

## Content

| Course Code | Course Name                    | Semester | Theory | Practice | Lab | Credit | ECTS |
|-------------|--------------------------------|----------|--------|----------|-----|--------|------|
| MAT328      | Partial Differential Equations | 6        | 4      | 0        | 0   | 4      | 8    |

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|------------------------|--|
| Prerequisites          |  |
| Admission Requirements |  |

|                         |  |
|-------------------------|--|
| Language of Instruction | French   |
| Course Type             | Compulsory   |
| Course Level            | Bachelor Degree  |
| Objective               | Introduction to the theory and solution of partial differential equations.   |
| Content                 | Initial-Boundary value problems, first-order equations, second-order equations, transport equation, heat equations, wave equation, Laplace equation, separation of variables, Fourier analysis, Green's function                         |
| References              | Introduction to partial differential equations - Pinchover, Rubenstein<br>Partial differential equations - Evans<br>Introduction aux Equations aux Dérivées Partielles - Heffler, Ramond<br>Équations aux dérivées partielles - Reinhard |

## Theory Topics

| Week | Weekly Contents               |
|------|-------------------------------|
| 1    | Overview                      |
| 2    | Classification                |
| 3    | First-order PDEs              |
| 4    | Transport equation            |
| 5    | Second-order equations, quizz |
| 6    | Wave equation                 |
| 7    | Heat equation                 |
| 8    | Midterm                       |
| 9    | Laplace equation              |
| 10   | Sturm-Liouville problems      |
| 11   | Transformées                  |
| 12   | Green functions               |
| 13   | Equations in high-dimension   |
| 14   | Variational methods, quizz    |