

International Master's Degree Programme in Wireless Communication Engineering (WCE)

Curriculum for WCE-RAN and WCE-RF Study Options 2018-2010

1. Structure of WCE Studies

The [Centre for Wireless Communications](#) (CWC) at the [Faculty of Information Technology and Electrical Engineering](#) (ITEE), [University of Oulu](#) is responsible for organizing the 2 years international master's degree programme (IMP) of [Wireless Communication Engineering](#) (WCE). WCE programme offers two study specialization options: Radio Access Networks (WCE-RAN) and RF Engineering (WCE-RF). Student has selected either programme already in IMP admission phase on spring.

In addition, CWC arranges a double degree (DD) programme in WCE (DD-WCE) together with the Asian Institute of Technology (AIT, Bangkok, Thailand, <https://www.ait.ac.th/>) and the University of Peradeniya (UoP, Peradeniya, Sri Lanka, <https://www.pdn.ac.lk/academics/academics.php>). Curriculum courses of the DD-WCE is organized together with AIT and UoP partners. Detailed curriculums for DD-WCE IMP can be found from the page: <http://www.oulu.fi/cwc/ddwcecurriculum>.

- <http://www.oulu.fi/sites/default/files/content/AIT-UOulu.pdf>
- <http://www.oulu.fi/sites/default/files/content/UoP-UOulu.pdf>

This curriculum covers only WCE-RAN and WCE-RF study options. WCE programme consist of 120 ECTS credits of studies based on the modules described below. 60 ECTS credits measure the workload of a full-time student during one academic year, which equals around 1500-1800 hours per year. Thus one ECTS credit stands for 25-30 working hours. The structure of WCE studies is organized according to the figure on next page.

All WCE courses are implemented in English. Execution of the WCE programme consist of passing the courses contained in the *basic*, *advanced* and *optional* (elective studies) modules. All courses within the basic and advanced modules must be completed. There is freedom to choose elective courses for the optional module based on student's interest. 17-22 ECTS of elective studies - depending of study option - must be chosen. That's why the minimum and maximum number of credit points in advanced and optional modules varies a within the limits shown above.

In addition, master's thesis theses work (30 ECTS equals roughly 6 month workload) and advanced practical training (3 ECTS equals roughly 2 month workload) are obligatory.

Mandatory WCE courses in basic and advanced modules are offered by the [Centre for Wireless Communications](#) and [Circuits and Systems](#) (CAS) research units. Most of elective courses are offered by other [ITEE](#) faculty units seen on the page: <http://www.oulu.fi/itee/units>. Finnish language studies are offered by the [UO Language & Communication unit](#).

Student can include elective courses into his/her optional studies module (elective studies) even from other units & faculties of Oulu University, provided they are accepted into student's personal study plan (PSP) by

the personal study advisor (academic coordinator, and director of programme Dr. Kari Kärkkäinen). *Always consult your personal study advisor before including elective courses offered by other faculties into your personal study plan, or before starting to listen a course.* Courses from CWC, and other ITEE research units can be included directly into your PSP without consulting your study advisor (see the list for such elective studies in Chapter 4).

Basic WCE studies (RAN: 40, RF: 41 ECTS)
Advanced WCE studies (RAN: 25, RF: 28-29 ECTS)
Optional WCE studies (RAN: ≥ 22 , RF: $\geq 17-18$)
Advanced practical training (3 ECTS)
Master's (Diploma) Thesis work (30 ECTS)
In total 120 ECTS

ECTS = European Credit Transfer System, 1 credit 25-30 hours, 1 year ca. 60 credits

If a student fails to pass an exam, she/he can try again on next final exam date of that course. Typically 3-4 exams are arranged per year for each course (depending on whether summer exams are arranged or not). *Notice, no restrictions are imposed on the number and the time-span of taken exams for each course, i.e., if you fail an exam, you can retry during next exams, or next study year without a need to listen again the course on next year.* Also, if you are not satisfied with your grade, you can try to upgrade your grade in next exams without restrictions. *Exams are always written with a pencil.* Use of permanent ink pen is not obligatory, and it is not recommended.

Each WCE student has to submit an electronic personal study plan (PSP) to the programme's personal study advisor Dr. Kari Kärkkäinen for approval at the beginning of studies (typically in October-November). Instructions session for creation of a PSP will be arranged at the beginning of autumn term. PSP is prepared with the aid of OodiPSP under [Weboodi environment](#). Take a look at the OodiPSP instructions on the page: <http://www.oulu.fi/cwc/node/11468>.

2. General Issues Dealing with Studies

Academic study year at UO is divided into 4 periods. Periods 1, and 2 run on autumn (A) term, and periods 3 and 4 run on spring (S) term. Time span for each period is 7-8 weeks. Final exams are arranged at the end of each period. Mid-term exams or mini-exams are organised for some courses. Each study year consists of approximately 32 weeks of teaching. Between 2nd and 3rd periods there is a season break for the Christmas & New Year between 22.12.2018-6.1.2019 (weeks 52-1). No teaching and exams are arranged during that holiday season. Then it is possible to visit in your home country.

Studies begin on week 36 with training period 3.9.-7.9.2018 and first lectures of each course. It is very important for students to arrange their residence permit issues, book flights and accommodation so that they can arrive on weekend 1.-2.9.2018 at the latest. Otherwise they will miss a lot of crucial instructions and information dealing with their studies and study practices at UO in order to get started.

The exact dates for the periods of the study year 2017-2018 are the following: 1st: 3.9.-26.10.2018 (weeks 36-43) , 2nd: 29.10.-21.12.2018 (weeks 44-51), 3rd: 7.1.-8.3.2019 (weeks 2-10), 4th: 11.3.-10.5.2019 (weeks 11-19). Summer brake is between 11.5.-1.9.2019.

Extra summer exams are typically arranged in summer time. Mandatory advanced practical training course of 3 ECTS credits is recommended to be done during summer season after 1st study year. Training extension of 3 ECTS equals 2 month full-time workload.

At the beginning of studies during the orientation week a WCE student will get his/her personal UO e-mail account, and a licenses to use UO computer networks, i.e. will get UID & PW for UO computer systems. Those computer systems are needed in executing exercise and design works contained in most courses of WCE curriculum, as well as, to access lecture and exercise materials stored in pdf-format in [Optima](#) environment.

3. Computer Environments and Study Portals in UO Computer Network

After enrolling to Oulu University in September, student will get personal userID & password for UO IT service's computer network needed in studies. It is called: **paju.oulu.fi** -account, and student will get an unique **pajuID**. Student needs pajuID -account when using [OPTIMA](#), [WEBOODI](#), [NOPPA](#), [AAPO](#), and [TUUDO](#) study portals. TUUDO is actually AAPO working as application in a smart phone. All study portals that will be explained briefly below, and student tutors (Kummiss) help students to get started.

Students will also get their personal UO e-mail address & service for the Microsoft's **Office 365 for Education (O365)** cloud service: <http://o365.oulu.fi/>. Office 365 for Education (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. Student's specific e-mail address will be told when student enrolls to university. Typically those are of the form **pajuID@student.oulu.fi**, or **firstname.familyname@student.oulu.fi**, although not limited those if students with same name exists at UO. More about UO IT Administration services can be found from: <http://www.oulu.fi/ict/>.

All official correspondence from academic coordinator, UO teachers and student service officers is communicated only with using student's O365 system e-mail address. Although you may prefer your personal e-mail system (Gmail, Yahoo, Hotmail, etc.), UO personnel does not use your personal e-mail address in matters dealing with your studies. ***That's why remember every now and then check your O365 e-mail account in order not to miss important messages from teachers, etc., and/or forward UO mails to your personal account.*** Instructions how to get and activate O365 service can be found from: <http://www.oulu.fi/ict/office365>.

Course materials are typically stored into the **TTK-OPTIMA** portal: <https://optima.oulu.fi/>. OPTIMA is an interactive study environment and two-way communication channel between student and teacher in order to share study materials and work assignments, and to discuss with teachers and colleague students.

NOPPA (<https://noppa.oulu.fi/noppa/kurssit/>) study portal is an open study environment (i.e. UO pajuUID & PW is not needed to use it) where all home pages of WCE courses exist, and learning outcomes and up-to-date daily information dealing with detailed execution of courses are located (lecture & exercise & exercise work schedules, course books, mode of delivery). All WCE courses are located on a specific NOPPA page: <https://noppa.oulu.fi/noppa/kurssit/organisaatio/tkst4342s>

WEBOODI (<https://weboodi.oulu.fi/oodi/>) is an environment where all official detailed course descriptions including course books, timing periods, mode of delivery and requirements are located. Final marks of completed courses will be stored, and will appear there. Weboodi is a “mother” of all study-related systems at our university, under which all other environments are located and from which all information is fetched.

Students have to register with WEBOODI for courses before course starts, and also for final exams. When registering to an exam using WEBOODI student always has to ask exam questions in English. Failing to register means that student cannot participate an exam! Registration period expires week before each final exam. Late registration beggings are not taken in account!

TUUDO (<https://www.tuudo.fi/en/>) is a course calendar containing main information needed in studies during each day. Each WCE student should create into her/his smart phone own electronic TUUDO lecture & exercise calendar containing dates, times and rooms of her/his courses for each period of academic year 2018-2019, notifications, UO maps, restaurant menus, etc.. Also registrations and passed credits will appear there. **Uploading of TUUDO application is one of the first tasks to be done after student's arrival.** TUUDO will pick up all timing & room information directly from the Weboodi system. Introduction to TUUDO pages:

- <http://www.oulu.fi/university/node/42359>
- <https://www.tuudo.fi/en/>

AAPO (https://aapo.oulu.fi/index.php?lang=en_US) is web browser version of TUUDO having same properties, but operating in student's laptop.

LATURI (<https://laturi.oulu.fi/index.php?uilang=en-US>) is an environment which loads student's ready master's thesis in pdf-A form for inspection to indicate possible plagiarism contained in a thesis.

URGUND (<http://www.urkund.com/fi/>) checks student's master's thesis (feeded with LATURI) revealing plagiarism.

Personal student tutors (Kummi) will advise students at the beginning of studies how to use those six study environments. Students should not worry, since they will learn them easily.

4. Curriculum Schedule for Academic years 2018-2020 of WCE Students

4.1 WCE Radio Access Networks Study Option (WCE-RAN)

Basic Module (all courses obligatory)	Course code	ECTS	Suggested study year	Precise course timing (A=autumn, S=spring)	Lecturer
Introduction to Optimization	031025A	5	1	A2018 (period 1)	Prof. Keijo Ruotsalainen
Statistical Signal Processing	521348S	5	1	A2018 (period 1)	Adj. Prof. Janne Lehtomäki
Broadband Communications Systems	521316S	5	1	A2018 (period 1)	Prof. Nandana Rajatheva
Elements of Information Theory and Coding	521321S	5	1	A2018 (period 2)	Prof. Nandana Rajatheva (IT part), University Teacher Timo Kokkonen (Coding part)
Mobile Telecommunication Systems	521385S	5	1	S2019 (period 3)	Prof. Marcos Katz
Wireless Communications I	521323S	5	1	A2018 (period 2)	Prof. Jari Iinatti
Communication Networks I	521340S	5	1	A2018 (period 2)	Prof. Mika Ylianttila
Communication Signal Processing I	521324S	5	1	S2019 (period 3)	Prof. Markku Juntti
total		40			

Advanced Module (all courses obligatory)	Course code	ECTS	Suggested study year	Precise course timing (A=autumn, S=spring)	Lecturer
Communication Networks II	521377S	7	1	S2019 (periods 3-4)	Prof. Mika Ylianttila
Wireless Communications II	521317S	8	1	S2019 (periods 3-4)	Associate Prof. Antti Tölli
Radio Engineering I	521326S	5	2	A2020 (period 2)	University Teacher Risto Vuohtoniemi
Communication Signal Processing II	521325S	5	1	S2019 (period 4)	Prof. Markku Juntti
total		25			

☒ = Student has to choose one from this set of two courses (one course of these is obligatory, and the other one has to be allocated into the optional module). Antenna course is lectured next time on spring term of year 2020. Radio Channels course is lectured next time on spring term of year 2019.

* = A bi-annual course lectured only on even years 2020, 2022, 2024,...

= A bi-annual course lectured only on odd years 2019, 2021, 2023,...

With the elective courses of an optional module a student can extend his/her knowledge from wireless communications, e.g., into the areas of practical electronics design, wireless measurement techniques and computer science & engineering. Notice that on the next page's table there are some recommendations depending on your interests. Student is anyway free to choose the elective courses she/he likes. She/he have to choose elective courses depending on how many credits must be chosen into advanced module. Student can also do more courses than the minimum ECTS requirement if she/he wish. **It is also possible to include at most 10 ECTS of Finnish language studies into optional module.** Finnish language studies are recommended

for all WCE students, especially during first study year, in order to integrate with Finnish society. Basic Finnish vocabulary is useful in daily life, although most Finnish people speak satisfying English outside our campus.

Optional Module (elective studies)	Course code	ECTS	Suggested study year	Suggested course timing	Lecturer
Survival Finnish Course	900017Y	2	1	annually, announced at the beginning of semester §	UO language center/ open university
Beginner's Finnish I Course	900013Y	3	1	annually, announced at the beginning of semester §	UO language center/ open university
Beginner's Finnish II Course	900053Y	5	1,2	annually, announced at the beginning of semester §	UO language center/ open university
Modern Topics in Telecommunications and Radio Engineering	521318S	3-7	2	annually (periods 1-4) @ ♥	Prof. Matti Latva-aho and Prof. Jari Iinatti are responsible
Antennas	521388S	5	2	S2020 (period 4) * ♥	Dr. Markus Berg
Radio Channels	521386S	5	1	S2019 (period 4) ✘ ♥	Dr. Markus Berg
Radio Engineering II	521327S	6	2	S2019 (period 3) ♥ ♠	University Teacher Risto Vuotoniemi
Telecommunication engineering project	521322S	5	2	A2019 (periods 1-2) ♥	Dr. Markus Berg, Adj. Prof. Harri Saarnisaari
Wireless Measurements	521097S	5	2	S2020 (period 3) ♥ ♠	Dr. Juha Saarela
RF Components and Measurements	521225S	5	2	S2020 (period 4) ♥ ♠	Dr. Merja Teirikangas
Electronics Design II	521401S	6	2	A2019 (period 1) ♠	Adj. Prof. Tarmo Ruotsalainen
Electronics Design III	521435S	6	2	A2019 (period 2) ♠	Adj. Prof. Tarmo Ruotsalainen
Electronic System Design	521405S	5	2	A2019 (period 1) ♠	Adj. Prof. Kari Määttä
Telecommunications Circuit Design	521402S	6	2	A2019 (period 1) ♠	Prof. Timo Rahkonen
Electronics Design and Construction Exercise	521300S	6	2	A2019 (periods 1-2) ♠	Adj. Prof. Kari Määttä
Research Method	813621S	2	2	A2019 (periods 1-2) ♣	Dr. Arto Lanamäki
Bio-signal processing	521273S	5	2	A2019 (period 2) ♣	Prof. Tapio Seppänen
Digital Video Processing	521259S	5	2	A2019 (period 2) ♣	Dr. Esa Rahtu
Human Computer Interaction	521145A	5	2	A2019 (period 2) ♣	Dr. Denzil Ferreira
Signal Processing Systems	521279S	5	2	A2019 (period 2) ♣	Prof. Olli Silven
Ubiquitous Computing Fundamentals	521148S	5	2	A2019 (periods 1-2) ♣	Adj. Prof. Hannu Kukka
Application Specific Signal Processors	521281S	5	2	A2019 (period 1) ♣	Dr. Teemu Nyländén
Computer Graphics	521493S	7	2	S2020 (period 4) ♣	Dr. Guoying Zhao, Dr. Xiaopeng Hong, Dr. Yinyue Xu
Distributed Systems	521290S	5	2	S2020 (period 3) ♣	Prof. Timo Ojala
Machine Vision	521466S	5	2	S2020 (period 3) ♣	Prof. Janne Heikkilä
Social Computing	521144S	5	2	S2020 (period 3) ♣	Dr. Denzil Ferreira
Mobile Computing	521145S	5	2	S2020 (periods 3-4) ♣	Dr. Denzil Ferreira
Programmable Web Project	521260S	5	2	S2020 (periods 3-4) ♣	Dr. Ivan Milara
Software Project	521479S	7	2	A2019 (periods 1-2) ♣	Dr. Christian Wieser
total		≥ 22			

- § = See details of timing either from WEBOODI (<https://weboodi.oulu.fi/oodi/>), or from NOPPA (<https://noppa.oulu.fi/noppa/app>), or from UO language centre's web page: <http://www.oulu.fi/languagesandcommunication/>
- * = A bi-annual course lectured only on even years 2020, 2022, 2024,...
- # = A bi-annual course lectured only on odd years 2019, 2021, 2023,...
- @ = Exact topics will be announced along each semester. Typically there will be several topics for each study year. *Notice also, you can choose several course topics of 3-7 ECTS credits under this "umbrella course" 521318S, not just one.*
- ♥ = This course is recommended for all WCE students.
- ♠ = If you are interested in radio frequency electronics design, a proper collection from these courses is recommended.
- ♣ = If you are interested in computer engineering issues to widen your expertise, a proper collection from these courses is recommended.

Other obligatory studies included in WCE Master's degree	Course code	ECTS	Suggested study year	Precise timing
Advanced practical training (includes also a written training report)	521016A	3	after first study year, suggested between June and August of summer 2019	2 months of full workload equals 3 ECTS credits
M.Sc. (Diploma) thesis work	521998S	30	2	A2019–S2020
Written English language proficiency test		0	2	after written master's thesis is accepted and ready to be loaded into LATURI and URGUND check.
total		33		

4.2WCE Radio Engineering Study Option (WCE-RF)

Basic Module (all courses obligatory)	Course code	ECTS	Suggested study year	Precise course timing (A=autumn, S=spring)	Lecturer
Electronics Design II	521401S	6	1	A2018 (period 1)	Adj. Prof. Tarmo Ruotsalainen
Statistical Signal Processing	521348S	5	1	A2018 (period 1)	Adj. Prof. Janne Lehtomäki
Broadband Communications Systems	521316S	5	1	A2018 (period 1)	Prof. Nandana Rajatheva
Radio Engineering I	521326S	5	1	A2018 (period 2)	University Teacher Risto Vuohtoniemi
Wireless Communications I	521323S	5	1	A2018 (period 2)	Prof. Jari Iinatti
Communication Signal Processing I	521324S	5	1	S2019 (period 3)	Prof. Markku Juntti
RF Components and Measurements	521225S	5	1	S2019 (period 4)	Dr. Merja Teirikangas
Electronic System Design	521405S	5	2	A2019 (period 1)	Adj. Prof. Kari Määttä
total		41			

Advanced Module (all courses obligatory)	Course code	ECTS	Suggested study year	Precise course timing (A=autumn, S=spring)	Lecturer
Electronics Design III	521435S	6	1	A2018 (period 2)	Adj. Prof. Tarmo Ruotsalainen
Radio Engineering II	521327S	6	1	S2019 (period 3)	University Teacher Risto Vuohtoniemi
Antennas *☐	521388S	5	2	S2020 (period 4)	Dr. Markus Berg
Radio Channels #☐	521386S	5	1	S2019 (period 4)	Dr. Markus Berg
Telecommunications Circuit Design	521402S	6	2	A2019 (period 1)	Prof. Timo Rahkonen
Telecommunication engineering project ☐	521322S	5	2	A2019 (periods 1-2)	Dr. Markus Berg, Adj. Prof. Harri Saarnisaari
Electronics Design and Construction Exercise ☐	521300S	6	2	A2019 (periods 1-2)	Adj. Prof. Kari Määttä
total		28-29			

* = A bi-annual course lectured only on even years 2020, 2022, 2024,...

= A bi-annual course lectured only on odd years 2019, 2021, 2023,...

☐ = Student has to choose one from this set of two courses (one course of these is obligatory, and the other one has to be allocated into the optional module).

With the elective courses of an optional module a student can extend his/her knowledge from wireless communications, e.g., into the areas of practical electronics design, wireless measurement techniques and computer science & engineering. Notice that on the next table there are some recommendations depending on your interests. You are anyway free to choose the elective courses you like. You have to choose elective courses depending on how many credits are chosen into your advanced module. You can also do more courses than the minimum ECTS requirement if you wish. *It is also possible to include at most 10 ECTS of Finnish*

language studies into your optional module. Finnish language studies are recommended for all WCE students, especially during first study year, in order to integrate with Finnish society. Basic Finnish vocabulary is useful in daily life, although most Finnish people speak satisfying English outside our university campus.

Optional Module (elective studies)	Course code	ECTS	Suggested study year	Suggested course timing	Lecturer
Survival Finnish Course	900017Y	2	1	annually, announced at the beginning of semester #	UO language center/ open university
Beginner's Finnish I Course	900013Y	3	1	annually, announced at the beginning of semester #	UO language center/ open university
Beginner's Finnish II Course	900053Y	5	1,2	annually, announced at the beginning of semester #	UO language center/ open university
Modern Topics in Telecommunications and Radio Engineering	521318S	3-7	2	annually (periods 1-4) *♥	Prof. Matti Latva-aho and Prof. Jari Iinatti are responsible
Antennas	521388S	5	2	S2020 (period 4) ♥	Dr. Markus Berg
Radio Channels	521386S	5	1	S2019 (period 4) ♥	Dr. Markus Berg
Mobile Telecommunication Systems	521385S	5	2	S2020 (period 3) ♥	Prof. Marcos Katz
Elements of Information Theory and Coding	521321S	5	2	A2019 (period 2) ♥	Prof. Nandana Rajatheva (IT part), University Teacher Timo Kokkonen (Coding part)
Communication Networks I	521340S	5	2	A2019 (period 2) ♥	Prof. Mika Ylianttila
Communication Networks II	521377S	7	2	S2020 (periods 3-4) ♥	Prof. Mika Ylianttila
Wireless Communications II	521317S	8	2	S2020 (periods 3-4) ♥	Adj. Prof. Antti Tölli
Communication Signal Processing II	521325S	5	2	S2020 (period 4)	Prof. Markku Juntti
Wireless Measurements	521097S	5	2	S2020 (period 3) ♥	Dr. Juha Saarela
Research Method	813621S	2	2	A2019 (periods 1-2) ♣	Dr. Arto Lanamäki
Bio-signal processing	521273S	5	2	A2019 (period 2) ♣	Prof. Tapio Seppänen
Digital Video Processing	521259S	5	2	A2019 (period 2) ♣	Dr. Esa Rahtu
Human Computer Interaction	521145A	5	2	A2019 (period 2) ♣	Dr. Denzil Ferreira
Signal Processing Systems	521279S	5	2	A2019 (period 2) ♣	Prof. Olli Silven
Ubiquitous Computing Fundamentals	521148S	5	2	A2019 (periods 1-2) ♣	Dr. Hannu Kukka
Application Specific Signal Processors	521281S	5	2	A2019 (period 1) ♣	Dr. Teemu Nyländen
Computer Graphics	521493S	7	2	S2020 (period 4) ♣	Dr. Guoying Zhao, Dr. Xiaopeng Hong, Dr. Yinyue Xu
Distributed Systems	521290S	5	2	S2020 (period 3) ♣	Prof. Timo Ojala
Machine Vision	521466S	5	2	S2020 (period 3) ♣	Prof. Janne Heikkilä
Social Computing	521144S	5	2	S2020 (period 3) ♣	Dr. Denzil Ferreira
Mobile Computing	521145S	5	2	S2020 (periods 3-4) ♣	Dr. Denzil Ferreira
Programmable Web Project	521260S	5	2	S2020 (periods 3-4) ♣	Dr. Ivan Milara
Software Project	521479S	7	2	A2019 (periods 1-2) ♣	Dr. Christian Wieser
total		≥ 17-18			

= See details of timing either from WEBOODI (<https://weboodi.oulu.fi/oodi/>), or from NOPPA (<https://noppa.oulu.fi/noppa/app>), or from UO language centre's web page: <http://www.oulu.fi/languagesandcommunication/>

- * = Exact topics will be announced along each semester. Typically there will be several topics for each study year. *Notice also, you can choose several course topics of 3-7 ECTS credits under this “umbrella course” 521318S, not just one.*
- ♥ = This course is recommended for all WCE students.
- ♣ = If you are interested in radio frequency electronics design, a proper collection from these courses course is recommended.
- ♣ = If you are interested in computer engineering issues to widen your expertise, a proper collection from these courses is recommended.

Other obligatory studies included in WCE Master’s degree	Course code	ECTS	Suggested study year	Precise timing
Advanced practical training (includes also a written training report)	521016A	3	after first study year, suggested between June and August of summer 2019	2 months of full workload equals 3 ECTS credits
M.Sc. (Diploma) thesis work	521991S	30	2	A2019–S2020
Written English language proficiency test		0	2	after written master’s thesis is accepted and ready to be loaded into LATURI and URGUND check.
total		33		

Course descriptions, learning outcomes and detailed content of all courses can be found in electronic form by from the WEBOODI portal:

<https://weboodi.oulu.fi/oodi/>

Course home pages, as well as up-to-date timing info and calendar changes dealing with courses (cancelled/moved lectures, room changes) can be found from the NOPPA portal:

<https://noppa.oulu.fi/noppa/kurssit/organisaatio/tkst4342s>

Course materials are stored in OPTIMA portal:

<https://optima.oulu.fi/learning/id76/bin/user>

All WCE curriculum documents, forms, templates, etc. can be founded from here:

<http://www.oulu.fi/cwc/wce>

which is the most important storage of WCE programme’s information during your studies. Bookmark it now!