Soedijono
Language	Bahasa Indonesia
Relation to curriculum	Bachelor Degree, Elective, 4th semester
Type of teaching, contact hours	150 minutes lectures, 180 minutes structured activities.
Workload	Total workload is 136 hours per semester, which consists of 150 minutes lectures per week for 14 weeks, 180 minutes structured activities per week, 180 minutes individual study per week, in total is 16 weeks per semester, including mid exam and final exam.
Credit points	3
Requirements according to the examination regulations	Students have taken the module of Multivariable Calculus II (MMM-2109) and have participated in the final exam of the course.
Recommended prerequisites	Competencies adequate in Calculus course: derivative and integral.
Module objectives/intended learning outcomes	After completing this course the students have ability to: CO 1. use vector operations in building the equation of straight lines and planes. CO 2. determine the vector derivative and vector integration. CO 3. Solve the line integrals and develop the Green's Theorem, Divergence Theorem, and Stoke's Theorem.
Content	• Algebraic and geometric vectors: addition of vectors and scalar multiplication, Inner and cross product. • Equation of straight lines and curves: Equation of straight lines and planes. Curve and surface, parametric and nonparametric equation of curves and surface. • Vector derivative: Derivative of vector-valued-function. • Vector field: Gradient, divergence and curl. Addition and composition of vector derivatives. • Vector Derivative of order two. Normal vector and tangent vector of a plane and a surface. • Vector Integration: line Integral, surface integral. Divergence Theorem, Green's Theorem, and Stoke's Theorem. • Coordinate system: Spherical coordinate, cylindrical coordinate, polar coordinate.

	• Potential Theory: Gradient, harmonic function, fundamental theorem of vector calculus.
Study and examination requirements and forms of examination	The final mark will be weighted as follows: No Assessment methods (components, activities) Weight (percentage) 1 Final Examination 45% 2 Mid-Term Examination 30% 3 Class Activities: Quiz, Homework, etc 25% The initial cut-off points for grades A, B, C, and D should not be less than 80%, 70%, 50%, and 40%, respectively.
Media employed	Board, LCD Projector, Laptop/Computer
Reading List	1. Harry F. Davis and Arthur David Snider, 1995, *Introduction to Vector Analysis*, 7th Edition, Allyn and Bacon Inc, Boston. 2. Frederick Max Stein, 1963, *Introduction to Vector Analysis*, Harper & Row Publisher, New York.

PLO and CO Mapping

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO7	PLO 8	PLO 9
CO 1		v	v						
CO 2		v				v			
CO 3		v	v			v			