Cloud and Network Infrastructures 2020-2022

Major code: ELEC3059

Entry points: Aalto, Technical University Berlin (TUB), University of Rennes 1 (UR1), Sorbonne University (SU), Roayl Institute of Technology (KTH), University of Trento (UNITN).

Exit points with specializations:
Aalto: Mobile Networking and Cloud Services
KTH: Networked Intelligence
TUB: Cloud & Distributed Computing
UR1: Smart City Services
SU: Smart Mobility Systems
UNITN: Beyond 5G

Curricula at partner universities

Professor in charge: Jukka Manner

Other professors of the major: Mario di Francesco, Riku Jäntti, Raimo Kantola, Stephan Sigg, Tarik Taleb, Hong-Linh Truong, Petri Vuorimaa, Yu Xiao

Objectives of the programme

The program on Cloud & Network Infrastructures (CNI) within the EIT Digital Master School is a unique offering that provides a holistic view on network and cloud computing and combines it with a minor on innovation and entrepreneurship. Students will be equipped with profound knowledge on network management, operation, and design on the one hand and cloud service and deployment models, implementation strategies, and application design on the other. The program also focuses on future directions of cloud computing, for example, in the fields of edge and fog computing as well as blockchains and distributed ledger applications respectively.
### Compulsory major courses (9 ECTS)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCI-E1010</td>
<td>Introduction course for Master's students: Academic Skills</td>
<td>1 ECTS</td>
</tr>
<tr>
<td>CS-E4190*</td>
<td>Cloud Software and Systems</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>LC-xxxx</td>
<td>Language course: Compulsory degree requirement, both oral and written requirements</td>
<td>3 ECTS</td>
</tr>
</tbody>
</table>

### Compulsory I&E Courses (7 ECTS)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-E5120</td>
<td>Introduction to Digital Business and Venturing</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>CS-E5130</td>
<td>Digital Business Management</td>
<td>4 ECTS</td>
</tr>
</tbody>
</table>

### Optional major courses (select 22 ECTS over two semesters)

#### Autumn courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-C3130</td>
<td>Information Security</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7120</td>
<td>Wireless Systems</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7130</td>
<td>Internet Traffic Measurements and Analysis</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7330</td>
<td>Laboratory Course in Internet Technologies</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7210</td>
<td>Communication Theory</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-A790101</td>
<td>Internet Forum</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7230</td>
<td>Mobile Communication Systems</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7460</td>
<td>Modelling and Simulation</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4300</td>
<td>Network Security</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7820</td>
<td>Operator Business</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-C3170</td>
<td>Web Software Development</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4260*</td>
<td>Multimedia Services in Internet</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4650*</td>
<td>Methods of Data Mining</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4710*</td>
<td>Machine Learning: Supervised Methods</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7810</td>
<td>Patterns in Communications Ecosystems</td>
<td>5 ECTS</td>
</tr>
</tbody>
</table>

*) New course starting in 2020-2021
### Compulsory major courses (5 ECTS)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC-E7320</td>
<td>Internet Protocols</td>
<td>5 ECTS</td>
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</table>

### Compulsory I&E Courses (17 ECTS)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>TU-E4100</td>
<td>Startup Experience</td>
<td>9 ECTS</td>
</tr>
<tr>
<td>CS-E5140</td>
<td>Global Business in the Digital Age</td>
<td>4 ECTS</td>
</tr>
<tr>
<td>CS-E5430</td>
<td>ICT Innovation Summer School</td>
<td>4 ECTS</td>
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</tbody>
</table>

### Optional major courses (select 22 ECTS over two semesters)

#### Spring courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC-E7470</td>
<td>Cybersecurity</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7420</td>
<td>Network Service Provisioning</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7310</td>
<td>Routing and SDN</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>ELEC-E7260</td>
<td>Machine Learning for Mobile and Pervasive Systems</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4300</td>
<td>Network Security</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4640</td>
<td>Big Data Platforms</td>
<td>5 ECTS</td>
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</tbody>
</table>

### Total for the whole year: 60 ECTS

Note for exit year at partner university: According to Finnish legislation, a master's thesis is a public document and its contents cannot be confidential. Therefore, the material of the thesis must be chosen so that it does not include any information that could be classified as a business secret of the financing company.

Aalto specialization – Mobile Networking and Cloud Services

### Compulsory major courses (14 ECTS)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCI-E1010</td>
<td>Introduction course for Master’s students: Career and working life skills</td>
<td>1 ECTS</td>
</tr>
<tr>
<td>LC-xxxx</td>
<td>Language course: Compulsory degree requirement, both oral and written requirements</td>
<td>3 ECTS</td>
</tr>
</tbody>
</table>

Select at least 10 ECTS from courses below

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<thead>
<tr>
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<th>Course name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ELEC-E7130</td>
<td>Internet Traffic Measurements and Analysis</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4300</td>
<td>Network Security</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>Code</td>
<td>Course name</td>
<td>Credits</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------</td>
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</tr>
<tr>
<td>CS-C3170</td>
<td>Web Software Development</td>
<td>5 ECTS</td>
</tr>
<tr>
<td>CS-E4260*</td>
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</table>

**Compulsory I&E Courses (6 ECTS)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-E5425</td>
<td>I&amp;E Study Project</td>
<td>6 ECTS</td>
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</tbody>
</table>

**Optional major courses (select 0-10 ECTS)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
<th>Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS-C3130</td>
<td>Information Security</td>
<td>5 ECTS</td>
<td>autumn</td>
</tr>
<tr>
<td>ELEC-E7120</td>
<td>Wireless Systems</td>
<td>5 ECTS</td>
<td>autumn</td>
</tr>
<tr>
<td>ELEC-E7330</td>
<td>Laboratory Course in Internet Technologies</td>
<td>5 ECTS</td>
<td>autumn</td>
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<tr>
<td>ELEC-E7210</td>
<td>Communication Theory</td>
<td>5 ECTS</td>
<td>autumn</td>
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<tr>
<td>ELEC-A79010</td>
<td>Internet Forum</td>
<td>5 ECTS</td>
<td>autumn</td>
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<tr>
<td>ELEC-E7280</td>
<td>Machine Learning for Mobile and Pervasive Systems</td>
<td>5 ECTS</td>
<td>spring</td>
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<tr>
<td>ELEC-E7230</td>
<td>Mobile Communication Systems</td>
<td>5 ECTS</td>
<td>autumn</td>
</tr>
<tr>
<td>ELEC-E7460</td>
<td>Modelling and Simulation</td>
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<td>autumn</td>
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<td>5 ECTS</td>
<td>spring</td>
</tr>
<tr>
<td>ELEC-E7810</td>
<td>Patterns in Communications Ecosystems</td>
<td>5 ECTS</td>
<td>autumn</td>
</tr>
<tr>
<td>ELEC-E7450</td>
<td>Performance Analysis</td>
<td>5 ECTS</td>
<td>spring</td>
</tr>
</tbody>
</table>

*) New course starting in 2020-2021

Total: 30 ECTS

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<thead>
<tr>
<th>Code</th>
<th>Course name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM.thes</td>
<td>Master's Thesis</td>
<td>30 ECTS</td>
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</table>

Total for the whole year: 60 ECTS