COURSE ANALYSIS, postgraduate course

Third cycle courses, EECS School, KTH

An asterix (*) denotes non-compulsory data.

Course data

Course name	**MAGNETOHYDRODYNAMICS, ADVANCED COURSE**
Course ID	FED3305
Credits	6 hp
Time period for course	**HT2021**
Teachers	Jan Scheffel (jan.scheffel@ee.kth.se)
Classroom hours	4 x 2
Nr of registered students	2 (one additional student followed the course in the sake of interest)
Examination rate, in %	100

Goals

Global course goals	When completing the course, the student should be able to describe: • the MHD spectrum and characterise the MHD waves in a cylinder and the basic modifications in a toroidal geometry • the basic structure of magnetic field lines in a three dimensional geometry and magnetic confinement • the basic MHD instabilities and how they limit magnetic confinement • how resistivity modifies the MHD theory and the implication on stability. • the non-linear evolution of common MHD instabilities in plasmas
How the course design helps fulfill these goals	The course is given as a set of four *discussion meetings*. Each student is expected to have studied the corresponding sections of the course and to have prepared five questions to discuss jointly at the meetings. The course design stimulates the students to continual studies. Also, at the course meetings, subject understanding can be achieved through discussions of topics and concepts that the student finds difficult. At these meetings, the teacher furthermore helps the students towards a global understanding of the subject. *A comprehensive set of course problems should be solved at home* and defended at a brief *oral examination* at the end of the course. Also, a *15 minutes presentation* on a chosen course topic should be given in the simulated setting of a conference; additionally the students train in the role of being chair of a session.

Pedagogical development - I

Changes made since previous time course was given	The course round was quite similar to that given in 2019. Some literature was appended. The students must now send in questions to discuss during the discussion meetings beforehand.

Course evaluation; comments from students

Based on the questionnaire used at the Division.
If the course has less than 10 students, the questionnaire can be replaced by informal discussions.

Evaluation response rate*	100 % The questions were: 1) Was the course relevant with respect to your expectations and the course goals? 2) Was the course in level with your pre-knowledge? 3) What do you think of the course design / teaching / learning? 4) What is your opinion of the course literature? 5) What do you think of examination in the form of log book /home assignment + oral presentation? 6) Any positive viewpoints? 7) Any negative viewpoints? 8) Would you like to change anything in the course?
Overall student view*	• "Allmänt var kursen bra. Dock tycker jag innehållet var på ett mycket djupare nivå än grundkursen. Rent matematiskt är det svårare än grundkursen. • "I really enjoy the structure of this course which is similar to the FED3230 and FJD3300." • "I learned a lot from the home assignments and doing the presentation. I also appreciate the wide selection of literature." • "Upplägget att läsa och diskutera frågor med inlämningsuppgifterna är ett bra sätt att lära sig innehållet."
Positive comments	The students responded merely positively throughout.
Negative comments	• "I liked the concept of preparing your own presentation on a subject related to the course but I felt like there was a bit lacking in information on what kind of presentation it should be."
Pre-knowledge, comments*	• "FED3230 which is a requirement for the course gives all the pre-knowledge required in my opinion."
Course design, comments*	• "I think the structure of this course is excellent! I thoroughly enjoy the seminars and also doing the exercise questions as they both help me learn very effectively." • "I appreciate the discussion meetings, but sometimes I would have preferred if the discussions were more structured. Sometimes the questions that the students bring

	not very relevant, so I think it could be beneficial if the teacher also brings some questions for the students to discuss, since the teacher has a better idea of what is most central to the course. ” • “There were adequate time between meetings.”
Literature, comments	• ”Some literature is good. For example the review on MHD in Freidberg is very helpful. I also enjoyed the papers we read on Alfvén eigenmodes (both of them). We use Wesson a lot in this course, and at times it’s too brief to be the sole source of information for a topic, in particular if we are supposed to answer questions on this topic in the examination, since it’s difficult to get a good understanding on the concept. In particular this was true for the resistive g-mode and the rippling mode (where we had White is the only reference). For me it was not enough to understand and explain these phenomena.” • “In large part the literature is really good. In particular, the fact that several books cover the same subject which means you can read them all if you have a hard time to grasp the contents and otherwise skip those sections in the later books if you have understood it from the first.”
Examination, comments	• ”I appreciate the home assignments. I spent a lot of time on them (maybe more than intended), but in the end they are much more beneficial for my learning than the discussion meetings.” • “I enjoy this kind of examination. Just like in FED3230 and FJD3300 the exercise questions seem to be developed to promote learning and understanding which I thoroughly enjoy.”
Particularly interesting* comments	• “I don’t think that the discussion meetings are as productive as they could be. Perhaps they could be more productive if the discussion was more structured (more teacher intervention), or requiring the students to finish the examination questions before the meeting, because some subtleties and difficulties don’t arise until you actively work with the topic.” • ”I do enjoy the final oral meeting that is in FED3230 and FJD3300 but has been cut from this course though. I think that meeting lets you discuss some final questions you might have and is a good way of finishing the course.”

Course teacher’s impressions from the evaluation

Comments	Very good and helpful comments from the students.

Course teacher’s summary

Overall view	The course topics are rather advanced. Since there is no dedicated course book it is a challenge for the teacher to puzzle with excerpts and articles in order to achieve an organic whole.
Positive comments	Continual learning works fine. And the 15-minutes presentations on chosen topics were really good and useful for the students w r t their skills in making conference presentations.

Negative comments	Not really.
View on pre-knowledge*	OK.
View on course design*	Continual discussion meetings work really well in small groups (up to 10 participants).
View on course material	The literature is OK, but I have a feeling that with some research it can be improved.
View on examination	Worked fine. Interesting that the students miss the brief oral examination that I use in my two other PhD courses that they have taken.

Pedagogical development - II

Outcome of course changes made since last time course was given	The students now prepare much better questions in advance for the discussion meetings. It was appreciated that the intervals between discussion meetings were extended – this provided more time for digesting the literature that belongs to each part.
Changes to be made before next time course is given	• Due to retirement, there will be a new examiner next time the course is given. I recommend that some new, improved literature is looked for. • A suggestion is to structure the discussion meetings somewhat better. It is important that all important topics of each part of the course are covered at each discussion meeting. • The requirements for the final oral presentation should be made clearer. • Otherwise I believe that the course format will be quite appreciated by both students and teacher.

Other

Comments*