Uppsala University
Department of Mathematics
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Applied Mathematics (1MA148)– Fall 2023

The course Applied Mathematics (1MA148) consists of 20 lectures.

Course literature

J. David Logan, *Applied Mathematics*, Fourth Edition, Wiley.

Teaching

The course aims at providing an overview of basic methods in applied mathematics. By following the approach adopted in the text used as a reference, general methods will be mainly introduced by examples. The highlight will be given to the techniques more than to abstract theorems and proofs.
In the table below, a syllabus of the course:

Contents	Sections in the book
Introduction	1.1 – 1.2
Perturbation methods	3.1–3.3, 3.5–3.6
Calculus of variations	4.1–4.5
Dynamical systems	1.3, 2.1–2.4
Partial differential equations	6.1, 6.3–6.5
Sturm-Liouville problem and orthogonal expansions	5.1, 5.2
Integral equations	5.4

In the following table there is a (tentative) plan of the lectures.

Lecture	Topic
1	Introduction
2	Perturbative methods (I)
3	Perturbative methods (II)
4	Perturbative methods (III)
5	Calculus of variations (I)
6	Calculus of variations (II)
7	Calculus of variations (III)
8	Dynamical systems (I)
9	Dynamical systems (II)
10	Dynamical systems (III)
11	Introduction to PDEs (I)
12	Introduction to PDEs (II)
13	Introduction to PDEs (III)
14	Sturm-Liouville problems and orthogonal expansions (I)
15	Sturm-Liouville problems and orthogonal expansions (II)
16	Integral equations (I)
17	Integral equations (II)
18	Integral transforms (I)
19	Integral transforms (II)

Examination

There will be 3 assignments during the course and a final exam at the end. Each assignment, if passed, gives a bonus point. It is not mandatory to do all the assignments.
The maximum score in the final exam is 40. A total score of 18 is needed for the grade 3, 25 for the grade 4 and 32 for the grade 5.

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