INTERNATIONAL MASTER’S DEGREE PROGRAMME IN WIRELESS COMMUNICATIONS ENGINEERING (WCE)

OODIPSP TOOL FOR PLANNING OF STUDIES

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Web Home for Enrolled WCE Students: http://www.oulu.fi/cwc/wce
Web Home for WCE Applicants: http://www.oulu.fi/university/masters/wce

WCE Orientation 6.10.2017
WCE CURRICULUM STRUCTURE

- Consist of the basic, advanced, and optional (elective) study modules, practical training, and master’s thesis work.

<table>
<thead>
<tr>
<th>Study Type</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic WCE studies</td>
<td>(RAN: 40, RF: 41)</td>
</tr>
<tr>
<td>Advanced WCE studies</td>
<td>(RAN: 25, RF: 28-29)</td>
</tr>
<tr>
<td>Optional WCE studies</td>
<td>(RAN: ≥ 22, RF: ≥ 18-19)</td>
</tr>
<tr>
<td>Practical training</td>
<td>(3)</td>
</tr>
<tr>
<td>M.Sc. (Diploma) Thesis work</td>
<td>(30)</td>
</tr>
<tr>
<td><strong>In total</strong></td>
<td><strong>120 ECTS</strong></td>
</tr>
</tbody>
</table>

ECTS = European Credit Transfer System, 1 credit 25-30 hours, 1 year ca. 60 credits
### WCE-RAN: Radion Access and Networks (5 common)

- **Basic & Advanced studies:**
  - Optimization (math)
  - Statistical signal processing
  - Broadband communications systems
  - Wireless communications I
  - Communication signal processing I
  - Radio engineering I
  - Wireless communications II
  - Communication networks I
  - Information theory & coding methods
  - Mobile telecommunication systems
  - Communication signal processing II

### WCE-RF: RF engineering

- **Basic & Advanced studies:**
  - Statistical signal processing
  - Broadband communications systems
  - Wireless communications I
  - Communication signal processing I
  - Radio engineering I
  - Radio engineering II
  - Electronics Design I & II
  - RF components & measurements
  - Radio channels & antennas
  - Electronic system design
  - Communication circuit design
  - Telecommunication or electronics construction project/work
OPTIONAL STUDIES

• NOTE: Obligatory course in one option can be taken as elective on other → choice of study option is not fatal for the beginning! → ”Taste” both CWC-RAN and CWC-RF option courses 2 weeks
• Optional (elective) courses plan must be submitted always to PSP advisor before taking courses
• Finnish language studies are also suggested as electives during 1st year.
• EE & CSE studies for RAN & RF study options:
  • Many electronics design courses & lab. works are offered as electives by the Electrical Engineering (EE) research units
  • Many computer engineering & DSP courses are offered as electives by Computer Science and Engineering (CSE) research units
  • Economics
• Courses offered by different UO faculties & departments are also possible
  • Eg. Industrial engineering, Information processing science, and Oulu Business School studies
  • You always have to ask coordinator’s opinion about suitability before taking them!
## OPTIONAL STUDIES FROM CWC, EE AND CSE

### Elective Courses of Optional Module Total 22 ECTS (at least)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name and credits</th>
<th>Suggested timing</th>
<th>1. Fall</th>
<th>1. Spring</th>
<th>2. Fall</th>
<th>2. Spring</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>90001Y</td>
<td>Survival Finnish Course (1)</td>
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<td>90001Y</td>
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<tr>
<td>90003Y</td>
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<tr>
<td>521386S</td>
<td>Radio Channels (odd yrs) (2)</td>
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<tr>
<td>521388S</td>
<td>Antennas (even yrs) (3)</td>
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<td>521398S</td>
<td>Modern Topics in telecommunications and Radio Engineering (3)</td>
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<td>3-7</td>
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<tr>
<td>521322S</td>
<td>Telecommunication engineering project</td>
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<td>5</td>
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<tr>
<td>521300S</td>
<td>Electronics Design and Construction Exercise</td>
<td></td>
<td>6</td>
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<tr>
<td>521225S</td>
<td>RF Components and Measurements</td>
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<tr>
<td>521097S</td>
<td>Wireless Measurements</td>
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<tr>
<td>521327S</td>
<td>Radio Engineering II</td>
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<td>521405S</td>
<td>Electronic System Design</td>
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<td>521407S</td>
<td>Communications Circuit Design</td>
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<td>Electronics Design II</td>
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<td>521435S</td>
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<td>521300S</td>
<td>Electronics Design and Construction Exercise</td>
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<td>521273S</td>
<td>Biosignal Processing I</td>
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<td>521259S</td>
<td>Digital Video Processing</td>
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<tr>
<td>521145A</td>
<td>Human Computer Interaction</td>
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</tbody>
</table>

### Additional Courses

- **RAN ≥ 22 ECTS**
- **RF ≥ 18-19 ECTS**

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Optional WCE subjects studies ~ 4 courses.
LANGUAGE STUDIES AS ELECTIVES

- Max. 10 ECTS Finnish language studies is allowed into electives.
  - Check the schedules of Finnish courses and the free seats in language study groups from here: [http://www.oulu.fi/languagesandcommunication/finnish_for_foreigners](http://www.oulu.fi/languagesandcommunication/finnish_for_foreigners)
- You can choose only from the following set of Finnish courses:
  - 900017Y Survival Finnish Course - 2 ECTS credits
  - 900013Y Beginners' Finnish Course 1 - 3 ECTS credits
  - 900053Y Beginners' Finnish Course 2 - 5 ECTS credits
- Reserve/book a Finnish language group ASAP, since number of groups/seats is typically limited every year!
<table>
<thead>
<tr>
<th>Autumn 2017 Periods 1-2</th>
<th>Spring 2018 Periods 3-4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic Studies</strong></td>
<td><strong>Advanced Studies</strong></td>
</tr>
<tr>
<td><strong>Introduction to Optimization (5 cr, 1 p)</strong></td>
<td><strong>Wireless Communications II (8 cr, 3-4 p)</strong></td>
</tr>
<tr>
<td><strong>Communications Networks I (5 cr, 2 p)</strong></td>
<td><strong>Communications Networks II (7 cr, 3-4 p)</strong></td>
</tr>
<tr>
<td><strong>Statistical Signal Processing (5 cr, 1 p)</strong></td>
<td><strong>Elements of Information Theory and Coding (5 cr, 2 p)</strong></td>
</tr>
<tr>
<td><strong>Commun. Signal Processing I (5 cr, 3 p)</strong></td>
<td><strong>Commun. Signal Processing II (5 cr, 4 p)</strong></td>
</tr>
<tr>
<td><strong>Broadband Communications Systems (5 cr, 1 p)</strong></td>
<td><strong>Wireless Communications I (5 cr, 2 p)</strong></td>
</tr>
<tr>
<td><strong>Mobile Telecommunication Systems (5 cr, 3p)</strong></td>
<td><strong>Advanced Practical Training (3 cr)</strong></td>
</tr>
<tr>
<td><strong>Finnish Language studies (2-10 cr) and/or optional studies depending on personal workload</strong></td>
<td><strong>(recommended in summer 2018, training report will be done on autumn 2018 term)</strong></td>
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<tr>
<td>Autumn 2018</td>
<td>Spring 2019</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
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<tr>
<td>Periods 1-2</td>
<td>Periods 3-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional Course</th>
<th>Radio Engineering I (5 cr, 2 p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional Course</td>
<td>Optional Course</td>
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<tr>
<td>Optional Course</td>
<td>Optional Course</td>
</tr>
</tbody>
</table>

Diploma (M.Sc.) Thesis Work (30 cr, 2-4 p)

Finnish Language studies (2-10 cr) and/or optional studies to fulfil 120 ECTS requirement

Basic Studies

Advanced Studies

Optional Studies
# WCE-RF Schedule – 1st Year 2017-2018

### Autumn 2017
#### Periods 1-2
- **Electronics Design II** (6 cr, 1 p)
- **Electronics Design III** (6 cr, 2 p)
- **Radio Engineering I** (5 cr, 2 p)
- **Statistical Signal Processing** (5 cr, 1 p)
- **Broadband Communications Systems** (5 cr, 1 p)

### Spring 2018
#### Periods 3-4
- **Commun. Signal Processing I** (5 cr, 3 p)
- **Radio Engineering II** (6 cr, 3 p)
- **Radio Channels** (5 cr, 4 p) or **Antennas** (5 cr, 4 p)
- **Wireless Communications I** (5 cr, 2 p)
- **Advanced Practical Training** (3 cr)

### Optional Courses
- **RF Components and Measurements** (5 cr, 4 p)
- **Radio Engineering II** (6 cr, 3 p)
- **Radio Channels** (5 cr, 4 p) or **Antennas** (5 cr, 4 p)

### Finnish Language Studies
- (2-10 cr) and/or optional studies depending on personal workload

### Basic Studie, Advanced Studies, Optional Studies

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WCE Orientation 6.10.2017

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**University of Oulu**
WCE-RF SCHEDULE – 2ND YEAR 2018-2019

Autumn 2018
Periods 1-2

Electronic System Design (5 cr, 1 p)
Communications Circuit Design (6 cr, 1 p)
Optional Course
Optional Course

Spring 2019
Periods 3-4

Diploma (M.Sc.) Thesis Work (30 cr, 2-4 p)
Optional Course

Telecommunication Engineering Project (5 cr)
or
Electronics Design and Construction Exercise (6 cr, 1-2 p)
(either one of these is mandatory)

Finnish Language studies (2-10 cr) and/or optional studies to fulfill 120 ECTS requirements

Basic Studies
Advanced Studies
Optional Studies
PERSONAL STUDY PLAN (PSP)

- Electronic PSP-plan is created with OodiPSP tool within Weboodi.
- A tool both for student and personal study advisor.
- PSP is a plan that includes the necessary choices and timing in order to graduate.
  - How am I going to go through my degree programme?
- By using OodiPSP student will get an overall picture of studies dealing with contents and timing
  - Degree structure as starting point, i.e. start with your curriculumn documents shared you today.
- Important part of PSP is study goals and following progress.

- **Video how to create your own PSP with OodiPSP tool**
  ([http://www.oulu.fi/oodienglish/node/19271](http://www.oulu.fi/oodienglish/node/19271))
YOUR PERSONAL STUDY PLAN AT OODI PSP

Responsible person at faculty or departmental level: Creating degree structures

Student: Create and update PSPs

Student: Send PSP for approval?

Yes

Student: sends PSP for approval

Email to Advisor

No

PSP not ok

Email to student

Advisor: Checks and comments on PSP

Yes

Advisor: Approves and archives PSP

PSP ok!

Approved PSP

Email to student

WCE Orientation 6.10.2017
### Example for OODI PSP Outlook

#### Module of the Option, Wireless Communications Engineering content 2016-17

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Planned ECTS</th>
<th>Completed ECTS</th>
<th>Obtained grade 1…5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A45122S</td>
<td>30</td>
<td>30</td>
<td></td>
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<tr>
<td>A45127A</td>
<td>11</td>
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<tr>
<td>A45127B</td>
<td>8</td>
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</tbody>
</table>

**Compulsory**
- 031025A Introduction to Optimization
- 521321S Elements of Information Theory and Coding
- 521316S Broadband Communications Systems
- 521323S Wireless Communications I
- 521323S-01 Wireless Communications I, Exam
- 521323S-02 Wireless Communications I, Exercise
- 521340S Communication Networks I
- 521340S-01 Communication Networks I, partial credit
- 521340S-02 Communication Networks I, partial credit
- 521324S Communication Signal Processing I
- 521285S Mobile Telecommunication Systems

**Advanced module**

Either Antennas or Radio Channels is chosen as compulsory (they are lectured in alternate years). Furthermore, choose the minimum of two courses from the list.

- A453271 Advanced module, Wireless Communications Engineering content 2016-17
- Two courses from this set of four courses must be selected
  - 521327S Radio Engineering II
  - 521317S Wireless Communications II

**WCE Orientation 6.10.2017**