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MODULE HANDBOOK

Module designation	*Vector Calculus*
Semester(s) in which the module is taught	*5*
Person responsible for the module	*Dra. Siti Aminah, M.Kom.*
Language	*Indonesian*
Relation to curriculum	*Compulsory*
Teaching methods	*Lecture*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload: 6 hours/week x 14 weeks + 3.67 hours/week x 2 weeks = 91.34 hours.* *Contact hours: 2 hours (100 minutes lectures).* *Private study including examination preparation, specified in hours[1]:* *2 hours structured activities and 2 hours individual study per week.*
Credit points	*2 SKS (3.18 ECTS)*
Required and recommended prerequisites for joining the module	*Calculus 2*

[1] When calculating contact time, each contact hour is counted as a full hour because the organisation of the schedule, moving from room to room, and individual questions to lecturers after the class, all mean that about 60 minutes should be counted.

Module objectives/intended learning outcomes	*After completing the course, students have the ability* 1. *to calculate operations on vector-valued functions, namely limit, differentiation, and integration.* 2. *to calculate velocity, acceleration, curvature, and acceleration components of vector-valued functions.* 3. *to describe vectors in a vector field.* 4. *to calculate divergence and curl in a vector field.* 5. *to calculate the line integral of a function along a curve.* 6. *to calculate the work done by a force field in moving a particle along a curve.* 7. *to use the theorem (conservative vector field) to prove that a vector field is conservative.* 8. *to use the (independence of path) theorem to prove that a line integral is the independence of path* 9. *to use Green's theorem to calculate the line integral on a closed curve.* 10. *to calculate the surface integral of a function.* 11. *to calculate the flux of a vector field passing through a surface using Gauss's theorem.* 12. *to calculate the flux circulation of a vector field around a surface using Stokes' theorem*
Content	1. *Introduction of Vector (Vector and Vector Operations)* 2. *Vector-valued function* 3. *Curvilinear Motion* 4. *Curve* 5. *Acceleration component* 6. *Vector Fields* 7. *Divergence and Curl of Vector Fields* 8. *Line Integrals* 9. *Force Fields* 10. *Criteria for Independence of Path* 11. *Recovering a Function from Its Gradient* 12. *Conservation of Energy* 13. *Green's Theorem in the Plane* 14. *Vector forms of Green's Theorem* 15. *Evaluating Surface Integral* 16. *The flux of Vector Field through a surface* 17. *Surface area for a parametrized surface* 18. *Gauss's Theorem* 19. *Extensions and Application* 20. *Stokes's theorem* 21. *Examples and Applications*

Examination forms	1. *Class activities : Written quiz, homework.* 2. *Mid-term examination* 3. *Final examination*
Study and examination requirements	*The final mark will be weighted as follows:* 1. *Homework (20%).* 2. *Written Quiz (20%)* 3. *Mid-term examination (30%)* 4. *Final examinations (30%)* *To succesfully pass the module it requires minimum 55% of the total mark.* *Mark — Grade* *85—100 — A* *80—<85 — A-* *75—<80 — B+* *70—<75 — B* *65—<70 — B-* *60—<65 — C+* *55—<60 — C* *40—<55 — D* *<40 — E*
Reading list	1. *Varberg, Dale; Edwin J. Purcell; Steven E. Rigdon. Calculus, 9th Edition, Prentice Hall Inc, 2007* 2. *Spiegel, M.R, Vector Analysis, 2nd ed, Schaum's Series, McGraw Hill, 1981.* 3. *Lecturer's Handout* 4. *Videos*