

SH2372/SI2372 - General Relativity

Course PM HT20

October 20, 2020

1 Course contact details

Teacher and examiner: Mattias Blennow (A5:3013, emb@kth.se)

Course homepage: The Course homepage is on Canvas. Make sure you have access to it as it will be used for handing in homework assignments and contain all information relevant to the course. In addition, all general announcements will be made in Canvas.

2 Course literature

The course is mainly based on:

- Modern General Relativity, M. Guidry.
- A first course in general relativity, B.F. Schutz.
- Lecture Notes on General Relativity, S. Carol.

Additional recommended reading and resources can be found on the course Canvas page. A problem collection in Special and General relativity will be distributed to students at the first lecture (this is the same problem collection distributed to students in SI2371, please take only one copy). Contact Mattias if you cannot attend.

3 Lectures

The course SH2372 will be taught in lecture format over twelve (12) lectures. These will cover the course material from a mainly a theoretical perspective. The lectures are not compulsory. The course SI2372 is co-taught with SH2372 and material not included in the former will be noted.

4 TA sessions

The course SH2372 also includes nine (9) TA sessions where a teaching assistant (Linda Tenhu) will solve problems on the covered material. These sessions are not formally included in SI2372, but students of SI2372 are of course also welcome to attend.

5 Covid-19 contingency

If the on-campus teaching of the course is suspended at any point of the course duration due to the on-going pandemic, the contingency plan is to move the lectures and TA sessions online. They will then be given through Zoom and the Zoom room will be announced in Canvas.

Please be considerate to each other and to the teachers and respect social distancing guidelines of the public health authority.

6 Course requirements

Both courses are examined through a written exam (TEN1) consisting of five (5) problems covering the different parts of the course curriculum. Parts of the problems not included in SI2372 will be noted. See the course schedule for the exam times.

6.1 Allowed aids

Apart from writing utensils (pen, eraser, etc), you will be allowed to bring a single A4 sheet to the exam. This sheet may contain any information you find suitable. You may add information to both sides of the sheet.

6.2 Grade requirements

Each problem on the exam will be graded on a scale from A to F, with A being the highest grade and E being the lowest passing grade. In order to pass the exam, a passing grade must be obtained on all problems. If this is satisfied, then the student will receive the highest grade such that at least three (3) problems have been given that grade or higher and no problem has a grade more than two grades below.

Examples: A grade combination of AABCC would result in a final grade B. A grade combination of AABDE would result in a final grade C.

In addition to this, the top grades A and B will require an oral exam in addition to obtaining the corresponding grade on the exam. The aim is to hold the oral exams within two weeks after the written exam results are posted. Students receiving an A or a B in the written exam will be contacted via Canvas. Should this apply to you and you are not in Canvas, please contact the examiner directly.

6.3 Partial credit

Students may replace up to two (2) problem grades in the written exam by their result on the corresponding homework problem (see below). At most one (1) F can be replaced in this manner.

6.4 Fx

Students receiving a passing mark on four problems or a passing mark on three problems and additionally passing mark on both homework sets corresponding to the failed problems will be given the grade Fx. Upon receiving an Fx, the student will be given an opportunity to raise one failed problem grade to an E through an oral exam. Students receiving an Fx will be contacted via Canvas. Should this apply to you and you are not in Canvas, please contact the examiner directly.

7 Homework problems

The course will offer five sets of homework problems that will each contain one to three (1-3) problems, depending on how extensive the problems are. The homework problems are not mandatory, but will give some partial credit for the exam. The homework sets will be corrected according to the same template as the exam problems (each set will be graded as a whole).

The homework sets should be handed in via Canvas in PDF format. Scanned versions of handwritten solutions are strongly preferred but computer written solutions are also accepted.

In order to be eligible for the partial credit from a homework set, you need to submit your solutions before the deadline of that set. In addition, you will need to peer correct and give feedback on the solutions of two other students before the peer correction deadline. The partial credit from homework set k will be available for problem k on the exam (see the grade requirements).

7.1 Homework rules

- Solutions to the homework should be handed in in PDF format via the course Canvas page. They may be handwritten and scanned or prepared using a computer. They should be clearly readable and ordered in problem order.
- Motivate your solutions as well and as concisely as you can. A few clear and correct sentences are always better than several long and incoherent ones.
- Hand in your solutions on time! If you are somehow prevented from doing so for external reasons, inform the examiner of this as soon as possible to see if other arrangements can be made.

- You are allowed to collaborate and discuss the problems with other students. However, *the solutions that you hand in have to be written by yourself and mirror your own understanding*. If this is in question due to similar solutions or other reasons, you may be asked by the examiner to motivate your answers orally. Also see the KTH rules regarding cheating and plagiarism:

<https://www.kth.se/en/student/studentliv/studenttratt/fusk-och-plagiering-1.323885>

8 Problem grading

Solutions to the problems (both exam and homework) will be graded according to the following criteria:

Grade	Criteria
A	The student has presented solutions to all parts of the problem. The solutions are clearly motivated and correct. Minor obvious typos can be accepted.
B	The student has solved all or most of the problem correctly. Minor issues with missing motivation and computational errors can be accepted as long as they do not lead to physical inconsistencies. Faulty arguments and inconsistent results can be accepted only if the remainder of the solution is essentially flawless.
C	The student's solutions treat most of the problem and is largely correct but may contain computational errors and lack motivation of a few steps. Faulty arguments and inconsistent results can be accepted to a minor degree.
D	The student has demonstrated a basic understanding for all parts of the problem as well as the underlying concepts. The student has made significant progress towards a solution of a large part of the problem. Faulty arguments and inconsistent results can be accepted to a more extended degree as long as the basic idea is correct.
E	The student's homework demonstrates a basic understanding of the major issues and concepts treated in the problem. The student has attempted to make proper progress towards a solution to the problem.
F	None of the above apply. This includes unreadable solutions, blank solutions, and solutions containing what is basically just a repetition of the problem formulation.