# MODULE HANDBOOK
# Differential Geometry

## BACHELOR DEGREE PROGRAM
## DEPARTMENT OF MATHEMATICS
## FACULTY OF SCIENCE AND DATA ANALYTICS

## INSTITUT TEKNOLOGI SEPULUH NOPEMBER

# MODULE HANDBOOK
# DIFFERENTIAL GEOMETRY

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| Module name | **Differential Geometry** |
| Module level | Undergradute |
| Code | KM184815 |
| Course (if applicable) | Differential Geometry |
| Semester | Spring (Genap) |
| Person responsible for the module | **Drs. Iis Herisman, M.Si** |
| Lecturer | **Drs. Iis Herisman, M.Si** |
| Language | Bahasa Indonesia and English |
| Relation to curriculum | Undergradute degree program, **mandatory**, 8th semester. |
| Type of teaching, contact hours | Lectures, <60 students<br>Tuesdays, 11.00-12.50 (GMT+7) |
| Workload | 1. Lectures : 2 x 50 = 150 minutes per week.<br>2. Exercises and Assignments : 2 x 60 = 120 minutes (2 hours) per week.<br>3. Private learning : 2 x 60 = 120 minutes (2 hours) per week. |
| Credit points | 2 credit points (sks) |
| Requirements according to the examination regulations | A student must have attended at least 80% of the lectures to sit in the exams. |
| Mandatory prerequisites | Persamaan Differensial Biasa |
| Learning outcomes and their corresponding ILOs | Course Learning Outcome (CLO) after completing this module,<br>1.Mahasiswa mampu menjelaskan dan mengklasifikasikan kelompok geometri, terutama yang berkaitan dengan aljabar linier, kalkulus dan persamaan differensial<br>*Students are able to explain and classify geometrical groups, especially that are related to linear algebra, calculus and differential equations*<br><br>*2.* Mahasiswa mampu menjelaskan elemen-elemen dari geometri differensial dan aplikasinya pada disiplin ilmu lainnya |

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| | *Students able to explain some elements of differential geometry and its applications to other fields*<br><br>*3.* Mahasiswa mampu menjelaskan definisi-definisi, lemma-lemma dan teorema-teorema dalam bidang geometri differensial<br>*Students able to explain definitions, lemmas, theorems in the field of differential geometry.*<br><br>*4.* Mahasiswa mampu menjelaskan dan menafsirkan asumsi-asumsi dari kasus kejadian pada model sistem dengan menggunakan teorema-teorema untuk mendapatkan penyelesaiannya.<br>*Students able to explain and understand assumptions of events in a system model by using theorems to obtain the solutions*<br><br>*5.* Mahasiswa mampu mempresentasikan makalah bidang geometri differensial secara mandiri maupun kerja kelompok.<br>*Students able to represent a paper in the field of differential geometry independently and in groups.* | |
| Content | Pada matakuliah ini mahasiswa akan belajar tentang persamaan aljabar dalam bentuk parameter, Kerangka Frenet, Bentuk dasar permukaan dalam parameter, bentuk dasar Gauss dan Codazzi, Diferensial kovarian, geometry hiperbolik, teori permukaan dalam bentuk Diferensial. Pada pembelajaran di kelas mahasiswa akan belajar dan dibekali untuk memahami serta untuk bisa menjelaskan materi yang diajarkan sesuai dengan bahan ajar dan disampingitu diberi tugas-tugas yang mengarah untuk belajar mandiri dan kerja kelompok.<br><br>*In this course, students will learn about algebraic equations in the form of parameters, Frenet Framework, basic surface shapes in parameters, basic form of Gauss and Codazzi, covariance differentials, hyperbolic geometry, and surface theory in the form of differentials. In the classroom, students will be equipped to understand and to be able to explain the teaching materials taught and are given tasks that lead to independent study and group work.* | |
| Study and examination requirements and forms of examination | • In-class exercises<br>• Assignment 1, 2, 3<br>• Mid-term examination<br>• Final examination | |
| Media employed | LCD, whiteboard, websites (myITS Classroom), zoom. | |
| Reading list | Main : | |

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| | 1. John McCleary., ”Geometry from a Differentiabel Viewpoint”, Cambridge University Press, New York America, 1994<br>2. Peter W, W Michor., “Topic in Differential Geometry“, Institut fur Mathematik der Universitat Wien, Strudlhofgasse, Austria, 2006.<br>Theodore Shifrin, “Differential Geometry, A First Course in Curves and Surfaces“, University Of Georgia, 2009.<br><br>Supporting :<br>Ivan Kolar, Peter W. Michor, Jan Slovak., “Natural Operations In Differential Geometry “, Institut fur Mathematik der Universitat Wien, Strudlhofgasse, Austria, and Departement of Algebra and Geometry Faculty of Science, Masaryk University Janackovo, Czechoslovakia, 2000. |