Microwave Engineering I, winter 2019 - individual progress form

Mark the completed tasks (this page) and learning outcomes (other side!) into this form! Have it always with you in the contact sessions.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Mark up your points!** | Pre task 1 (0-3 p) | Clicker lecture 1(0-2 p) | Pre task 2 (0-3 p) | Clicker lecture 2(0-2 p) | Prob. 1(0-3 p) | Prob. 2(0-3 p) | Prob. 3(0-3 p) | Prob. 4(0-3 p) | Prob. 5(0-3 p) | Prob. 6(0-3 p) |
| Topic 1 |  |  |  |  |  |  |  |  |  |  |
| Topic 2 |  |  |  |  |  |  |  |  |  |  |
| Topic 3 |  |  |  |  |  |  |  |  |  |  |
| Topic 4 |  |  |  |  |  |  |  |  |  |  |
| Topic 5 |  |  |  |  |  |  |  |  |  |
| Specific topic  |  |  |  |  |  |  |  |  |

Topic 1: transmission line theory and waveguides

Topic 2: Smith chart and impedance matching

Topic 3: analysis of microwave circuits

Topic 4: radio systems

Topic 5: radio wave propagation

Specific topic: safety issues of radio waves (MyCourses online workshop in February)

Tentative grading of the course: 50% of the points → grade 1, 60% → 2, 70% → 3, 80% → 4, 90% → 5

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| Learning outcomes(If you don’t understand what the learning outcome means, ask the teachers.) | Mark here which **pre tasks** (e.g., Pre task 2 of Topic 1), **clicker lectures** (e.g., Clicker 1 of Topic 2) **exercise problems** (Problem 3.3), **course book chapters** and/or any other source that are related to this outcome. | Mark **the date** when you **master** this outcome. |
| I am able to **identify** the types of radio waves. |  |  |
| I am able to **discuss** the usage of radio-frequency spectrum and typical applications in microwave engineering. |  |  |
| I am able to **discuss** the biological effects and safety issues of radio waves. |  |  |
| I am able to **explain** the behaviour (such as signal propagation, attenuation, reflection) of a radio-frequency signal in transmission lines. |  |  |
| I am able to **calculate** and **simulate** circuit parameters (such as voltage, current, power, characteristic impedance, loss, reflection coefficient etc.) related to transmission lines. |  |  |
| I am able to **design** transmission lines (such as microstrip line, coaxial line) with calculations and simulation (AWR) |  |  |
| I can **design** impedance matching circuits using Smith chart and simulator tool (AWR). |  |  |
| I am able to **explain** the design principles and bandwidth issues related to impedance matching. |  |  |
| I am able to **model** the operation of microwave circuits and resonators with suitable circuit parameters (e.g., S, Z, Y, ABCD). |  |  |
| I can **analyse** the operation of basic microwave circuits and resonators based on basic calculations and simulations (AWR). |  |  |
| I am able **explain** the operational principles of basic microwave systems, such as mixing phenomenon and superheterodyne transceivers. |  |  |
| I can **calculate** the relevant radio system parameters, such as signal-to-noise ratio, noise figure and link budget analytically. |  |  |
| The student is able to **explain** the basic principles of radio wave propagation (such as Fresnel ellipsoid, effect of atmosphere and weather). |  |  |
| I am able to **calculate** the basic characteristics of radio links based on basic propagation models. |  |  |