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>ECTS</th>
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<tbody>
<tr>
<td>Basic WCE studies module (41 ECTS)</td>
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<tr>
<td>Advanced WCE studies module (28-29 ECTS)</td>
<td></td>
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<tr>
<td>Optional WCE studies module (≥ 17-18 ECTS)</td>
<td></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>
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ECTS = European Credit Transfer System, 1 credit 25-30 hours, 1 year

**Basic Module, 41 ECTS, all courses obligatory**
- 031025A Introduction to Optimization, 5 ECTS
- 521321S Elements of Information Theory and Coding, 5 ECTS
- 521385S Mobile Telecommunication Systems, 5 ECTS
- 521320S Wireless Communications I, 8 ECTS
- 521340S Communication Networks I, 5 ECTS
- 521373S Communication Signal Processing I, 6 ECTS
- 521335S Radio Engineering I, 6 ECTS
- 521350S Seminar in Telecommunication and Radio Engineering, 1 ECTS

**Advanced Module, 28-29 ECTS, all courses obligatory**
- 521377S Communication Networks II, 7 ECTS
- 521375S Radio Engineering II, 5 ECTS
- 521317S Wireless Communications II, 8 ECTS
- 521360S Communication Signal Processing II, 4 ECTS
- 521380S Antennas, 4 ECTS
- 521386S Radio Channels, 5 ECTS

*Student have to choose one of these courses (one course of these is obligatory, and the other one can be chosen as an elective course into the optional module).
Optional Module (Elective Studies), must be chosen at least 17-18 ECTS

- 521318S Modern Topics in telecommunications and Radio Engineering, 3-7 ECTS*
- 521443S Electronics Design II, 5 ECTS
- 521433A Laboratory Exercises on Analogue Electronics, 3 ECTS
- 521273S Biosignal Processing, 5 ECTS
- 521259S Digital Video Processing, 5 ECTS
- 521145A Human Computer Interaction, 5 ECTS
- 521488S Multimedia Systems, 6 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, 4 ECTS
- 521466S Machine Vision, 5 ECTS
- 521147S Mobile and Social Computing, 5 ECTS
- 521497S Pattern Recognition and Neural Networks, 5 ECTS
- 521260S Programmable Web project, 5 ECTS
- 521479S Software Project, 7 ECTS
- 521280S DSP Laboratory Work, 5 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 center or by UO open university. 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 2013

First year autumn:

- 29 ECTS basic studies
- 2-4 ECTS optional Finnish language studies recommended

First year spring:

- 6 ECTS basic studies
- 24-25 ECTS 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 term

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

Second year spring:
- 1 ECTS basic studies
- 4-5 ECTS advanced studies
- completion of optional studies in order to fulfil 17-18 ECTS requirement of optional studies
- completion of 30 ECTS diploma thesis manuscript

<table>
<thead>
<tr>
<th>Autumn 2013</th>
<th>Spring 2014</th>
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</thead>
<tbody>
<tr>
<td>Periods 1-3</td>
<td>Periods 4-6</td>
</tr>
<tr>
<td><strong>Basic Studies</strong></td>
<td><strong>Advanced Studies</strong></td>
</tr>
<tr>
<td>Introduction to Optimization (5 cr, 1-2 p)</td>
<td>Commun. Signal Processing I (6 cr, 4-5 p)</td>
</tr>
<tr>
<td>Wireless Communications I (8 cr, 1-3 p)</td>
<td>Wireless Communications II (8 cr, 4-6 p)</td>
</tr>
<tr>
<td>Communication Networks I (5 cr, 1-3 p)</td>
<td>Communication Networks II (7 cr, 4-6 p)</td>
</tr>
<tr>
<td>Radio Engineering I (6 cr, 1-3 p)</td>
<td>Radio Engineering II (5 cr, 4-6 p)</td>
</tr>
<tr>
<td>Elements of Inf. Theory and Coding (5 cr, 1-3 p)</td>
<td>Radio Channels (5 cr, 4-6 p) or Antennas (4 cr, 4-6 p) (one of these is mandatory, one can be chosen as an elective course)</td>
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<tr>
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<td>Advanced Practical Training (3 cr) (recommended in summer 2014, training report will be done on autumn term)</td>
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<td>Finnish Language studies (2-4 cr)</td>
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* = Student can also take both of these. Antennas course is lectured on spring terms of on years 2014, 2016, 2018,... and Radio Channels course on spring term of years 2015, 2017, 2019,...
### Autumn 2014 (Periods 1-3)

<table>
<thead>
<tr>
<th>Mobile Telecommunication Systems (5 cr, 1-3 p)</th>
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<tbody>
<tr>
<td>Commun. Signal Processing II (4cr, 2-3 p)</td>
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<tr>
<td>Diploma (M.Sc.) Thesis Work (30 cr)</td>
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<tr>
<td>Seminar in Telecommunication and Radio Engineering (1 cr, 1-6 p)</td>
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</tbody>
</table>

| Radio Channels (5 cr, 4-6 p) or Antennas (4 cr, 4-6 p) (one of these is mandatory, one can be chosen as an elective course)* |

| Elective studies from the optional module to fulfill 120 ECTS requirement (23 courses available) |

### Spring 2015 (Periods 4-)

* = Student can also take both of these. Antennas course is lectured on spring terms of on years 2014, 2016, 2018,..., and Radio Channels course on spring term of years 2015, 2017, 2019,...