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 2026

Sections

Curves. Seminars 1-5:

Seminar 1. Lecture 1: Curves: Parametrization and Tangent and Normal Vectors
Exercises: 1.1.2.i, 1.1.3.i, 1.1.6, 1.1.7, 1.2.2, 1.2.3, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 2.1.1.i, 2.1.1.iii

Seminar 2. Lecture 2: Curvature of Curves. Frenet-Serret Equations and Fundamental Theorem
Exercises: 2.1.1.iv, 2.1.2 (cubic curve), 2.3.1, 2.2.4, 2.2.5, 2.2.6, 2.2.7

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

Seminar 4. Lecture 4: Special Curves: Envelopes and Optimisation. Exercises: 2.2.9, 2.3.4,

Seminar 5. Lecture 5: Global Properties of Curves
Exercises: 3.3.1, 3.3.2, 3.3.3.3, Extra exercises will be provided at the seminar

Surfaces and their Curvatures. Seminars 6-11:

Seminar 6. Lecture 6: Surfaces and Charts, Tangent Plane and Orientation.

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

Seminar 8. Lecture 8: I- andII-fundamental forms: normal curvatures

Seminar 9. Lecture 9: Shape Theory

Seminar 10. Lecture 10. Gaussian Curvature

Wednesday, October 14 (13:00) Hand-in Examination, Exercises Part I.

Surfaces and Curves in Surfaces. Gauss Egregium Theorem and Gauss-Bonnet Theorem. Seminars 12-18:

Seminar 11. Lecture 11. Geodesics and Parallell Translation.

Seminar 12. Presentation of Examination Part I (Thursday, November 5, 10:15-12:00)

Seminar 13. Lecture 12. Minimal and Ruled Surfaces

Monday, November 16 (13:00) Hand-in Examination, Exercises Part II.

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

Seminar 15. Lecture 14. Gauss-Bonnet Theorem

Seminar 16. Lecture 15. Introduction to Riemannian Manifolds

Tuesday, December 1 (15:00) Hand-in Examination, Exercises Part III.

Seminar 17. Presentation of Examination Part II (Tuesday, December 1, 15:15-17:00)

Seminar 18. Presentation of Examination Part III (Tuesday, December 8, 15:15-17:00)