

COURSE ANALYSIS, postgraduate course

Third cycle courses, EECS School, KTH , from 2018

An asterix (*) denotes non-compulsory data.

Course data

Practical Radio Communication

Course ID FIK3511

Credits 4 hp

Time period for course: Per 3, VT 2022

Teachers: Carl-Mikael Zetterling, Jonas Hultin, Jens Zander

Examiner Jens Zander

Classroom hours: 20h

Nr of registered students 8

Examination rate, in % 88% (7/8)

Goals

Global course goals

The objective of the course is to provide the knowledge and skills that are required to conduct experimental work in radio electronics and wireless systems under their own responsibility

How the course design helps to fulfill these goals

The focus lies with practical implementation. The participants are given the opportunity to apply their knowledge in a number of practical laboratory exercises in amplifier and antenna design, radio propagation and traffic procedures.

Pedagogical development - I

Changes made since previous time course was given

New course

Course evaluation; comments from students

Based on the anonymous questionnaire.

Evaluation response rate 5/8

Overall student view*

I believe that the courses like this are very important to fill the traditional gap between the theory and "how things work in practice".

The course met almost all of my expectations, even if I would have appreciated a bit more practicalities. For instance, how some specific circuits (of interest for the exam/general usage) or instruments are used in real scenarios, instead of more "mathematics-style" exercises (for instance, the Smith chart and the magnetic field exercises).

For sure the labs helped toward this end.

I think overall the course was great so I would strongly encourage that you continue offering it in the next years. I think that it would also be good if it could be expanded for non-PhD students (provided that there is no some limitation that can't be overcome),

It was a great course so I would definitely recommend it to future students.

Generally, I liked the course, I learned a lot of practical things such as electrical protection, RF impedance matching, antenna design, and a general overview of the transceivers.

Jag tyckte kursen var bra och jag lärde mig mycket om radio och amatörradio. Jag tyckte mest om laborationerna.

Did the course meet your expectations? Yes! Absolutely! and then some!

The hands-on labs were very well thought out and designed. Especially neat is now I have a (mostly complete) dipole antenna ready for when I get the license + transceiver.

Great course, I learned a lot. And especially thank you for the work you've all done to try to get an English version of the HAREC exam up and running for those with less than ideal knowledge of Swedish =)

Course design, comments*

I would change a bit the format for the next years giving less time for the exercises and, instead, give more traditional "lecture-style" sessions. I believe that many concepts could have been easier to understand with a traditional lecture instead of YouTube videos and exercises (even though the quality of many of them is very good!).

I would also include some more (perhaps optional) labs with the goal of learning better "how do you use the radio in practice", similar to the last lab we did, to get a bit more solid background on that and apply the "In Practice" on the course.

The labs were great overall, but I found that lab 3 (propagation) was a bit "boring" since it was less hands-on as the other ones and more of just observing. I think that you could consider changing that lab to an exercise and then having a "demo" during the seminars where you can show the practical setup.

I think it would be great to add a section/seminar that is about getting started in radio, what to look for when you are looking to buy the first equipment, what receivers are good for beginners also considering different budgets, what bands is it best to use etc. I think that would be great for noobies since sometimes it can be a bit hard to get make the initial decisions.

The course met my expectations to some extent, but I would expect to learn a bit more about the electronics of the transceivers and see different modules like mixers, etc in the labs.

It would be better to have a lab for designing and implementing an FM transceiver.

Since the title of the course is Practical radio communications, I think it would be good if we had a lab about wireless channel impairments (e.g., shadow fading, small scale fading, reflections, etc) at higher frequencies (2-6 GHz).

En labb om EMC hade varit roligt.

Perhaps a bit of information on how 'electrically short' antennas work, they seem to be a bit of a mystery to me. Like the vertical antenna used in the last lab to practice QSOs between station groups. Or those tiny ceramic SMD antenna packages found on bluetooth/GPS modules etc.

Examination, comments

I think the workload of the course is more than 4 credits.
It would be better if you increase that to 6 credits.

Vissa HWs var något omfattande.
Jag jobbade ganska mycket mer än vanligt för 4 hp.

It was unfortunate that we could not get the English version of the test after the course finish it but I understand it was a problem with PTS and that hopefully will be solved when the course runs next time.

Course teacher's impressions from the evaluation

Comments

The response to the course from the PhD students was very positive. Unfortunately, due to the pandemic, we could not hold any physical seminars, which was a drawback. Physical labs were still possible to conduct, which is a "must" for a practical course like this. Regarding the offer of a HAREC examination, the Swedish version was held in April, but the english version had to be delayed due to restrictions from PTS, and will be held in June.

Course teacher's summary

Overall view

This new course was felt to satisfy an important need to fill the gap between the theoretical education in wireless and radio electronics and the practical application. The students were given an important insight in implementational constraints and should be better prepared for own experimental work in radio. The course was also open for master students and engineers at Ericsson. These were not formally registered for the PhD course, but were given the opportunity to follow the course and the labs. A total 50 persons had signed up for the course, but only about 20 (including the 7 PhD student) followed the course to the end.

View on pre-knowledge*

Some of the students were definitely "rusty" when it comes to basic electrical circuits, which made them spend considerable time on some of the more simple HW-tasks. The course was definitely a useful refresher.

View on course design*

The flipped class-room setup with homework presentations by the PhD students worked well – physical seminars would have been preferred.

Lab 1 (Antennas), Lab 2 (Amplifier measurements) and Lab 4 Traffic techniques works very well and were appreciated by the students. Lab 3 on propagation tools needs to be updated to contain a more "hands-on" practical component.

View on course material

View on examination

Pedagogical development - II

Outcome of course changes made since last time course was given

New course

Changes to be made before next time course is given

Update of lab 3, HF propagation tools, to contain more practical, hands-on elements

Other