INTERNATIONAL MASTER’S DEGREE PROGRAMME IN WIRELESS COMMUNICATIONS ENGINEERING (WCE):
WCE-RAN & WCE-RF & DD-WCE

WCE STUDY OPTIONS & CURRICULUM & SCHEDULE
TOOLS 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 6.9.2018
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 Module</th>
<th>RAN</th>
<th>RF</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic WCE studies</td>
<td>40</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Advanced WCE studies</td>
<td>25</td>
<td>28-29</td>
<td>28-29</td>
</tr>
<tr>
<td>Optional WCE studies</td>
<td>≥ 22</td>
<td>≥ 17-18</td>
<td>≥ 17-18</td>
</tr>
<tr>
<td>Practical training</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>M.Sc. (Diploma) Thesis work</td>
<td></td>
<td></td>
<td>30</td>
</tr>
<tr>
<td><strong>In total</strong></td>
<td></td>
<td></td>
<td>120</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

• Optional (elective) courses plan must be submitted always to PSP advisor/coordinator Kari before taking courses.
• Finnish language studies are also suggested as electives during 1st year.
• EE & CSE & IPS 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
  • Information processing science (IPS)
• Courses offered by different UO faculties & departments are also possible, e.g.
  • Industrial engineering dept.
  • Information processing science dept.
  • Oulu Business School studies
  • You always have to ask coordinator’s opinion about suitability before taking them!
**OPTIONAL STUDIES FROM CWC, EE AND CSE**

<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>
</thead>
<tbody>
<tr>
<td>900017Y</td>
<td>Survival Finnish Course (1)</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>900013Y</td>
<td>Beginner’s Finnish Course I (1)</td>
<td></td>
<td>3</td>
<td></td>
<td>3</td>
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<tr>
<td>900053Y</td>
<td>Beginner’s Finnish Course II (1)</td>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
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</tr>
<tr>
<td>521386S</td>
<td>Radio Channels (odd yrs) (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>521388S</td>
<td>Antennas (even yrs) (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>521318S</td>
<td>Modern Topics in telecommunications and Radio Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-7</td>
</tr>
<tr>
<td>521322S</td>
<td>Telecommunication engineering project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>521300S</td>
<td>Electronics Design and Construction Exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>521225S</td>
<td>RF Components and Measurements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>521097S</td>
<td>Wireless Measurements</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>521327S</td>
<td>Radio Engineering II</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>521405S</td>
<td>Electronic System Design</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>521402S</td>
<td>Communications Circuit Design</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>521401S</td>
<td>Electronics Design II</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>521435S</td>
<td>Electronics Design III</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>521300S</td>
<td>Electronics Design and Construction Exercise</td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>813621S</td>
<td>Research Method</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>521273S</td>
<td>Biosignal Processing I</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**Elective Courses of Optional Module Total at least 22 ECTS**

- **521259S** Digital Video Processing
- **521145A** Human Computer Interaction
- **521279S** Signal Processing Systems
- **521148S** Ubiquitous Computing Fundamentals
- **521281S** Application Specific Signal Processors
- **521493S** Computer Graphics
- **521290S** Distributed Systems
- **521466S** Machine Vision
- **521145S** Mobile Computing
- **521144S** Social Computing
- **521260S** Programmable Web project
- **521479S** Software Project

Optional WCE subjects studies ~ 4 courses
- **RAN ≥ 22 ECTS**
- **RF ≥ 17-18 ECTS**
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
  • 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!
## WCE-RAN SCHEDULE – 1ST YEAR 2018-2019

<table>
<thead>
<tr>
<th>Autumn 2018</th>
<th>Spring 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Periods 1-2</strong></td>
<td><strong>Periods 3-4</strong></td>
</tr>
<tr>
<td>Introduction to Optimization (5 cr, 1 p)</td>
<td>Mobile Telecommunication Systems (5 cr, 3 p)</td>
</tr>
<tr>
<td>Communications Networks I (5 cr, 2 p)</td>
<td>Commun. Signal Processing II (5 cr, 4 p)</td>
</tr>
<tr>
<td>Statistical Signal Processing (5 cr, 1 p)</td>
<td>Commun. Signal Processing I (5 cr, 3 p)</td>
</tr>
<tr>
<td>Elements of Information Theory and Coding (5 cr, 2 p)</td>
<td>Wireless Communications I (5 cr, 3 p)</td>
</tr>
<tr>
<td>Broadband Communications Systems (5 cr, 1 p)</td>
<td>Wireless Communications II (8 cr, 3-4 p)</td>
</tr>
<tr>
<td>Wireless Communications I (5 cr, 2 p)</td>
<td>Communications Networks II (7 cr, 3-4 p)</td>
</tr>
<tr>
<td>Finnish Language studies (2-10 cr) and/or optional studies depending on personal study plan</td>
<td>Advanced Practical Training (3 cr) (recommended in summer 2019, training report will be done on autumn 2019 term)</td>
</tr>
</tbody>
</table>

### Basic Studies
- Introduction to Optimization
- Communications Networks I
- Statistical Signal Processing
- Broadband Communications Systems
- Wireless Communications I
- Communications Networks I

### Advanced Studies
- Mobile Telecommunication Systems
- Wireless Communications II
- Communications Networks II
- Finnish Language studies
- Statistical Signal Processing and Coding
- Elements of Information Theory and Coding

### Optional Studies
- Advanced Practical Training
WCE-RAN SCHEDULE – 2ND YEAR 2019-2020

Autumn 2019
Periods 1-2

- Optional Course
- Radio Engineering I (5 cr, 2 p)
- Optional Course
- Optional Course
- Optional Course

Spring 2020
Periods 3-4

- Diploma (M.Sc.) Thesis Work (30 cr, 2-4 p)
- Finnish Language studies (2-10 cr) and/or optional studies to fulfil PSP requirements

Basic Studies
Advanced Studies
Optional Studies
### WCE-RF Schedule – 1st Year 2018-2019

#### Autumn 2018 (Periods 1-2)

- **Electronics Design II** (6 cr, 1 p)
- **Electronics Design III** (6 cr, 2 p)
- **Statistical Signal Processing** (5 cr, 1 p)
- **Broadband Communications Systems** (5 cr, 1 p)

#### Spring 2019 (Periods 3-4)

- **Commun. Signal Processing I** (6 cr, 3 p)
- **Radio Engineering I** (5 cr, 2 p)
- **Radio Engineering II** (6 cr, 3 p)
- **Radio Channels** (5 cr, 4 p) or **Antennas** (5 cr, 4 p) *(one of these is mandatory for RF option, one can be chosen as an optional study course)*

#### Optional Course

- **Advanced Practical Training** (3 cr) *(recommended in summer 2019, training report will be done on autumn 2019 term)*

**Finnish Language studies** (2-10 cr) and/or optional studies depending on personal study plan

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- **Basic Studies**
- **Advanced Studies**
- **Optional Studies**

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WCE Orientation 6.9.2018
WCE-RF SCHEDULE – 2ND YEAR 2019-2020

Autumn 2019
Periods 1-2

- Electronic System Design (5 cr, 1 p)
- Telecommunications Circuit Design (6 cr, 1 p)
- Optional Course
- Optional Course
- Telecommunication Engineering Project (5 cr)
  or Electronics Design and Construction Exercise (6 cr, 1-2 p)
  (one of these is mandatory)
- Finnish Language studies (2-10 cr) and/or optional studies to fulfill PSP requirements

Spring 2020
Periods 3-4

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

Basic Studies
Advanced Studies
Optional Studies
UO SCHOLARSHIP FOR NON-EU/ETA STUDENTS

• Waiver to release the payment of tuition fee of 10000 Eur/yr
• To renew it for the second year, at least 55 ECTS is required to obtain by the end of 1st academic year (31.7.2019)
• **No UO scholarship for the 3rd year**, i.e. WCE degree must be obtained with scholarship by the end of 2nd academic year (31.7.2020), or student have to pay 10000 Eur for the third year.
• **Read the detailed terms of scholarship in ”Terms and Conditions”** document received with your admission acceptance letter.
• **No (sad) excuses are taken in account if student fails to obtain 55 ECTS.**
• In the case of long term severe sickness during studies ask always medical doctor’s statement concerning your ability to do studies
  • Contact e.g. Finnish Students Health Service, FSHS/YTHS, but not for an ordinary couple of days flu!
CWC’S GRANT FOR MASTER’S THESIS & INTERNSHIP

• If you wish to have a chance to obtain a CWC’s master’s thesis grant of 3000 Eur for the thesis work during second study year, also at least 55 ECTS is required to be passed by the end of 1st academic year (31.7.2019)

• NOTE:
  1. Student has always to follow either WCE-RAN or WCE-RF 1st year curriculum exactly, i.e., ”easy-to-do” elective studies that are not accepted for the 1st year personal study plan (PSP) are not counted into the sum of obtained credits required by the terms of CWC’s grant. Follow always schedule of basic and advanced courses!
  2. Study credits that are obtained with credit compensation are not included into the sum of obtained credits from a standpoint of UO tuition fee waiver, i.e. if you have done a course during your B.Sc. studies the content of which equals, or is closely similar to WCE course content based on recognition of prior learning process (RPL shortly) procedure.

• CWC also offers training grant of 1500 Eur for summer internship after 1st study year to be done at CWC.
RESULTS FOR FRAUD & MISCONDUCT IN STUDIES

- If student participates in exam cheating (e.g. using smart phones, stored material, conversation, looking friend’s paper), or preparing course exercise report, or training report e.g. based on friend’s reports etc. (plagiarism) a hearing is always conducted by ITEE dean of education, and punishment results.
- Even carrying mobile phone in exams with you results dean’s hearing!
- Students who have participated in misconduct in their studies are not eligible for:
  - Paid (contract-based) training or master’s thesis topics (appr. 1375 Eur/month)
  - CWC training scholarship (1500 Eur)
  - CWC master’s thesis scholarship (3000 Eur)
  - Doctoral studies at University of Oulu graduate school
  - To get job from CWC after graduation
- Excuses are not taken in account if student participates in cheating! Clearly the risk of cheating is not worth taken!
LAPTOP & SMART PHONE TOOLS FOR STUDYING

• Several tools to help in daily studies, and to monitor progress.
• You will get your personal PAJU userID & PW when registering to UO.
• PAJU account is needed to access most web-tools.
• Your student tutor will help you to get familiar with these systems.
• 7 systems to be introduced next:
  • O365 → UO e-mails, Microsoft softwares (student edition)
  • AAPO → timetable, credits, registrations, study news (laptop-based)
  • TUUDO → timetable, credits, registrations, study news (smart phone-based)
  • WEBOODI → personal study register, all course info, course/exam registration
  • OPTIMA → stored lecture & exercise materials
  • NOPPA → course homepages & info channel
  • OodiPSP → personal study plan (PSP) tool within Weboodi
  • OSAT → study rigth activation & extension, application of degree certificate, recognition of prior learning (RPL) application, resignation, application of certificate of student status
YOUR E-MAIL ADDRESS AT UO

• **O365**
  • Students will get their personal UO e-mail address & access for the *Microsoft’s Office 365 for Education* (O365) cloud service.
  • Take a glance of UO IT admin services: [http://www.oulu.fi/ict/](http://www.oulu.fi/ict/)
  • Instructions to activate O365: [http://www.oulu.fi/ict/office365](http://www.oulu.fi/ict/office365)
  • O365 will offer our students a free Outlook e-mail, and free cloud services like Office Online applications (Word, Excel, PowerPoint, OneNote), calendar and OneDrive.
  • **NOTICE:** WCE staff will use only official UO addresses to contact you, i.e. they will never contact you with your private e-mail addresses (Gmail, Hotmail, Yahoo, etc.).
  • Format of official UO e-mail address designed to you is: • pajuid@student.oulu.fi (UO network & e-mail)
YOUR E-MAIL ADDRESSES AT UO

• O365
  • Remember every now and then check your O365 e-mail account in order not to miss important messages from teachers, coordinator, officers, etc..
  • Instructions how to get O365 access can be found from: http://www.oulu.fi/ict/office365.
  • When encountering computer problems, just ask help from your Kummis, or from older WCE colleagues! They will certainly help you.
DAILY & WEEKLY COURSE CALENDARS

  • Aapo combines student and study services into one place.
  • Use Aapo with your laptop’s browser.
  • Aapo features:
    • Timetable for each day
    • Obtained credits and notifications of new credits
    • Credit statistics
    • Registration for courses and exams
    • Map of the University and room search
    • Menus of campus restaurants
    • Studying news
    • Use UO paju UID & PW to login Aapo.

• TUUDO https://www.tuudo.fi/en/
  • TUUDO has the same properties as AAPO, but it works in your smart phone
AAPO: HTTPS://AAPO.OULU.FI/INDEX.PHP?LANG=EN_US

Feed your pajuUID & PW here

AAPO
Stay on Top of Your Studies!

Aapo
Aapo combines student and study services into one place. Use Aapo on your computer’s browser.

What is in Aapo?
Aapo has the following:
- Received credits and notifications of new credits
- Timetable
- Credit statistics
- Registration for courses and exams
- Map of the University and room search
- Lunch menus
- Studying news

Use University of Oulu account to login to Aapo.

Aapo goes www
Aapo changed from a mobile app into a browser operated environment. Aapo the mobile app is replaced by a new mobile app Tuudo. Tuudo is a mobile app for students and studies, containing the same functions as Aapo.
Tuudo pages

Helpdesk: aapoli@oulu.fi

Privacy policy

UNIVERSITY OF OLU
TUUDO: HTTPS://WWW.TUUDO.FI/EN/

For Students

Tuudo is a mobile app, made for you, to make your student life simpler. With Tuudo, you manage your studies and ease your daily life, both on and off the campus. Enjoy your institution's most important services and your study information on your mobile device – safely, simply and surely up to date.

Load this from Google Play or AppStore
EVERYTHING STUDY-RELATED IS IN WEBOODI

WEBOODI

• All student’s study-related history like contact addresses, course & exams registrations, leaves, course marks, etc. are stored there, i.e. everything about you since first enrollment.
• The most important system at UO, i.e., a ”mother” of all student-related web-based study tools.
• Closed environment, i.e. pajuID & PW needed
• Course & exam registrations & exam results → everything is also seen in AAPO & TUUDO
• Detailed description of courses, their schedule and classrooms: number of ECTS, prerequisites, learning outcomes, target group, timing, contents, mode of delivery, learning activities, assesment methods & criteria, grading, teacher’s contact e-mail
• You will soon create your Personal Study Plan (PSP) in Weboodi
  • Shortly, OodiPSP is an E-document for the purpose of monitoring your study progress (by yourself and your personal study advisor/coordinator).
WEBOODI:
HTTPS://WEBOODI.OUlu.FI/OODI/ETUSIVU.HTML?KIELI=6

Feed your pajuUID & PW here
You can search teachers, contents, learning outcomes, prerequisites, implementation, timetables, exams, room info, etc. of the whole academic year 1.8.2018-31.7.2019 for each course by typing course name or course code here.
NOPPA STUDY PORTAL

- NOPPA
  - One-way channel to share information from teachers to students
  - Home pages of all UO courses are located there
  - Open environment, i.e. no pajuUID & PW needed
  - Course overviews
  - News
  - Coming events
  - Exam info
  - Timetable & room info
  - Share of public materials by a teacher (if she/he wishes to do so)
  - However, all WCE materials are typically stored in OPTIMA study portal instead of NOPPA
NOPPA Study Portal

FIELDS OF STUDY
- Dentistry
- Humanities
- Education
- Economics
- Language and Communication Education
- Natural Sciences
- Medicine
- Engineering
- Health Sciences
- UniOGS

UNIVERSITY OF OULU

Noppa is a study portal at the University of Oulu. It offers tools for students and teachers to handle study information and roads to the sources of this information.

You will find detailed course information in Noppa. Teachers update their courses and post study materials on course pages. You can also find timetables for each course, as well as news posted by teachers on course pages.

If you need help, contact Noppa Helpdesk for support.

Protection of privacy | Service description

WCE Orientation 6.9.2018
The Faculty of Technology at the University Oulu offers the following degrees: Bachelor of Science in Technology, Bachelor of Science in Architecture, Master of Science in Technology and Master of Science in Architecture. The success in high technology in Oulu Region is based on the high quality of education and research provided by the Faculty. The Faculty collaborates closely with regional partners, especially with business.

The Faculty offers seven degree programmes: architecture, mechanical engineering, process engineering, electrical engineering, computer science and engineering, industrial engineering and management, and environmental engineering. All degree programmes provide several orientations of specialization. The annual intake for the programmes is about 500 students. The Faculty of Technology differs from many other technical universities because it is a part of the multi-disciplinary University of Oulu. All the Faculties are located on the same Linnanmäki campus area, except the Faculty of Medicine. In this environment it is possible to study a wide range of subjects in addition to technology.

Why choose engineering or architecture? Graduated Masters and Bachelors are provided with a solid mathematical and scientific knowledge base and it is easy to build on these skills throughout the whole career. The degrees are durable and the employment rate is almost 100%. Studying at the University of Oulu, Faculty of Technology is certainly not a waste of time but rather an investment in the future!
HOMEPAGES OF ALL UO & CWC COURSES

Wireless Communications I

Course starts October 2017.
Lecture notes and exercises will be available in OPTIMA.
Lectures by Jari Hinatti
Exercises by Timo Kokkonen
Simulation work advised by Timo Kokkonen
Requirements: Lectures, Exercises and Literature
The course is passed by a final exam and by laboratory project (simulation work).
NOTE! By doing homework assignments and with excellently done simulation work (laboratory project), you can improve your exam based grade! In the final grade of the course, the weight for the examination is 0.6 and that for the design work report 0.4.
NOTE also! This course replaces old WC 1 (521320S) 8 CU.
Final Exams:
- 11.12.2017
- 20.02.2018
ALL COURSE MATERIALS & STUDY GROUP COMMUNICATION IS IN OPTIMA

• OPTIMA
  • Interactive two-way channel for the purpose of communication between teacher and student
  • Closed environment, i.e. all teacher’s materials & communications are protected with PAJU UID & PW
  • Organized as folders for each course
  • Lecture, class-exercise, exercise work share, instructions, etc. materials are stored there
  • Registration for courses also possible
  • Registration BOTH with WEBOODI AND with OPTIMA are recommended
  • Your Kummi will help you to find and use OPTIMA.
  • Because there are several OPTIMA environments for different faculties, choose right OPTIMA environment
  • After PAJU logging:
    • Enter an environment: → Oulun yliopisto, TTK
OPTIMA: HTTPS://OPTIMA.OULU.FI/

Choose this OPTIMA environment:

Oulun yliopisto, TTK
CWC MASTER’S THESIS TOPICS FOLDER

Red color indicates a topic is temporarily reserved for some student. Topic will be removed from the list once a student and a thesis supervisor agree to start a topic. If a student gives up a topic, font color will change to black again, and someone else student can reserve it.

Free master’s thesis topics (new topics with blue color, reserved topics with red color):

1. Five topics for antennas and propagation (Information: Veikko Hovinen, Published: April 2013)
2. Aging-Effect of Human Body Tissue on UWB Antenna Performance and Operation (Information: Markus Berg, Published: April 2013)
3. Frequency Selective Surfaces (FSS) in selective glazing of windows (Information: Erkki Salonen, Published: April 2013)
4. Development and analysis of flexible textile based antenna for wireless sensor networks (Information: Pradeep Kumar, Published: April 2013)
5. Implementation of robust user authentication framework for wireless sensor networks (Information: Pradeep Kumar, Published: April 2013)
6. Usability of FM-UWB in WBAN System (Information: Ville Niemela, Published: April 2013)
7. DBPSK/QDPSK modulations in IR-UWB WBAN System (Information: Ville Niemela, Published: April 2013)
8. UWB-Antenna with Band-REjection for 5 Ghz WLAN (More information: Markus Berg, Published: April 2013)
9. Wideband UWB BALUN (More information: Markus Berg, Published: April 2013)
10. Scattering Measurement of Vivaldi Antenna (More information: Marko Oinonen, Published: April 2013)
11. Visible light communication testbed, More information: Marcos Katz, Published: April 2013
12. Radio environment characterization in industrial automation scenarios (More information: Harri Posti, Published: September 2013)
13. Error control techniques for caching storage in 5G wireless heterogeneous networks (More information: Nandana Rajatheva, Published: September 2013)
15. Implementation of layer 2 protocols in VPLS enabled ethernet networks (More information: Madhusanka Liyanage, Published: September 2013)
16. Performance analysis of full-duplex wireless networks using stochastic geometry (Information: Pedro Nadelle, Published: October 2014)
17. User admission and serving cell assignment for throughput maximization in cellular systems (Information: Antti Tölli or Jarkko Kaleva, Published: October 2014)
18. Coherent transmission mode selection for coordinated multipoint transmission (More information: Antti Tölli or Jarkko Kaleva, Published: October 2014)
19. Analysis of robust and secure access control mechanisms in smart environments, More information: Pradeep Kumar, Published: October 2014
20. Study end-to-end authentication framework for Internet-of-things driven pervasive healthcare, More information: Pradeep Kumar, Published: October 2014
21. Two master’s thesis topics related to 5G wireless RF systems and implementation architecture aspects, More information: Aarno Pärssinen, Published: February 2015
22. Measurements and performance evaluation of THz band for ON-OFF key wireless communication, More information: Joonas Kokkonen and Janne Lehtomäki, Published: October 2015
25. Secure communication architecture for software defined machines and SDN based industrial networks, More information: Madhusanka Liyanage, Published: October 2015
26. Software-defined networking for smart grid networks, More information: Madhusanka Liyanage, Published: October 2015
27. Implementation of layer 2 protocols in VPLS enabled ethernet networks (More information: Madhusanka Liyanage, Published: October 2015)
28. Dynamic WBAN channel modeling using MATLAB’s UWB transceivers, More information: Matti Hamalainen, Published: October 2015
29. Ultra reliable communication (URC) with security guarantees, More information: Hirley Ales, Published: April 2016
30. Review and analysis of low-power wide area networks (LPWANs) for critical infrastructure monitoring, More information: Jussi Haapala, Published: September 2016
33. Beamforming Designs for Full-Duplex Simultaneous Information and Power Transfers, More information: Quang-Doanh Vu, Quang Vu@oulu.fi & Published: September 2016
34. Advanced Equalizers for Long Delay Spread Channels, More information: Harri Saarnisaari, harri.saarnisaari@oulu.fi & Published: January 2017

WCE Orientation 6.9.2018
OSAT:
HTTPS://OSAT.OULU.FI/INDEX.PHP?LANG=EN_US

Feed your pajuUID & PW here
WHAT CAN A STUDENT DO WITH OSAT?

• In OSAT-system a student can fill in an electronic:
  • RPL (Recognition of Prior Learning)-application
  • Application for extended study period for completion of studies
  • Study right reactivation
  • Application for degree certificate
  • Resignation form
  • Application of certificate of student status
  • System login to OSAT is with university account.
  • A student with no valid university account can login with Citizen's account (suomi.fi).
  • Only PDF-format (.pdf) application attachments are accepted.

CONFUSED ABOUT ALL THESE WEB-TOOLS?

• The most updated information of each course schedule is always located in NOPPA and OTIMA. Follow them for each course!
• Don’t worry about these tools! You will learn them sooner than you will believe.
• Advice: Ask your Kummi, or your older WCE colleague students. They will certainly help you.
• Join also the first lecture of each new course, because the most important information for passing the course is always given then!
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 curriculum documents shared you today.
- Important part of PSP is study goals and following progress.
- You must create your own PSP by 11.11.2018!
  - PSP supervisor asks you for study progress & PSP meeting
- **Video how to create your own PSP with OodiPSP tool** ([http://www.oulu.fi/oodienglish/node/19271](http://www.oulu.fi/oodienglish/node/19271))
### Module of the Option, Wireless Communications Engineering content 2016-17

<table>
<thead>
<tr>
<th>Course</th>
<th>Planned ECTS</th>
<th>Completed ECTS</th>
<th>Obtained grade 1…5</th>
</tr>
</thead>
<tbody>
<tr>
<td>031025A Introduction to Optimization</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>521321S Elements of Information Theory and Coding</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<tr>
<td>521316S Broadband Communications Systems</td>
<td>5</td>
<td>5</td>
<td>4</td>
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<tr>
<td>521323S Wireless Communications I</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<tr>
<td>521323S-02 Wireless Communications I, Exercise</td>
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<tr>
<td>521340S Communication Networks I</td>
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<tr>
<td>521340S-01 Communication Networks 1, partial credit</td>
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<td>15.03.2017</td>
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<td>521324S Communication Signal Processing I</td>
<td>5</td>
<td>5</td>
<td>3</td>
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<td>521385S Mobile Telecommunication Systems</td>
<td>5</td>
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<tr>
<td>Advanced module</td>
<td>29/16-31</td>
<td>11</td>
<td></td>
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<tr>
<td>Either Antennas or Radio Channels is chosen as compulsory (they are lectured in alternate years). Furthermore, choose the minimum of two courses from the set list.</td>
<td></td>
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<tr>
<td>A553271 Advanced module, Wireless Communications Engineering content 2016-17</td>
<td>29/16-35</td>
<td>11</td>
<td></td>
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<td>Two courses from this set of four courses must be selected</td>
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<tr>
<td>521327S Radio Engineering II</td>
<td>6</td>
<td>6</td>
<td>4</td>
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<tr>
<td>521317S Wireless Communications II</td>
<td>8</td>
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</tr>
</tbody>
</table>

**Legend:**
- **Mark for done course:** Indicates a course that has been completed.
- **Planned ECTS:** The planned number of ECTS for the course.
- **Completed ECTS:** The actual number of ECTS completed for the course.
- **Obtained grade 1…5:** The grade obtained for the course, ranging from 1 to 5.
YOUR ORIGINAL B.SC. DOCUMENTATION

• Bring your original bachelor’s degree diploma certificate and transcript of records to Faculty of ITEE student services cluster as will be told today by ITEE faculty’s international studies coordinator Ms. Maritta Juvani (room TS110).
• You must show your passport and residence permit card when bringing your documents.
• You will get a receipt that you have left your documents at the faculty office.
• You’ll get your documents back within one month.
• Coordinator will inform you, when you can pick up them back.
ENJOY YOUR STAY IN FINLAND!

FIND LIFE-LONG FRIENDS, AND CREATE SOCIAL & ACADEMIC NETWORKS IN ORDER TO BE CONNECTED IN A GLOBAL WIRELESS WORLD, SOON WITH 5G AND BEYOND (SEE OUR 6GENESIS FLAGSHIP PROGRAMME)!

Regards, WCE staff