Course PM

Lectures:

References are to chapters in Jonsson + Ström.

16/1 Green's functions and introduction to integral equations §1 Room **Hjärne** (Osquars backe 33)
17/1 Cherenkov radiation **cherenkov_3.pdf** (https://canvas.kth.se/courses/17131/files/2513639/download?wrap=1) (https://canvas.kth.se/courses/17131/files/2513639/download?wrap=1). Integral representation, bounded domain and exterior domain §2.1, **Hjärne** (OB33)

20/1 Integral representation exterior domain continued §2.2- §2.5 Room Ivar Herlitz, **(IH)** Teknikringen 33 (TR33)
23/1 Equivalent currents, §3, **(IH)** TR 33

27/1 Representation of far-fields, Reflector antenna Chapter 4, geometric optics, physical optics. Discussion of HWP1, **(IH)** TR 33
30/1 Geometric Optics example (end of Chapter 4) **geometrisk.pdf** (https://canvas.kth.se/courses/17131/files/2575509/download?wrap=1) (https://canvas.kth.se/courses/17131/files/2575509/download?wrap=1). Start of Spherical Harmonics and Multipoles. Expansion as vector multipole fields: Appendix A, §5, **(IH)** TR33

3/2 Multipoles con't, end of §5**, (IH) TR 31**
6/2 §5.5 + Scattering of a sphere §6 **(IH) TR 31**

10/2 End of §6, Scattering of spheres **(IH) TR 31**
13/2 Radar cross section. §7, +HWP2-discussion. **(IH) TR 31**

17/2 Short about multiple scattering **multiple.pdf** (https://canvas.kth.se/courses/17131/files/2642891/download?wrap=1) (https://canvas.kth.se/courses/17131/files/2642891/download?wrap=1). Acoustic null-field method §8.1-8.4 **(IH) TR 31**
21/2 Acoustic null-field method §8.4- The null-field method: Electromagnetic case **(IH) TR 31**

24/2 The null-field method: Electromagnetic case §9, HWP3 discussion, **(IH) TR 31**
27/2 Scattering by integral methods, §10, , **(IH) TR 31**

2/3 Scattering from a dipole §11.1-11.2 Time domain Green's function **(IH) TR 31**
12/3 Exam room

The above schedule is an estimate, and can be estimated depending on how the classes work out.

Homework problems

There are three home-work problems (HWP). Each assignment is typically a smaller design task or deeper exploration of some result. There exists several predefined HWPs, but if a student wants to do a subject related or article related problem in the area, discuss it with Lars during the week of the hand out of the problem.

- HWP 1 hand out 23/1. Due Monday 3/2.
- HWP 2 hand out 6/2. Due Monday 17/2.
- HWP 3 hand out 17/2. Due 2/3.

The deadline is sharp, and HWP delivered before the deadline will each be graded with 0-100 points. The report is to be written using a word processor, e.g. Latex or Word or similar and organize as follows:

- Describe your analysis/solution. Refer to the course literature or HWP information when appropriate
- Give a brief description about the numerical treatment. Comment on the figures and tables that have been inserted into the text
- Attach your numerical code.

The reports shall be emailed to me according to the deadlines above. The grading of the assignments will be based on the degree of activity, creativity and understanding as they appear from the report. The work is an individual work. Upon request you can be requested to present your result.

Exercises

To each chapter there are a set of exercises giving 1-2 points depending on size, all in all there are 50+ possible exercises. The exercises of the week *are due on first lecture of next week*. I.e. the Exercises of classes of week 1 are due arriving to the class the 20/1 and similarly each week. The information about which exercises that are included are updated weekly no later than after the last class of this week.

Exam

To pass the course one needs a minimum of 300 credits, from HWP and Exercises giving an E. If one has 350 or more corresponds to a D. For higher grades there an exam, depending on the number of students the exam can either be verbal or written. If it is fewer than five students that want higher grade, there is a verbal exam.

For a written exam all students bring their HWP-points as the starting point on the exam. We use the conversion between HWP-points, y, to exam-grade points, B, as

$$B = \min\left(\frac{y-300}{10} + 25; 34\right)$$

The exam contains 50 points and we have that conversion between grade-points B and grades such that

24=Fx, 25=E, 30=D, 35=C, 40=B, 45=A.

Thus 350 HWP points correspond to 30 Grade-points and a D on the exam. Higher grades are obtained by writing the exam.

Course responsible, and examiner, Lars Jonsson, 08-790 7732, email, **ljonsson@kth.se (mailto:ljonsson@kth.se)** eller ei2420@ee.kth.se

The book will be for sale late December/January in Kårbokhandeln.

Course information: Current information (chapters, exercises etc per week) about the course will appear on KTH Canvas during the semester. The above schedule is an estimate, and can be estimated depending on how the classes work out.