LINKÖPINGS UNIVERSITET
Matematiska Institutionen
Milagros Izquierdo

Notice: The programme shows when will go through each topic roughing speaking. The program follows the main book of the course:

Andrew Pressley **Elementary Differential Geometry**.

The book contains a list of very good Exercises. I advice you to solve them. Remember: to learn maths is to do maths!

You find extra material, including some lists of proposed training exercises, in the LISAM virtual classroom of the course.

Programme for TATA74 : Differential Geometry. Fall 2025

Sections

Curves. Seminars 1-5:
Seminar 1. Curves: Parametrization and Tangent and Normal Vectors
Exercises: 1.2.i, 1.3.i, 1.6, 1.7, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 2.1.i, 2.1.iii

Seminar 2. Curvature of Curves. Frenet-Serret Equations and Fundamental Theorem
Exercises: 2.1.iv, 2.2 (cubic curve), 2.3, 2.4, 2.14, 2.19, 2.21

Seminar 3. Bézier Curves (Extra material. See course web-page and LISAM).

Seminar 4. Special Curves: Envelopes and Optimisation.

Seminar 5. Global Properties of Curves
Exercises: 3.2, 3.3, 3.4, Extra exercises will be provided at the seminar

Surfaces and their Curvatures. Seminars 6-10:
Seminar 6. Surfaces and Charts, Tangent Plane and Orientation.

Seminar 7. I-fundamental Form. Lengths, Areas. Isometric and Conformal Surfaces

Seminar 8. II-fundamental form and normal curvatures

Wednesday, October 1 (13:00) Hand-in Examination, Exercises Part I.

Seminar 9. Gaussian Curvature

Seminar 10. Presentation of Examination Part I (Tuesday, October 7, 13:15-15:00)

Surfaces and Curves in Surfaces. Gauss Egregium Theorem and Gauss-Bonnet Theorem. Seminars 11-18:

Seminar 11. Lecture 10. Bézier Surfaces

Seminar 12. Lecture 11. Geodesics and Parallell Translation.

Seminar 13. Lecture 12. Minimal and Ruled Surfaces

Seminar 14. Lecture 13. Geodesic Coordinates and Gauss' Theorem Egregium

Seminar 15. Lecture 14. Gauss-Bonnet Theorem

Thursday, November 20 (13:00) Hand-in Examination, Exercises Part II.

Seminar 16. Lecture 15. Introduction to Riemannian Manifolds

Seminar 17. Presentation of Examination Part II (Tuesday, December 2, 15:15-17:00)

Tuesday December 2 (15:00) Hand-in Examination, Exercises Part III.

Seminar 18. Presentation of Examination Part III (Tuesday, December 2, 15:15-17:00)