

# UE Differential geometry



Level  
Baccalaureate  
+4



ECTS  
6 credits



Component  
UFR IM2AG  
(informatique,  
mathématiques  
et  
mathématiques  
appliquées)



Semester  
Printemps

- > **Teaching language(s):** French
- > **Teaching method:** In person
- > **Teaching type:** Lectures
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** GBMG8U13

## Presentation

### Description

Introduction to curves and surfaces.

Curves: Frénet references, covariant derivatives, reference fields, connection forms, structural equations.

Surfaces: surfaces of  $\mathbb{R}^3$ , plane tangents, differential forms, differentiable applications between surfaces.

Abstract Variety: Whitney's Theorem

Curvature: Normal curvature, Gauss curvature, Geodesics. Case of surfaces of revolution.

Geometry of the surfaces of  $\mathbb{R}^3$ : Egregium theorem, Gauss Bonnet's theorem

Possibility of complement: Transition to sub-varieties of  $\mathbb{R}^n$  and abstract varieties

Possibility of complement: Introduction to dynamic systems. Vector fields and dynamic systems on varieties

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## Course parts

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|---|----------------|-------|
| UE Differential and dynamic geometry - CM | Lectures (CM)  | 19,5h |
| UE Differential and dynamic geometry - TD | Tutorials (TD) | 29h   |

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## Recommended prerequisites

Differential calculus of L3

**Period** : Semester 8

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## Bibliography

- Edmond Ramis, Claude Deschamps, Jacques Odoux, *Cours de mathématiques spéciales. 5. Applications de l'analyse à la géométrie*, Masson, 1981
- Marcel Berger, Bernard Gostiaux, *Géométrie différentielle : variétés, courbes et surfaces*, seconde édition, Presses Universitaires de France, 1992
- Manfredo Do Carmo, *Differential geometry of curves and surfaces*, Prentice-Hall, 1976
- Jacques Lafontaine, *Introduction aux variétés différentielles*, Grenoble Sciences, 2010

## Useful info

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### Contacts

Program director

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### Place

› Grenoble

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### Campus

› Grenoble - University campus