Master of Science (Technology) International Master’s Programme in Wireless Communications Engineering (WCE), 2 year, 120 ECTS credits

<table>
<thead>
<tr>
<th>Module</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Basic WCE studies module (40 ECTS)</td>
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<tr>
<td>Advanced WCE studies module (16-21 ECTS)</td>
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<tr>
<td>Optional WCE studies module (≥ 26-31 ECTS)</td>
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<tr>
<td>Advanced practical training (3 ECTS)</td>
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<tr>
<td>Master’s (Diploma) Thesis work (30 ECTS)</td>
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<tr>
<td>In total 120 ECTS</td>
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</tbody>
</table>

ECTS = European Credit Transfer System, 1 credit 25-30 hours, 1 year

**Basic Module, 40 ECTS, all courses obligatory**
- [031025A](#) Introduction to Optimization, 5 ECTS
- [521321S](#) Elements of Information Theory and Coding, 5 ECTS
- [521316S](#) Wireless Broadband Systems, 5 ECTS
- [521320S](#) Wireless Communications I, 5 ECTS
- [521340S](#) Communication Networks I, 5 ECTS
- [521355S](#) Radio Engineering I, 5 ECTS
- [521385S](#) Mobile Telecommunication Systems, 5 ECTS
- [521373S](#) Communication Signal Processing I, 5 ECTS

**Advanced Module, choose 16-21 ECTS,**
- [521377S](#) Communication Networks II, 7 ECTS
- [521317S](#) Wireless Communications II, 8 ECTS
- [521360S](#) Communication Signal Processing II, 5 ECTS
- [521375S](#) Radio Engineering II, 6 ECTS
- [521380S](#) Antennas, 5 ECTS
- [521386S](#) Radio Channels, 5 ECTS

* Choose at least two courses from this set of four courses. Rest of these four advanced courses can be allocated into optional module.

# Student has to choose one from this set of two courses (one course of these is obligatory, and the other one can be allocated into the optional module). Antenna course is lectured on spring terms of years 2016 and 2018. Radio Channels course is lectured on spring terms of years 2015 and 2017.
Optional Module (Elective Studies), must be chosen at least 16-21 ECTS (depending on size of advanced module)

- 521318S Modern Topics in telecommunications and Radio Engineering, 3-7 ECTS
- 521225S RF Components and Measurements, 5 ECTS
- 521443S Electronics Design II, 5 ECTS
- 521433A Laboratory Exercises on Analogue Electronics, 5 ECTS
- 521273S Biosignal Processing I, 5 ECTS
- 521259S Digital Video Processing, 5 ECTS
- 521145A Human Computer Interaction, 5 ECTS
- 521279S Signal Processing Systems, 5 ECTS
- 521148S Ubiquitous Computing Fundamentals, 5 ECTS
- 521281S Application Specific Signal Processors, 5 ECTS
- 521493S Computer Graphics, 7 ECTS
- 521266S Distributed Systems, 5 ECTS
- 521466S Machine Vision, 5 ECTS
- 521147S Mobile and Social Computing, 5 ECTS
- 521260S Programmable Web project, 5 ECTS
- 521479S Software Project, 7 ECTS

* This course is typically lectured several times a year with different themes and credits varying 3-7 ECTS. Student can include this course with different topics several times into optional studies.

Finnish Language Studies, can be chosen at most 4 ECTS

It is also possible to include at most 4 ECTS of optional Finnish language studies into a degree. Finnish language studies help a WCE student to integrate into the Finnish society. Language studies must be included into the optional module of elective studies. The Finnish language studies must be chosen from the set of Finnish language courses given by the UO language centre or by UO open university. The recommended Finnish courses are as follows:

- 900017Y Survival Finnish Course, 2 ECTS
- 900013Y Beginner’s Finnish Course I, 2 ECTS
- 900053Y Beginner’s Finnish Course II, 4 ECTS

Other obligatory studies

- 521016A Advanced practical training, 3 ECTS

Diploma (master’s) thesis work, 30 ECTS

Also a written English language proficiency test must be passed before graduation

Timing Schedule for Students Starting in September 2015

First year autumn:
- 30 ECTS obligatory basic studies
- 2-4 ECTS optional Finnish language studies recommended

First year spring:
- 5 ECTS obligatory basic studies
- 26 ECTS obligatory advanced studies
- 2-4 ECTS optional Finnish language studies recommended

Summer:
- 3 ECTS advanced practical training (equals to 2 months full-time workload)
- training report will be submitted at the beginning of autumn 2016 term

**Second year autumn:**
- 5 ECTS obligatory basic studies
- 5 ECTS obligatory advanced studies
- optional studies depending on accepted personal study plan
- starting of 30 ECTS diploma thesis practical work

**Second year spring:**
- 5 ECTS advanced studies
- completion of optional studies in order to satisfy ECTS requirement of optional studies
- completion of 30 ECTS diploma thesis manuscript

### Autumn 2015

<table>
<thead>
<tr>
<th>Periods 1-2</th>
<th>Spring 2016</th>
<th>Periods 3-4</th>
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</table>
| **Introduction to Optimization (5 cr, 1 p)** | **Wireless Communications II (8 cr, 3-4 p)**
| **Communication Networks I (5 cr, 2 p)** | **Communication Networks II (7 cr, 3-4 p)**
| **Radio Engineering I (5 cr, 1 p)** | **Radio Engineering II (6 cr, 3 p)**
| **Elements of Information Theory and Coding (5 cr, 2 p)** | **Radio Channels (6 cr, 4 p) or Antennas (5 cr, 4 p)** (one of these is mandatory, one can be chosen as an optional study course)
| Wireless Broadband Systems (5 cr, 1 p) | Commun. Signal Processing I (5 cr, 3 p)
| Wireless Communications I (5 cr, 2 p) | **Advanced Practical Training (3 cr)** (recommended in summer 2016, training report will be done on autumn 2016 term)

### Finnish Language studies (2-4 cr) and/or optional studies depending on personal workload

# Choose at least two courses from this set of three courses

*= Student can also take both of these. Antennas course is lectured on spring terms of on years 2016, 2018, 2020,..., and Radio Channels course on spring term of years 2015, 2017, 2019,...

### Basic Studies

### Advanced Studies

### Optional Studies
Autumn 2016
Periods 1-2

Commun. Signal Processing II (5 cr, 1 p)
Mobile Telecommunication Systems (5 cr, 2 p)

Spring 2017
Periods 3-4

Radio Channels (5 cr, 4 p) or Antennas (5 cr, 4 p)
(one of these is mandatory, one can be chosen as an optional study course)

Diploma (M.Sc.) Thesis Work (30 cr)

Finnish Language studies (2-4 cr) and/or optional studies to fulfil 120 ECTS requirement (totally 21 courses available)

= Student can also take both of these. Antennas course is lectured on spring terms of on years 2016, 2018, 2020,.... and Radio Channels course on spring term of years 2015, 2017, 2019,....

Basic Studies  Advanced Studies  Optional Studies