

## Equations of Mathematical Physics

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**Subject area:** Mathematics

<b>University:</b>	TalTech
<b>Level:</b>	MA all years
<b>Teaching mode:</b>	hybrid: some students participate online, other students attend real-life
<b>Instructor(s):</b>	Prof. Jaan Janno

### Short description

Derivation of partial differential equations from laws of physics. Elliptic, parabolic and hyperbolic equation. Concepts of the solution. Classification and canonization of equations of 2nd order. Problems of mathematical physics. Initial and boundary conditions. Cauchy problem, boundary value problems. Well- and ill-posed problems. Analytical methods of solution. Method of coordinates and characteristics. Fundamental solution. Operator method. Fourier method. Method of integral transforms.

### Full description

All material of the course is in TalTech Moodle. Extended syllabus can be found at [https://moodle.taltech.ee/pluginfile.php/174569/mod\\_resource/content/6/syllabus.pdf](https://moodle.taltech.ee/pluginfile.php/174569/mod_resource/content/6/syllabus.pdf)

### Learning outcomes

When finished the course the student:  
is able to formulate main notions of theory of partial differential equations  
knows foundations of the theory of partial differential equations,  
knows classification of partial differential equations and main problems,  
solves main types of the partial differential equations.

### General information

<b>Contact hours per week:</b>	4
<b>Total workload:</b>	156 (in student hours for the whole course)
<b>ECTS credits:</b>	6
<b>Language:</b>	English

**Course start date:** 29 August 2022  
**Course end date:** 22 January 2023  
**Add. info about start date:**  
**Weekly teaching day/time:**  
**Time zone:** CET +1 (Estonia, Israel)  
**Further information:**

**Prerequisites:** Knowledge about calculus of functions of multiple variables and ordinary differential equations  
**Activities and methods:** Lectures, Practices  
**Presence on campus:**

## Final examination

**Form:** final grade is computed as a sum of points of 2 tests on theory and 2 test on practice  
**Date:**  
**Location/format:** Online for EuroTeQ students  
**Re-sit possibility:** yes  
**Transcript available:** end of semester  
**Add. info/requirements:**

## Registration

To register for this course, follow the registration requirements of your **home university** as specified here: [www.euroteq.eu/courses-registration](http://www.euroteq.eu/courses-registration).

## Administration

**Number of places:**  
**Minimum participants:**  
**Internal course code:** YMX8140  
**Contact:** E-mail: [jaan.janno@taltech.ee](mailto:jaan.janno@taltech.ee)

*This course is part of the EuroTeQ Engineering University joint course catalogue 2022/2023. This is a collaborative activity of the partner universities DTU, L'X, TU/e, TalTech, CTU, TUM as well as Technion. Students from these universities can participate in the offered courses. It is the responsibility of the student to check if you fulfil the requirements to participate in a specific course. Students are also advised to check with their home institution how to get recognition of the ECTS credits gained in courses of the EuroTeQ course catalogue. For further information about EuroTeQ Engineering University, visit [www.euroteq.eu](http://www.euroteq.eu) or get in touch with the above-mentioned point of contact.*