

# Aalto University School of Electrical Engineering

## List of course substitutes

\* If you can't find an old AS- /S- course in the list, it doesn't have a substitute in the new degree. You can use the course in the elective studies

|      | Newest course  | Previous course  | Previous course                           | Previous course   | Previous course                          | Previous course  | Previous course | Previous course |
|------|--|--|---|---|--|--|-----------------|-----------------|
| code | ELEC-A0110 Johdatus opiskeluun Sähkötekniikan kandidaattiohjelmassa 1 op | Kysy korvaavuudesta Sähkötekniikan kandidaattiohjelman koordinaattorilta tai suunnittelijalta                    |   |   |  |  |                 |                 |
| code | ELEC-A0120 Opintojen suunnittelu 1 op                                    | Kysy korvaavuudesta Sähkötekniikan kandidaattiohjelman koordinaattorilta tai suunnittelijalta                    |   |   |  |  |                 |                 |
| Code | ELEC-A4010 Sähköpaja 8 op  | Katso laboratorioskurssien korvaaminen Opiskelijan oppaasta  |   |   |  |  |                 |                 |
| Code | ELEC-A4130 Sähkö ja magnetismi 5 op                                      | S-104.1021 Fysiikka IIa 3 op ja S-104.1022 Fysiikka IIb 3 op   | S-104.1020 Fysiikka II 6 op               | S-104.102 Fysiikka II 4,5 ov (Est) tai S-104.202 Fysiikka II 4,5 ov (Tlt) | S-104.323 Fysiikka II (S) 4,5ov          | 0.03.23 Fysiikan peruskurssi; sähkö-, valo- ja aaltoliikeoppi 5 ov |                 |                 |
| Code | ELEC-A4910 Sähköpaja (sivuaineopiskelijoille) 5 op                       | Katso laboratorioskurssien korvaaminen Opiskelijan oppaasta  |   |   |  |  |                 |                 |
| Code | ELEC-A4930 Astronomical View of the World 3 cr                           | S-92.3299 Astronomical View of the World   |   |   |  |  |                 |                 |
| Code | ELEC-A5140 Matematiikkaohjelmistot 2 op                                  | AS-74.1106 Johdatus Matlab-ohjelmiston käyttöön 1 1 op ja AS-74.1107 Johdatus Matlab-ohjelmiston käyttöön 2 1 op |   |   |  |  |                 |                 |
| Code | ELEC-A5240 Computer Lab in Digital Signal Processing Basics 5 cr         | ELEC-A5140 Matematiikkaohjelmistot 2 op ja ELEC-C5230 Digitaalisen signaalikäsittelyn perusteet 5 op             |   |   |  |  |                 |                 |
| Code | ELEC-A7100 C-ohjelmoinnin peruskurssi 5 op                               | ELEC-A1100 C-ohjelmoinnin peruskurssi 5 op   | AS-0.1103 C-ohjelmoinnin peruskurssi 6 op | AS-0.1101 C-ohjelmoinnin peruskurssi (todo)                               | AS-0.101 C/C++ -ohjelmoinnin peruskurssi |  |                 |                 |

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|------|--|--|--|--|--|--|---|-----------------|
| Code | ELEC-A7151 Object oriented programming with C++ 5 cr       | ELEC-A7150 C++ Programming 5 cr  | AS-0.3302 C++ Programming 5 cr                             | AS-0.3301 C++ -ohjelmointi 4 op        | AS-0.1102 C/C++ -ohjelmointi 4 op  |  |   |                 |
| Code | ELEC-A7200 Signaalit ja järjestelmät 5 op                  | S-72.1110 Signaalit ja järjestelmät 5 op   | S-72.060 Signaalit ja järjestelmät 3ov                     | S-72.116 Signaalit ja järjestelmät 2ov | Ele-95.115 Tietoliikennetekniikan perusteet A 2 ov and Tkl- 38.112 Tietoliikennetekniikan perusteet B 1,5 ov | Ele-72.114 Tietoliikennetekniikan perusteet 3 ov |   |                 |
|      |  | AS-84.2161 Automaation signaalinkäsittelymenetelmät ja AS-74.2111 Analoginen säätö/ELEC-C1230 Säätötekniikka |  |  |  |  |   |                 |
| Code | ELEC-A8001 Johdatus sähköenergiajärjestelmiin 3 op         | ELEC-A6001 Johdatus sähköenergiajärjestelmiin  |  |  |  |  |   |                 |
| Code | ELEC-A8720 Biologisten ilmiöiden mittaaminen 8 op          | ELEC-A8510 Biologisten ilmiöiden mittaaminen   | ELEC-A2200 Ihmisen mittaaminen                             |  |  |  |   |                 |
| Code | ELEC-A9110 Klassinen fysiikka 5 op                         | ELEC-A3110 Mekaniikka 5 op   | S-104.1011 Fysiikka Ia 3 op ja S-104.1012 Fysiikka Ib 3 op | S-104.1010 Fysiikka I 6 op             | S-104.101 Fysiikka I 4,5 ov (Est) tai S-104.201 Fysiikka I 4,5 ov (Tlt)                                      | S-104.322 Fysiikka 1 (S) 4,5 ov                  | 0.03.22 Fysiikan peruskurssi; mekaniikka 4 ov |                 |
| Code | ELEC-C1110 Automaatio- ja systeemitekniikan perusteet 5 op | AS-84.1132 Automaatio- ja säätötekniikka 5 op  | AS-84.132 Automaatio- ja säätötekniikka                    |  |  |  |   |                 |
|      |  | AS-84.1128 Automaatio- ja säätötekniikan perusteet 3 op  |  |  |  |  |   |                 |
| Code | ELEC-C8202 Automaatiojärjestelmät 1 5 op                   | ELEC-C1210 Automaatio 1 5 op   | AS-0.1501 Automaatio 1 5 op                                | AS-116.1100, AS-84.1168 ja             |  |  |   |                 |

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|------|---|---|---|--|---|---|--|-----------------|
| Code | ELEC-C8203<br>Automaatiojärjestelmät 2 5 op   | ELEC-A1220 Automaatio 2 5 op                                      | AS-0.1502 Automaatio 2 5 op                                 | T-75.1110  |   |   |  |                 |
| Code | ELEC-C1230 Sääätötekniikka 5 op   | AS-74.2111 Analoginen säätö 3 op                                  | AS-74.111 Analoginen säätö                                  |  |   |   |  |                 |
| Code | ELEC-C1310 Automaatio- ja systeemitekniikan laboratoriotyöt 5 op                              | AS-0.2230 Automaatio- ja systeemitekniikan laboratoriotyöt 2-6 op | AS-74.2230 Automaatio- ja systeemitekniikan laboratoriotyöt | AS-74.230 Automaatio- ja systeemitekniikan laboratoriotyöt |   |   |  |                 |
| Code | ELEC-C1320 Robottiikka 5 op   | AS-84.1137 Robottiikka 3 op                                       | AS-84.137 Robottiikka                                       |  |   |   |  |                 |
| Code | ELEC-C3210 Materiaalien ominaisuudet 5 op   | S-129.1032 Molekyylien ja kiinteän aineen fysiikka 3 op           | S-114.1327 Fysiikka III 6 op (toinen osa)                   |  |   |   |  |                 |
| Code | ELEC-C9220 Moderni fysiikka 5 op  | ELEC-C3220 Kvantti-ilmiöt 5 op                                    | S-129.1031 Kvanttifysiikka 3 op                             | S-114.1327 Fysiikka III 6 op (ensimmäinen osa)             | S-114.325 Fysiikka III 2 ov (S) ja S-114.326 Fysiikka IV 3 ov (S) | S-104.325 Fysiikka III (S) ja S-104.326 Fysiikka IV (S) | 0.03.40 Kvantti- ja ydinfysiikan peruskurssi 6 ov (korvaa Fys. 1 ja 2) |                 |
| Code | ELEC-C3230 Elektroniikka 1 5 op   | S-87.1010 Elektroniikka I 5 op                                    | S-87.010 Elektroniikka I 4 ov                               |  |   |   |  |                 |
|      |   | S-87.2113 Elektroniikan perusteet 3 op (Ei EST)                   | S-87.113 Elektroniikan perusteet 2 ov                       | S-87.112 Elektroniikka I                                   |   |   |  |                 |
| Code | ELEC-C3240 Elektroniikka 2 5 op   | S-87.2020 Elektroniikka II 5 op                                   | S-87.020 Elektroniikka II 4 ov                              | S-87-114 Elektroniikka II                                  |   |   |  |                 |
| Code | Kysy korvaavuudesta Sähkötekniikan kandidaattiohjelman koordinaattorilta tai suunnittelijalta | ELEC-C4120 Piirianalyysi II 5 op                                  | S-55.1220 Piirianalyysi 2 5 op                              | S-55.142 Piirianalyysi 2 3 ov                              | Ele-55.142 Piirianalyysi II 3 ov                                  | Ele-55.121 Piirianalyysi 2 o                            |  |                 |
|      |   | S-96.1101 Sovellettu kentäteoria 5 op                             | S-96.101 Sovellettu kentäteoria 3 ov                        |  |   |   |  |                 |

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|------|--|--|---|--|--|---|--|-----------------|
| Code | ELEC-C4140 Kenttäteoria 5 op                     | S-96.1111 Staattinen kenttäteoria 5 op   | S-96.111 Staattinen kenttäteoria 3 ov   | S-96.110 Static Field Theory 2,5 ov                        | Ele-55.113 Sähkö- ja magneettikentät 3 ov  | 1.55.11 Teoreettinen sähkötekniikka I 5,5 ov        |  |                 |
|      |  | S-96.1121 Dynaaminen kenttäteoria 5 op   | S-96.121 Dynaaminen kenttäteoria 3 ov   | S-96.120 Dynaaminen kenttäteoria 2,5 ov                    | Ele-55.126 Kenttäteoria ja radiotekniikan perusteet 3 ov   |   |  |                 |
| Code | ELEC-C5213 Signaalien tilastollinen mallinnus    | ELEC-C5212 Johdatus signaalien tilastolliseen mallintamiseen 5 op                    | ELEC-C5211 Johdatus signaalien tilastolliseen mallintamiseen ja päättelyyn 5 op | ELEC-C5210 Satunnaisprosessit tietoliikenteessä 5 op       | S-88.2146 Tietoliikenteen satunnaisprosessit 6 op  | S-88.2145 Satunnaisprosessit tietoliikenteessä 4 op | S-88.145 Satunnaisprosessit tietoliikenteessä 2 ov |                 |
| Code | ELEC-C5231 Introduction to Signal Processing     | ELEC-C5230 Digitaalisen signaalinkäsittelyn perusteet 5 op                           | T-61.3015 Digitaalinen signaalinkäsittely ja suodatus 5 op                      | T-61.3010 Digitaalinen signaalinkäsittely ja suodatus 6 op |  |   |  |                 |
| Code | ELEC-C5341 Äänen- ja puheenkäsittely             | ELEC-C5340 Sovellettu digitaalinen signaalinkäsittely 5 op                           | S-89.3510 Signaaliprosessorit ja äänenkäsittely 5 op                            | S-89.510 Signaaliprosessorit ja äänenkäsittely 3 ov        | S-89.122 Signaaliprosessorit ja äänenkäsittely 3 ov  |   |  |                 |
| Code | ELEC-C7110 Informaatioteknologian perusteet 5 op | S-38.1105 Tietoliikennetekniikan perusteet 2 op tai T-110.250 Verkkomedian perusteet | S-38.105 Tietoliikennetekniikan perusteet                                       | S-38.112 Tietoliikennetekniikan perusteet B                | S-38.112 Tietoliikennetekniikan perusteet B 1,5 ov ja S-95.115 Tietoliikennetekniikan perusteet A 2 ov | Ele-72.114 Tietoliikennetekniikan perusteet 3 ov    |  |                 |
| Code | ELEC-C7250 Tietoliikenteen stokastiset ilmiöt    | ELEC-C7210 Tietoverkkojen mallinnus ja analyysi 5 op                                 | S-38.1146 Introduction to Performance Analysis 5 op                             | S-38.1145 Liikenneteorian perusteet 3 op                   | S-38.145 Liikenneteorian perusteet   |   |  |                 |
|      |  | ELEC-C7220 Informaatioteoria 5 op  | S-72.2410 Information Theory P 5 op   | S-72.340 Information Theory P 3 ov                         |  |   |  |                 |

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|------|------------------------------------|--|--|--|--|--|---|-----------------------------------|--------------------------------------|
| Code | ELEC-C7231 Tiedonsiirron perusteet | ELEC-C7230 Tietoliikenteen siirtomenetelmät 5 op               | S-72.1140 Transmission Methods in Telecommunication Systems 5 op | S-72.245 Transmission Methods in Telecommunication Systems 4 ov    | S-72.420 Tiedonsiirtojärjestelmien suunnittelumetodikka 3 ov + S-72.244 Modulation and Coding Methods 2 cr | S-72.322 Televiestintäjärjestelmät 3 ov                                    | S-72.220 Televiestintäjärjestelmät 4 ov, completion of course S-72.350 Tiedonsiirto- ja yhteyskäytännöt 1 ov not required |                                   |                                      |
| Code | ELEC-C7241 Tietokoneverkot 5 op    | ELEC-C7240 Internet-teknikat                                   | S-38.2188 Tietoliikenneverkot 5 op (spring 2015)                 | S-38.188 Tietoliikenneverkot 3 ov or T-110.350 Tietokoneverkot     | S-38.175 Lähiverkot 2 ov   | S-38.181 Paikallisverkot 2 ov  |   |                                   |                                      |
|      |                                    |  |  |  | Tkl-38.184 Tietokoneverkot 2 ov  | S-38.189 Tietoliikenneverkot 2 ov and S-38.191 Televerkot yrityksissä 2 ov |   |                                   |                                      |
|      |                                    |  | S-72.1130 Telecommunication Systems 5 op                         | S-72.423 Telecommunication Systems/ Tietoliikennejärjestelmät 3 ov | S-72.422 Televiestintäjärjestelmät 3 ov  | S-38.108 Tietoliikenneverkkojen arkkitehtuuri                              | S-38.118 Teletekniiikan perusteet   | S-38.118 Teletekniiikan perusteet | S-38.115 Toimistotekniikan perusteet |
|      |                                    |  |  |  | S-38.108 Tietoliikenneverkkojen arkkitehtuurit 3 ov  |  |   |                                   |                                      |
|      |                                    |  | CSE-C2400 Tietokoneverkot  |  |  |  |   |                                   |                                      |
| Code | ELEC-E7261 Ambient Intelligence    | ELEC-E7260 Machine Learning for Mobile and Pervasive Systems D |  |  |  |  |   |                                   |                                      |

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|------|--|--|--|--|--------------------------------------|---------------------------------------|-------------------------------------|---------------------------------------|
| Code | ELEC-C7310 Sovellusohjelmointi 5 op                        | S-38.3600 UNIX sovellusohjelmointi 5 op                            | S-38.1600 UNIX sovellusohjelmointi 5 op                                |  |                                      |                                       |                                     |                                       |
| Code | ELEC-C7320 Ohjelmistoradio 5 op                            | S-72.2311 Laboratory Course in Communications Engineering 1 2-5 cr | S-72.2310 Laboratory Course in Wired Communications 2-5 op             | S-72.141 Tiedonsiirtotekniikan laboratoriotyöt 2 ov  |                                      |                                       |                                     |                                       |
| Code | ELEC-C8002 Sähköenergiajärjestelmät 5 op                   | ELEC-C8001 Sähköenergiatekniikka 5 op                              | ELEC-C6001 Sähköenergiatekniikka 5 op                                  | S-17.1010 Sähkövoimatekniikka 4 op                   | S-17.142 Sähkövoimatekniikka 2 ov    | S-17.141 Sähkövoimatekniikka 3 ov     | Svt-17.141 Sähkövoimatekniikka 3 ov | Svt-17.140 Sähkövoimatekniikka 2,5 ov |
| Code | ELEC-C8701 Elektroniikkapaja 5 op                          | ELEC-C5070 Elektroniikkapaja 5 op                                  | Katso laboratorioskurssien korvaaminen INTOsta                         |  |                                      |                                       |                                     |                                       |
| Code | ELEC-C8722 Molekyyli- ja solubiologia 5 op                 | ELEC-C2210 Molekyyli- ja solubiologia 5 op                         | S-113.1210 Biotieteiden perusteet insinööreille 6 op                   | S-0.1104 Solubiologian perusteet 6 op                | S-0.104 Solubiologian perusteet 4 ov |                                       |                                     |                                       |
| Code | ELEC-C8730 Insinööri työelämässä 5 op                      | ELEC-C5270 Insinööri työelämässä V 5 op                            |  |  |                                      |                                       |                                     |                                       |
| Code | ELEC-C9110 Piirianalyysi 5 op                              | ELEC-C4110 Piirianalyysi I 5 op                                    | S-55.1210 Piirianalyysi 1 5 op   | S-55.141 Piirianalyysi 1 3 ov                        | Ele-55.141 Piirianalyysi 1 3 ov      | Ele-55.112 Virtapiirit ja verkot 3 ov |                                     |                                       |
| Code | ELEC-C9620 Basics of Electronic Circuits 5 op              | ELEC-C4210 Sähkötekniikka ja elektroniikka 5 op                    | S-55.1100 Sähkötekniikka ja elektroniikka 4 op (ei Est-opiskelijoille) | S-55.103 Sähkötekniikka 2,5 ov (Ei S-opiskelijoille) |                                      |                                       |                                     |                                       |
|      |  |  | S-66.2120 Elektroniikan peruskurssi 5 op (spring 2015)                 |  |                                      |                                       |                                     |                                       |
|      |  |  | ELEC-C9600 Electronic circuits 5 cr                                    |  |                                      |                                       |                                     |                                       |
| Code | ELEC-C9801 Desing Thinking and Electronic Prototyping 5 cr | ELEC-C9800 Desing in engineerig 5 cr                               |  |  |                                      |                                       |                                     |                                       |
| Code | ELEC-D7011 Human Factors Engineering                       | ELEC-D7010 Engineering for Humans                                  |  |  |                                      |                                       |                                     |                                       |

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|------|---|--|---|---|--|-----------------------------------|--|---|
| Code | ELEC-D7902 Telecom Forum 2cr                        | ELEC-A7901 Internet Forum P V 3 cr   | ELEC-A7900 Telecommunications Forum                     | S-38.3001 Telecommunications Forum L V 1-5 op                     | S-38.001 Telecommunications Forum L V 1-4 ov   | S-38.102 Sähköinen viestintä 2 ov | S-38.101 Sähköisen viestinnän ja tutkimustyön perusteet 1 ov | S-38.101 Sähköisen viestinnän ja tutkimustyön perusteet 1 ov ja Vie-98.100 Viestinnän perusopintojakso 1 ov |
| Code | ELEC-D8710 Principles of materials science 5 cr     | ELEC-C2100 Materiaalitieteen perusteet   | S-113.2110 Materiaalitieteen perusteet 5-8 op           | S-113.2100 Elektroniikan materiaali- ja valmistustekniikka 3-8 op | S-113.100 Elektroniikan materiaali- ja valmistustekniikka 2-3 ov (leikkaava kurssi S-113.2105) |                                   |  |   |
| Code | ELEC-D9130 Electromagnetic Fields 5 cr              | ELEC-C9430 Electromagnetism 5 cr<br>(ELEC-C9430 doesn't substitute ELEC-D9130 in the master's programme) |   |   |  |                                   |  |   |
|      |   | ELEC-E4130 Electromagnetic fields 5 cr   |   |   |  |                                   |  |   |
| Code | ELEC-D9420 Basics of RF technology 5cr              | ELEC-E4420 Microwave engineering I 5 cr  | S-26.2110 Fundamentals of Radio Engineering             | S-26.2100 Radiotekniikan perusteet 5 op                           | S-26.101 Radiotekniikan perusteet 3 ov   | S-26.100 Radiotekniikka 3 ov      |  |   |
| Code | ELEC-E0110 Academic Skills in Master's Studies 3 cr | ELEC-E4111 Introduction to NanoRad Master's Programme 3 cr   | ELEC-E4110 Introduction to nano and radio sciences 5 cr |   |  |                                   |  |   |
|      |   | ELEC-E0100 Introduction to Master's Studies at Aalto ELEC 0 cr   | S-0.1600 Introduction to Studies at Aalto ELEC          |   |  |                                   |  |   |
| Code | ELEC-E0210 Master's Thesis Process 2 cr             | ELEC-E0200 Master's Thesis Process 0 cr  |   |   |  |                                   |  |   |
| Code | ELEC-E3210 Optoelectronics 5 cr                     | S-104.3310 Optoelectronics   | S-104.371 Optoelektronikka 3 ov                         |   |  |                                   |  |   |

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|------|--|--|---|--|-----------------|-----------------|-----------------|-----------------|
| Code | ELEC-E3220 Semiconductor Devices 5 cr                      | S-69.2111 Mikro- ja nanoelektronian perusteet 5 op           | S-69.2101 Puolijohdeteknologian perusteet 5 op          | S-66.101 Puolijohdeteknologian perusteet 3 ov              |                 |                 |                 |                 |
|      |  | S-69.3114 Microsensors 5 cr                                  | S-69.3104 Elektroniset anturit 5 op                     | S-69.155 Elektroniset anturit 2 ov                         |                 |                 |                 |                 |
| Code | ELEC-E3230 Nanotechnology 5 cr                             | S-104.3610 Nanotechnology 5cr                                | S-104.380 Nanotekniikka 3 ov                            |  |                 |                 |                 |                 |
| Code | ELEC-E3240 Photonics 5 cr                                  | S-104.3410 Photonics and Integrated Optics                   | S-104.374 Fotoniikka ja integroitu optiikka 3 ov        |  |                 |                 |                 |                 |
| Code | ELEC-E3250 Optical Fibers: Physics and Applications L 5 cr | S-129.4006 Optical fibers: physics and applications L V 5 cr | S-129.3310 Physics of Optical Communications L 5 op     | S-114.402 Physics of Optical Communications Network P 3 ov |                 |                 |                 |                 |
| Code | ELEC-E3261 Characterization of Biomolecules D 5 op         | ELEC-E3260 Biomolecules                                      |   |  |                 |                 |                 |                 |
| Code | ELEC-E3280 Micronova Laboratory Course 5 cr                | S-69.3116 Puolijohdeteknologian laboratoriotyöt              | S-69.3106 Puolijohdeteknologian laboratoriotyöt II 5 op | S-69.126 Puolijohdeteknologian laboratoriotyöt II 5 ov     |                 |                 |                 |                 |
|      |  |  | S-69.3107 Puolijohdeteknologian laboratoriotyöt I 1 op  | S-69.140 Puolijohdeteknologian laboratoriotyöt I 1 ov      |                 |                 |                 |                 |
|      |  | S-104.3920 Nanotechnology Laboratory Course 5 cr             | S-104.3910 Mikro- ja nanotekniikan laboratoriotyöt 4 op |  |                 |                 |                 |                 |
| Code | ELEC-E3290 Micronova Special Assignment 5 cr               | S-69.3105 Puolijohdeteknologian erikoistyö 5 op              | S-69.127 Puolijohdeteknologian erikoistyö 3 ov          | S-69.129 Puolijohdeteknologian erikoistyö 3 ov             |                 |                 |                 |                 |
|      |  | S-104.3880 Optoelektronian ja nanotekniikan erikoistyö 8 op  | S-104.398 Optoelektronian erikoistyö 5 ov               |  |                 |                 |                 |                 |
| Code | ELEC-E3290 Micronova Special Assignment 5 cr               | S-129.3120 Sähköfysiikan erikoistyö V (2-10 op)              |   |  |                 |                 |                 |                 |



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|------|---|---|--|--|--|-----------------|-----------------|-----------------|
| Code | ELEC-E3510 Basics of IC Design 5 cr                             | S-87.3141 Analog Integrated Circuits 3 cr           | S-87.141 Integroitujen analogiapiirien suunnittelu 2 ov          |  |  |                 |                 |                 |
|      |   | S-87.3137 Integrated circuit Design 3 cr            | S-87.137 Integroitujen piirien suunnittelun perusteet 2 ov       |  |  |                 |                 |                 |
| Code | ELEC-E3520 Digital Microelectronics I L 5 cr                    | S-87.3182 Digital Microelectronics I L 5 cr         | S-87.182 Digitaalisten VLSI-piirien sähköinen suunnittelu L 3 ov | S-87.181 Digitaalisten VLSI-piirien sähköinen suunnittelu 2 ov | S-87.180 Digitaalisten VLSI-piirien suunnittelun perusteet |                 |                 |                 |
| Code | ELEC-E3530 Integrated Analog Systems L 5 cr                     | S-87.3145 Analog Integrated Systems P 5 cr          | S-87.145 Analogiasysteemien integrointi 3 ov                     |  |  |                 |                 |                 |
| Code | ELEC-E3550 Integrated RF-circuit L 5 cr                         | S-87.3156 Integrated RF-circuit P 5 cr              | S-87.156 RF-piirien integrointi L 3 ov                           |  |  |                 |                 |                 |
| Code | ELEC-E3560 IC Design Project 5 cr                               | S-87.3163 Piiriteknikan erikoistyö 5-8 op           | S-87.163 Piiriteknikan erikoistyö 3-6 ov                         |  |  |                 |                 |                 |
| Code | ELEC-E3570 Special Course in Electronic Circuit Design L V 5 cr | S-87.3200 Piiriteknikan erikoiskurssi LV 1-8 op     | S-87.200 Piiriteknikan erikoiskurssi V 1-5 op                    |  |  |                 |                 |                 |
| Code | ELEC-E4230 Microwave Earth observation instrumentation L 5 cr   | S-92.3132 Remote Sensing                            |  |  |  |                 |                 |                 |
| Code | ELEC-E4240 Satellite systems L 5 cr                             | S-92.3114 Spaceflight instrumentation               |  |  |  |                 |                 |                 |
| Code | ELEC-E4440 Microwave engineering workshop L 5 cr                | S-26.3120 Radio Engineering, laboratory course 7 cr | S-26.191 Radiotekniikan laboratoriotyöt 4 ov                     |  |  |                 |                 |                 |
| Code | ELEC-E4530 Radio astronomy L 5 cr                               | S-92.3146 Radio Astronomy                           | S-92.3145 Radioastronomia 3 op                                   | S-92.145 Radioastronomia 2 ov                                  |  |                 |                 |                 |
| Code | ELEC-E4740 Antennas workshop L 5 cr                             | S-26.3150 Antennas Practice P 5 cr                  | S-26.3401 Tietoliikenteen antennitekniikka L 4 op                | S-26.135 Tietoliikenteen antennitekniikka L 2 ov               |  |                 |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course  | Previous course   | Previous course  | Previous course                                     | Previous course                                   | Previous course | Previous course | Previous course |
|------|--|---|--|---|---|-----------------|-----------------|-----------------|
| Code | ELEC-E4920 Special assignment in radio science and engineering V 5-10 cr | S-26.3000 Radiotekniikan erikoistyö L V 3-8 op                    | S-26.161 Radiotekniikan erikoistyö 2-5 ov  | S-26.160 Radiotekniikan erikoistyö 2-4 ov           |   |                 |                 |                 |
|      |  | S-55.3320 Piiriteoria erikoistyö L V 3-5 op                       | S-55.169 Piiriteorian erikoistyö L V 2-3 ov  |   |   |                 |                 |                 |
|      |  | S-96.3191 Sähkömagneetiikan erikoistyö 3-5 op                     | S-96.191 Sähkömagneetiikan erikoistyö 2-3 ov   |   |   |                 |                 |                 |
| Code | ELEC-E4930 Space technology project V 5-10 cr                            | S-92.3200 Student Satellite Project 3-6 cr                        |  |   |   |                 |                 |                 |
| Code | ELEC-E4940 Special assignment in space science and technology V 5-10 cr  | S-92.3192 Avaruustekniikan erikoistyö 5 op                        | S-92.192 Avaruustekniikan erikoistyö 3 ov  |   |   |                 |                 |                 |
| Code | ELEC-E5400 Signaalinkäsittelyn erikoistyö L V 1-10 op                    | S-88.3155 Signaalinkäsittelyn erikoistyö V 5-10 op                | S-88.155 Signaalinkäsittelyn erikoistyö 3-5 ov   | S-88.128 Tietotekniikan erikoistyö 3-5 ov           |   |                 |                 |                 |
| Code | ELEC-E5410 Signal Processing for Communications 5 cr                     | S-88.3104 Digital Signal Processing Systems 6 cr                  | S-88.3105 Digital Signal Processing Systems 5 op, S-88.3106 Digitaaliset signaalinkäsittelyjärjestelmät 5 op | S-88.105 Digital Signal Processing Systems 3 ov     | S-88.115 Digital signal processing systems 2,5 ov |                 |                 |                 |
| Code | ELEC-E5424 Convex Optimization D   | ELEC-E5422 Convex Optimization I P 5 cr                           | ELEC-E5421 Convex Optimization for Engineers P 10 cr   | ELEC-E5420 Convex Optimization for Engineers L 5 cr | S-88.4400 Convex Optimization for Engineers L     |                 |                 |                 |
| Code | Discontinued, contact Sergiy Vorobyov                                    | ELEC-E5423 Convex Optimization II P 5 op                          |  |   |   |                 |                 |                 |
| Code | ELEC-E5431 Large Scale Data Analysis P 5 cr                              | ELEC-E5430 Signal Processing for Large Scale Data Analysis P 5 cr |  |   |   |                 |                 |                 |
| Code | ELEC-E5440 Statistical Signal Processing L 5 cr                          | S-88.4200 Statistical Signal Processing P 5 cr                    | S-88.200 Statistical Signal Processing P 3 ov  |   |   |                 |                 |                 |

# Aalto University School of Electrical Engineering

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|      | Newest course   | Previous course  | Previous course  | Previous course                                    | Previous course                                   | Previous course                                   | Previous course | Previous course |
|------|---|--|--|--|---|---|-----------------|-----------------|
| Code | ELEC-E5500 Puheen käsittely 5 op                          | S-89.3610 Puheen käsittely 5 op                            | S-89.610 Puheen käsittely 3 ov                         | S-89.127 Puheen käsittely 3 ov                     | S-89.123 Puheen käsittelyn perusteet 2 ov         |   |                 |                 |
| Code | ELEC-E5510 Speech Recognition L 5 cr                      | S-89.5150 Speech Recognition                               |  |  |   |   |                 |                 |
| Code | ELEC-E5522 Speech Processing Project D                    | ELEC-E5521 Speech and Language Processing Methods P 5 cr   | ELEC-E5520 Puheen- ja kielen käsittelyn metodit L 2 op | S-89.3640 Puheen käsittelytekniikan metodit L 3 op | S-89.640 Puheen käsittelytekniikan metodit L 2 ov | S-89.129 Puheen käsittelytekniikan metodit L 2 ov |                 |                 |
| Code | ELEC-E5550 Statistical Natural Language Processing L 5 cr | T-61.5020 Statistical Natural Language Processing P        |  |  |   |   |                 |                 |
| Code | ELEC-E5600 Communication Acoustics 5 cr                   | S-89.3320 Kommunikaatioakustiikka 5 op                     | S-89.320 Kommunikaatioakustiikka 3 ov                  | S-89.121 Kommunikaatioakustiikka 3 ov              |   |   |                 |                 |
| Code | ELEC-E5610 Acoustics and the Physics of Sound 5 cr        | S-89.3310 Akustiikka ja äänen fysiikka 4 op                | S-89.310 Akustiikka ja äänen fysiikka 2 ov             | S-89.102 Akustiikan perusteet II 2ov               |   |   |                 |                 |
| Code | ELEC-E5620 Audio Signal Processing L 5 cr                 | S-89.3540 Audio Signal Processing P 5 op                   | S-89.540 Audio Signal Processing P 3 op                | S-89.128 Audio Signal Processing P 3 ov            |   |   |                 |                 |
| Code | ELEC-E5631 Acoustics Seminar V D                          | ELEC-E5630 Acoustics and Audio Technology Seminar L V 5 cr | S-89.3480 Akustiikan seminaari V 3 op                  | S-89.480 Akustiikan seminaari V 2 ov               | S-89.144 Akustiikan seminaari V 2 ov              | S-89.124 Puheen käsittelyn jatkokurssi L          |                 |                 |
|      |   |  | S-89.3580 Äänen käsittelyn seminaari V 3 op            | S-89.580 Äänen käsittelyn seminaari V 2 ov         | S-89.154 Äänen käsittelyn seminaari V 2 ov        | S-89.124 Puheen käsittelyn jatkokurssi L          |                 |                 |
|      |   |  | S-89.4810 Akustiikan jatko-opintokurssi L V 8 op       | S-89.810 Akustiikan jatko-opintokurssi LV 6 ov     | S-89.145 Akustiikan lisensiaattikurssi LV 6 ov    |   |                 |                 |
| Code | ELEC-E5632 Audio Technology                               |  |  |  |   |   |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course   | Previous course  | Previous course   | Previous course  | Previous course   | Previous course   | Previous course   | Previous course |
|------|---|--|---|--|---|---|---|-----------------|
|      | Seminar V D   |  | S-89.4820 Äänenkäsittelyn jatko-opintokurssi L V 8 op             | S-89.820 Äänenkäsittelyn jatko-opintokurssi LV 6 ov                              | S-89.155 Äänenkäsittelyn lisensiaattikurssi LV 6 ov                 |   |   |                 |
| Code | ELEC-E5640 Meluntorjunta L 5 op   | S-89.3471 Meluntorjunta 5 op                                   | S-88.3470 Meluntorjunta 3 op                                      |  |   |   |   |                 |
| Code | ELEC-E5650 Electroacoustics L 5 cr  | S-89.3410 Sähköakustiikka 4 op                                 | S-89.410 Sähköakustiikka 2 ov                                     | S-89.104 Sähköakustiikka   |   |   |   |                 |
| Code | ELEC-E5660 Special Assignment in Acoustics and Audio Technology L V 1-10 cr | S-89.3490 Akustiikan ja äänenkäsittelyn erikoistyö L V 1-10 op | S-89.490 Akustiikan ja äänenkäsittelyn erikoistyö L 2-6 ov        | S-89.111 Akustiikan ja äänenkäsittelyn erikoistyö LV 2-6 ov                      | S-89.112 Akustiikan ja äänenkäsittelyn työt 2-4 ov                  |   |   |                 |
| Code | ELEC-E7120 Wireless Systems 5 cr  | S-72.3216 Radio Communication Systems I 5 cr                   | S-72.3220 Radio Communication Systems 3 op                        | S-72.135 Fixed Radio Networks 2 ov AND S-72.232 Radio Communication Systems 2 ov |   |   |   |                 |
|      |   |  | S-72.3210 Channel Modeling for Radio Communication Systems V 3 op |  |   |   |   |                 |
|      |   |  | S-38.3194 Langattomat verkot                                      | S-38.3193 Langattomat verkot   | S-38.193 Langattomat verkot 2 ov                                    |   |   |                 |
| Code | ELEC-E7131 Internet Traffic Measurements and Analysis 10 cr                 | ELEC-E7130 Internet Traffic Measurements and Analysis 5 cr     | S-38.3184 Network Traffic Measurements and Analysis L 5 cr        | S-38.3184 Internetliikenteen mittaus ja mittausten analysointi 4 op              | S-38.3183 Internetliikenteen mittaus ja mittausten analysointi 4 op |   |   |                 |
| Code | ELEC-E7211 Digital Wireless Communication D 5 cr                            | ELEC-E7210 Communication Theory 5 cr                           | S-72.3281 Advanced Transmission Methods L 4 cr                    | S-72.3281 Advanced Radio Transmission Methods P 4 cr                             | S-72.3280 Advanced Radio Transmission Methods P 4 op                | S-72.630 Capacity Enhancement Method for Radio Interface P 2 ov | S-72.700 Spread Spectrum and Orthogonal Multiplexed Systems |                 |
|      |   |  |   |  | S-72.3320 Advanced Digital Communication 4 op                       | S-72.227 Digital Communication Systems 3 ov                     |   |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course  | Previous course  | Previous course   | Previous course  | Previous course                                     | Previous course                             | Previous course | Previous course |
|------|--|--|---|--|---|---|-----------------|-----------------|
| Code | ELEC-C7222 Embedded Programming with Communication Devices 5 cr        | ELEC-E7221 Machine Type Communications for Internet of Things      |   |  |   |   |                 |                 |
| Code | ELEC-E7230 Mobile Communication Systems 5 cr                           | S-72.3226 Radio Communication Systems II P 5 cr                    | S-72.3275 Cellular Radio Network Planning and Optimization P 5 cr | S-72.3270 Cellular Radio Network Planning Methods 3 cr | S-72.620 Radio Network Planning Methods 2 ov        |   |                 |                 |
|      |  |  |   | S-72.3290 Cellular Radio Network Optimization P 3 cr   | S-72.640 WCDMA Network Planning in Practice 2 ov    |   |                 |                 |
| Code | ELEC-E7240 Coding Methods L 5 cr                                       | S-72.3410 Coding Methods P 5 cr                                    | S-72.341 Coding Methods P 3 ov                                    |  |   |   |                 |                 |
| Code | ELEC-E7250 Laboratory Course in Communications Engineering 5 cr        | S-72.3251 Laboratory Course in Communications Engineering 2 2-5 cr | S-72.3250 Laboratory Course in Wireless Communications 2-5 op     | S-72.260 Tietoliikennetekniikan laboratoriotyöt 2 ov   |   |   |                 |                 |
| Code | ELEC-E7315 Networking at Scale and Advanced Applications D 5 cr        | ELEC-E7311 SDN Fundamentals & Techniques 5 cr                      | ELEC-E7310 Routing and SDN 5 cr                                   | S-38.2121 Routing in Communication Networks 4 cr       | S-38.121 Reititys tietoliikenneverkossa 2 ov        | S-38.122 Tiedonvälitystekniikka II          |                 |                 |
| Code | ELEC-E7321 Advanced Networking D 5 cr                                  | ELEC-E7320 Internet Protocols 5 cr                                 | S-38.3610 Network Programming 5 cr                                |  |   |   |                 |                 |
| Code | ELEC-E7331 Laboratory Course in Networking and Cloud Technologies 5 cr | ELEC-E7330 Laboratory Course in Internet Technologies 5 cr         | S-38.3133 Networking Technology, laboratory course B 2-5 cr       | S-38.133 Tietoverkkotekniikan laboratoriotyöt 2-4 ov   | S-38.123/124 Teletekniikan laboratoriotyöt I/II     | S-38.125 Teletekniikan laboratoriotyöt 3 ov |                 |                 |
|      |  |  |   | S-38.187 Teletietotekniikan lab. työt Ti 2 ov          | Tkl-38.186 Tietokoneen tiedonsiirron lab. työt 2 ov |   |                 |                 |
| Code | ELEC-E7410 Communication transmission lines 5 cr                       | S-72.3310 Communication Transmission Lines 4cr                     | S-72.430 Tietoliikenteen siirtomediat 2 ov                        |  |   |   |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|------|---|---|--|--|---|-----------------|-----------------|-----------------|
| Code | ELEC-E7470 Cybersecurity L 5 cr                                     | S-38.3153 Security of Communication Protocols 4 cr    | S-38.153 Tietoliikenteen tietoturva 2 ov/<br>corresponding course T-110.4200<br>Tietoturvaluustekniikka 3 op |  |   |                 |                 |                 |
| Code | ELEC-E7825 Communications Ecosystems and Techno-Economics 5 cr      | ELEC-E7810 Patterns in Communications Ecosystems 5 cr | S-38.3061 Communications Ecosystem Analysis L 5 cr   | S-72.2530 Acceptability and Quality of Service P 3 op                |   |                 |                 |                 |
|      |   | ELEC-E7820 Operator Business L 5 cr                   | S-38.3041 Operator Business P 3-5 op   | S-38.041 Tietoverkkoliiketoiminta L 2-3 op                           |   |                 |                 |                 |
| Code | ELEC-E7852 Computational Design and Interaction D                   | ELEC-E7851 Computational User Interface Design 5 cr   | ELEC-E7850 User Interfaces   | S-38.3062 Modelling Human Behaviour 3-5 cr                           |   |                 |                 |                 |
| Code | ELEC-E7861 Research Project in Human-Computer Interaction P 5-10 cr | ELEC-E7860 Research Project in User Interfaces        | S-72.2510 Tietoliikennepalveluiden käyttäjäkeskeinen suunnittelu 5 op  | S-72.1510 Ihminen ja tietoliikennetekniikka 2 op                     | S-72.040 Ihminen ja tietoliikennetekniikka 1 ov |                 |                 |                 |
|      |   |   |  | S-72.501 Tietoliikennepalveluiden käyttäjäkeskeinen suunnittelu 3 op | S-72.500 Sosiaalitekniikka 2 ov                 |                 |                 |                 |
| Code | ELEC-E7871 Advanced Topics in Human-Computer Interaction D          | ELEC-E7870 Advanced Topics in User Interfaces V D     |  |  |   |                 |                 |                 |

# Aalto University School of Electrical Engineering

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|------|---|--|--|---|--|---|--|---|
| Code | ELEC-E7903 Telecom Forum II D 5 cr                            | ELEC-A7901 Internet Forum P V 5 cr                               | ELEC-A7900 Telecommunications Forum                        | S-38.3001 Telecommunications Forum L V 1-5 op             | S-38.001 Telecommunication s Forum L V 1-4 ov        | S-38.102 Sähköinen viestintä 2 ov   | S-38.101 Sähköisen viestinnän ja tutkimustyön perusteet 1 ov | S-38.101 Sähköisen viestinnän ja tutkimustyön perusteet 1 ov ja Vie-98.100 Viestinnän perusopintojakso 1 ov |
| Code | ELEC-E7911 Special Project in Communications Engineering 5 cr | ELEC-E7910 Special Project in Communications Engineering 2-10 cr | S-38.3138 Networking Technology, special assignment 2-6 cr | S-38.138 Tietoverkkotekniikan erikoistyö V 1-4 ov         | S-38.128 Teletekniikan erikoistyö                    | S-38.126 Teletekniikan erikoistyö 1 ov, S-38.127 Teletekniikan erikoistyö II 3 ov |  |   |
|      |   |  | S-38.3138 Networking Technology, special assignment 2-6 cr | S-38.3045 Tietoverkkoliiketoiminnan seminaari 2-6 op      | S-38.045 Tietoverkkoliiketoiminnan erikoistyö 1-4 ov |   |  |   |
| Code | ELEC-E8001 Embedded Real-Time Systems 5 cr                    | S-81.2200 Sulautetut mikroprosessori-järjestelmät 3 op           | S-81.250 Sähkökäyttöjen ohjauselektronikka 2 ov            | S-81.230 Teollisuus-elektronikan signaaliprosessorit 3 ov |  |   |  |   |

List of course substitutes continue on the next page

# Aalto University School of Electrical Engineering

## List of course substitutes

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|------|-------------------------------|--|---|--|---|-----------------|-----------------|-----------------|
| Code | ELEC-E8004 Project work 10 cr | ELEC-E8002 Project work A<br>- Theory 5 cr   | S-66.3300 Special Study in Applied Electronics 4-8 cr     | S-66.300 Sovelletun elektroniikan erikoistyö V 2-5 ov                            |   |                 |                 |                 |
|      |                               |  | S-66.3304 Bioelectronics, special assignment 5-8 cr       | S-66.304 Bioelektronikan erikoistyö 3-5 ov                                       |   |                 |                 |                 |
|      |                               |  | S-66.3201 Product development 5 cr                        | S-66.201 Elektroniikkatuotteen suunnittelu I 3 ov                                |   |                 |                 |                 |
|      |                               |  | S-113.3155 Project Work in Microsystem Reliability 3-6 cr | S-113.155 Project Work in Microsystem Reliability (leikkaava kurssi S-113.3150 ) |   |                 |                 |                 |
|      |                               |  | S-113.3160 Luotettavuustekniikan erikoistyö 3-8 op        | S-113.3261 Bioadaptiivisen tekniikan PBL-kurssi                                  | S-113.3260 Bioadaptiivinen tekniikka 7 op |                 |                 |                 |
|      |                               |  | S-113.3251 Bioadaptiivisen tekniikan erikoistyöt          | S-113.3250 Bioadaptiivisen tekniikan erikoistyö                                  |   |                 |                 |                 |
|      |                               | ELEC-E8003 Project work B<br>- Practice 5 cr | S-66.3300 Special Study in Applied Electronics 4-8 cr     | S-66.300 Sovelletun elektroniikan erikoistyö V 2-5 ov                            |   |                 |                 |                 |
|      |                               |  | S-66.3304 Bioelectronics, special assignment 5-8 cr       | S-66.304 Bioelektronikan erikoistyö 3-5 ov                                       |   |                 |                 |                 |
|      |                               |  | S-66.3201 Product development 5 cr                        | S-66.201 Elektroniikkatuotteen suunnittelu I 3 ov                                |   |                 |                 |                 |



# Aalto University School of Electrical Engineering

## List of course substitutes

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|------|---|--|---|--|---|-----------------|-----------------|-----------------|--|
| Code | ELEC-E8004 Project work 10 cr                                     | ELEC-E8003 Project work B - Practice 5 cr                              | S-113.3155 Project Work in Microsystem Reliability 3-6 cr | S-113.155 Project Work in Microsystem Reliability (leikkaava kurssi S-113.3150 ) |   |                 |                 |                 |  |
|      |   |  | S-113.3160 Luotettavuustekniikan erikoistyö 3-8 op        | S-113.3261 Bioadaptiivisen tekniikan PBL-kurssi                                  | S-113.3260 Bioadaptiivinen tekniikka 7 op |                 |                 |                 |  |
|      |   |  | S-113.3251 Bioadaptiivisen tekniikan erikoistyöt          | S-113.3250 Bioadaptiivisen tekniikan erikoistyö                                  |   |                 |                 |                 |  |
| Code | ELEC-E8107 Stochastic models, estimation and control D            | ELEC-E8104 Stochastic models and estimation 5 cr                       | AS-84.3128 Estimation and Sensor Fusion Methods P 4 cr    | AS-84.3125 Estimointi- ja sensorifuusio-menetelmät L (3 op)                      |   |                 |                 |                 |  |
| Code | ELEC-E8106 Bayesian Filtering and Smoothing 5 cr                  | ELEC-E8105 Non-linear Filtering and Parameter Estimation P 5 cr        |   |  |   |                 |                 |                 |  |
| Code | ELEC-E8111 Autonomous mobile robots L 5 cr                        | AS-84.3144 Field and Service Robotics P 5 cr                           | AS-84.3145 Kenttä- ja palvelurobotiikka 4 op              |  |   |                 |                 |                 |  |
| Code | ELEC-E8113 Information systems in industry 5 cr                   | AS-116.311 Teollisuuden tietojärjestelmät                              | AS-116.3110 Teollisuuden tietojärjestelmät 5 op           | AS-116.3110 Teollisuuden tietojärjestelmät 4 op                                  |   |                 |                 |                 |  |
| Code | ELEC-E8115 Micro- and Nano Robotics L 5 cr                        | AS-74.3178 Micro- and Nanorobotics 4cr                                 |   |  |   |                 |                 |                 |  |
| Code | ELEC-E8125 Reinforcement learning 5 op                            | ELEC-E8119 Robotics: Manipulation, Decision Making and Learning P 5 op |   |  |   |                 |                 |                 |  |
| Code | ELEC-E8402 Control of Electric Drives and Power Converters L 5 cr | S-81.3300 Control of Electric Drives P                                 | S-81.310 Sähkökäyttöjen ohjaus 4 ov                       |  |   |                 |                 |                 |  |
| Code | ELEC-E8403 Converter Techniques 5 cr                              | S-81.3110 Suuntaajatekniikka 5 op                                      | S-81.112 Suuntaajatekniikka 4 ov                          | S-81.111 Suuntaajatekniikka 4 ov   |   |                 |                 |                 |  |
| Code | ELEC-E8404 Design of Electrical Machines 5 cr                     | S-17.3030 Design of Electrical Machines 5 cr                           | S-17.121 Sähkökoneiden suunnittelu 3 ov                   |  |   |                 |                 |                 |  |

# Aalto University School of Electrical Engineering

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|------|--|--|---|---|-----------------|-----------------|-----------------|-----------------|
| Code | ELEC-E8405 Electric Drives 5 cr                            | S-17.2020<br>Sähkömekaniikka ja<br>sähkökäytöt 6 op            | S-81.101 Sähkökäytöt ja<br>tehoelektroniikka 5 ov           |   |                 |                 |                 |                 |
|      |  |  | S-17.102 Sähkömekaniikka<br>ja sähkökäytöt 5 ov             |   |                 |                 |                 |                 |
|      |  | S-17.2030<br>Electromechanics and<br>Electric Drives 6 cr      | S-17.103 Electromechanics<br>and Electric Drives 5 cr       |   |                 |                 |                 |                 |
| Code | ELEC-E8406 Electricity Distribution<br>and Markets 5 cr    | S-18.3154 Electricity<br>Distribution and Markets 6<br>cr      | S-18.154 Electricity<br>Distribution and Markets P<br>4 ov  |   |                 |                 |                 |                 |
|      |  | S-18.3153 Sähkön jakelu ja<br>markkinat 6 op                   | S-18.153 Sähköjakelu ja<br>markkinat L 4 ov                 | S-18.152 Sähköenergian<br>siirtotekniikka 2,5 ov                |                 |                 |                 |                 |
| Code | ELEC-E8407 Electromechanics 5 cr                           | S-17.2020<br>Sähkömekaniikka ja<br>sähkökäytöt 6 op            | S-81.101 Sähkökäytöt ja<br>tehoelektroniikka 5 ov           | S-81.101 Sähkökäytöt ja<br>tehoelektroniikka 5 ov               |                 |                 |                 |                 |
|      |  |  | S-17.102 Sähkömekaniikka<br>ja sähkökäytöt 5 ov             |   |                 |                 |                 |                 |
|      |  | S-17.2030<br>Electromechanics and<br>Electric Drives 6 cr      | S-17.103 Electromechanics<br>and Electric Drives 5 cr       |   |                 |                 |                 |                 |
| Code | ELEC-E8408 Embedded Systems<br>Development 5 cr            | S-81.3200 Reaaliaikaisten<br>järjestelmien suunnittelu 3<br>op | S-81.260 Sähkökäyttäjien<br>ohjelmistotekniikka 2 ov        | S-81.240<br>Teollisuuselektronii-kan<br>liityntätekniiikka 2 ov |                 |                 |                 |                 |
| Code | ELEC-E8409 High Voltage<br>Engineering 5 cr                | S-18.3150 High Voltage<br>Engineering 4 op                     | S-18.150 High Voltage<br>Engineering 2,5 ov                 |   |                 |                 |                 |                 |
|      |  | S-18.3146<br>Suurjännitetekniikka 4 op                         | S-18.146<br>Suurjännitetekniikka 2,5 ov                     |   |                 |                 |                 |                 |
| Code | ELEC-E8411 Numerical Methods in<br>Electromechanics L 5 cr | S-17.3010 Numerical<br>Methods in<br>Electromechanics P 5 cr   | S-17.153 Sähkömekaniikan<br>numeeriset menetelmät L 3<br>ov |   |                 |                 |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course  | Previous course   | Previous course  | Previous course                                      | Previous course                                     | Previous course | Previous course | Previous course |
|------|--|---|--|--|---|-----------------|-----------------|-----------------|
| Code | ELEC-E8412 Power Electronics 5 cr  | S-81.2110 Power Electronics 5 cr  | S-81.2100 Tehoelektroniikka 4 op   | S-81.102 Tehoelektroniikka 3 ov                      |   |                 |                 |                 |
|      |  |   | S-81.103 Power Electronics 3 ov  |  |   |                 |                 |                 |
| Code | ELEC-E8413 Power Systems 5 cr  | S-18.2103 Power Systems 4 cr  | S-18.103 Power Systems 3 ov  |  |   |                 |                 |                 |
|      |  | S-18.2104 Sähköverkot 4 op  | S-18.104 Sähköverkot 3 ov  |  |   |                 |                 |                 |
| Code | ELEC-E8414 Seminar on Electromechanics L 5 cr                                      | S-17.3040 Seminar on Electromechanics 5 cr                              |  |  |   |                 |                 |                 |
| Code | ELEC-E8415 Special Assignment in Electrical Power and Energy Engineering V 2-10 cr | S-17.3710 Electromechanics, special assignment 2-10 cr                  | S-17.170 Sähkömekaniikan erikoistyö 3 ov, S-17.171 Sähkömekaniikan erikoistyö 5 ov |  |   |                 |                 |                 |
|      |  | S-18.3156 Sähköverkkojen erikoistyö 5-8 op                              | S-18.156 Sähköverkkojen erikoistyö 2-4 ov  | S-18.159 Sähköverkkojen erikoistyö 2 ov              |   |                 |                 |                 |
|      |  |   | S-18.3148 Suurjännitetekniikan erikoistyö L V 5-8 op                               | S-18.3147 Suurjännitetekniikan erikoistyö L V 5-8 op | S-18.147 Suurjännitetekniikan erikoistyö L V 3-5 ov |                 |                 |                 |
|      |  | S-81.3400 Teollisuuselektronii-kan ja sähkökäyttöjen erikoistyö 2-10 op | S-81.131 Teollisuuselektronii-kan ja sähkökäyttöjen erikoistyö 2-5 ov              |  |   |                 |                 |                 |
| Code | ELEC-E8428 Rotating fields and harmonics in electrical machines D                  | ELEC-E8416 Special Course on Electromechanics L 5 cr                    | S-17.3050 Special Course on Electromechanics P 5 cr                                |  |   |                 |                 |                 |
| Code | ELEC-E8429 Vibrations and noise of electrical machines D                           |   |  |  |   |                 |                 |                 |
| Code | ELEC-E8417 Switched-Mode Power Supplies 5 cr                                       | S-81.3100 Hakkuriteholähteet 5 op                                       | S-81.141 Hakkuriteholähteet 3 ov   |  |   |                 |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|  | Newest course   | Previous course  | Previous course   | Previous course  | Previous course                             | Previous course | Previous course | Previous course |
|--|---|--|---|--|---|-----------------|-----------------|-----------------|
| Code   | ELEC-E8421 Tehoelektroniikan komponentit 5 op   | S-81.3120 Tehoelektroniikan komponentit 5 op                         | S-81.121 Tehoelektroniikan komponentit 3 ov                           |  |   |                 |                 |                 |
| Code   | ELEC-E8430 Magnetic and insulation materials in energy applications D                           | ELEC-E8426 Advanced Topics in Electrical Engineering                 |   |  |   |                 |                 |                 |
| Code   | ELEC-E8431 Diagnosis and condition monitoring of electrical machines D                          |  |   |  |   |                 |                 |                 |
| Code   | ELEC-E8700 Principles and fundamentals of lighting 5 cr   | S-118.3216 Valaistustekniikka I                                      | S-118.216 Valaistustekniikka I  | S-18.216 Valaistustekniikka I  | S-18.101 Sähkölaitos- ja valaistustekniikka |                 |                 |                 |
|  |   | S-118.3217 Illumination Engineering I 5 op                           | S-118.217 Illumination Engineering I 2 ov                             |  |   |                 |                 |                 |
| Code   | ELEC-E8701 Lighting technology and applications 5 cr  | S-118.3218 Valaistustekniikka II 4 op                                | S-118.218 Valaistustekniikka II 2,5 ov                                | S-18.218 Valaistustekniikka 2,5 ov                                   |   |                 |                 |                 |
| Code   | ELEC-E8702 Rakennussähköistys 5 op  | S-118.3280 Sähköisten taloteknisten järjestelmien suunnittelu 5 op   | S-118.280 Sähköisten taloteknisten järjestelmien suunnittelu 3 ov     | S-18.220 Rakennusten sähkösuunnittelu 3 ov                           |   |                 |                 |                 |
| Code   | ELEC-E8703 Special assignment on illumination engineering and building electrical design V 5 cr | S-118.3232 Valaistustekniikan ja sähkösuunnittelun erikoistyö 2-8 op | S-118.232 Valaistustekniikan ja sähkösuunnittelun erikoistyö V 1-5 ov | S-18.232 Valaistustekniikan ja sähkösuunnittelun erikoistyö V 1-5 ov |   |                 |                 |                 |
| List of course substitutes continue on the next page |   |  |   |  |   |                 |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course                               | Previous course                                      | Previous course                                       | Previous course  | Previous course  | Previous course   | Previous course | Previous course |
|------|---|--|---|--|--|---|-----------------|-----------------|
| Code | ELEC-E8712 Design for reliability 5 cr      | S-113.3141 Design for Reliability 5 cr               | S-66.3170 Elektroniikan luotettavuus 3 op             | S-66.170 Elektroniikan luotettavuus 2 ov   |  |   |                 |                 |
|      |   |  | S-113.3140 Elektroniikan luotettavuus 6 op            | S-113.141 Elektroniikan luotettavuus 4 ov (leikkaava kurssi S-113.3145)            | S-113.140 Elektroniikan luotettavuus ja testaus 3 ov                               |   |                 |                 |
|      |   |  | S-113.3145 Reliability of Micro- and Nanosystems 4 cr | S-113.145 Reliability of Micro- and Nanosystems 3 ov (leikkaava kurssi S-113.3140) | S-113.140 Elektroniikan luotettavuus ja testaus 3 ov                               |   |                 |                 |
| Code | ELEC-E8716 Heterogeneous Integration D 5 cr | ELEC-E8713 Materials & Microsystems Integration 5 cr | ELEC-E8503 Materials & Microsystems Integration 5 cr  | S-113.2105 Materials and Microsystems Integration 3-8 cr                           | S-113.105 Materials and Microsystems Integration 3 ov (leikkaavakurssi S-113.2100) | S-113.105 Materiaalitekniikan perusteet 2 ov            |                 |                 |
|      |   |  |   | S-113.2106 Materials & Microsystems Integration 5-8 cr                             | S-113.3101 Mikrosysteemien integrointi 2 op  |   |                 |                 |
|      |   |  |   | S-113.3150 Tuotantotekniikan seminaari 4 op  | S-113.151 Tuotantotekniikan seminaari 3 ov (leikkaava kurssi S-113.3155)           | S-113.150 Elektroniikan tuotantotekniikan seminaari 4ov |                 |                 |
|      |   |  | ELEC-E8711 Materials Compatibility L 5 op             | S-113.3102 Materiaalien yhteensopivuus I   |  |   |                 |                 |
|      |   |  |   | S-113.3103 Materiaalien yhteensopivuus II  |  |   |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course  | Previous course  | Previous course   | Previous course  | Previous course                    | Previous course | Previous course | Previous course |
|------|--|--|---|--|------------------------------------|-----------------|-----------------|-----------------|
| Code | ELEC-E8725 Methods of bioadaptive technology 5 cr                        | S-113.3231 Bioadapttiivisen tekniikan menetelmät 7 op                  | S-113.3230 Bioadapttiivisen tekniikan tutkimusmenetelmät 6 op     | S-113.220 Solu- ja kudostekniikan rakennetutkimusmenetelmät 4 ov |                                    |                 |                 |                 |
| Code | ELEC-E8729 Biomaterial interfaces 5 cr                                   | S-ELEC-E8728 Tissue-foreign body interaction 5 cr                      | S-113.3220 Rajapintailmiöt vierasesineen ja kudoksen välissä 6 op | S-113.210 Rajapintailmiöt kudoksen ja vierasaineen välillä 4 ov  |                                    |                 |                 |                 |
| Code | ELEC-E8734 Biomedical Instrumentation 5 cr                               | S-66.3166 Biomedical Instrumentation 5 cr                              | S-66.166 Biotekniikan instrumentointi 3 ov                        | S-66.165 Biotekniikan instrumentointi 2 ov                       |                                    |                 |                 |                 |
| Code | ELEC-E8742 Translational Engineering Forum 5 cr                          | ELEC-E8730 Design of electronic equipment 5 cr                         | S-66.3171 Design of electronic equipment 5 cr                     | S-66.171 Elektroniikkalaitteiden suunnittelu 2 ov                |                                    |                 |                 |                 |
| Code | ELEC-E8744 Electromagnetic field safety 5 cr                             | ELEC-E8741 Electromagnetic field safety and medical applications 5 cr  |   |  |                                    |                 |                 |                 |
| Code | ELEC-E8736 Basics of MRI L 5 cr  | S-66.3322 Basics of MRI (5 cr) P                                       |   |  |                                    |                 |                 |                 |
| Code | ELEC-E8748 Sensors and Measurement Methods 5 cr                          | ELEC-E5710 Sensors and Measurement Methods 5 cr                        | S-108.3011 Sensors and Measurement Methods 5 cr                   | S-108.3010 Mittauselektronikka 5 op                              | S-108.194 Mittauselektronikka 3 ov |                 |                 |                 |
| Code | ELEC-E8750 Virtual Instrumentation D 5 cr                                | ELEC-E5720 Virtuaali-instrumentointi 5 op                              | S-108.3030 Virtual Instrumentation 5 cr                           | S-108.184 Tietokoneavusteinen mittaustekniikka 2 ov              |                                    |                 |                 |                 |
| Code | ELEC-E8751 Optics 5 cr   | ELEC-E5730 Optics 5 cr   | S-108.2110 Optics 5 cr  | S-108.181 Optiikka 2 ov  |                                    |                 |                 |                 |
| Code | ELEC-E8752 Research Seminar on Measurement Science and Technology D 2 cr | ELEC-E5740 Research Seminar on Measurement Science and Technology 2 cr | S-108.4020 Research Seminar on Measurement Science                | S-108.914 Mittaustekniikan tutkimusseminaari                     |                                    |                 |                 |                 |
|      |  | ELEC-E5741 Research Seminar on Measurement Science and Technology 2 cr |   |  |                                    |                 |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course   | Previous course                                     | Previous course   | Previous course   | Previous course  | Previous course   | Previous course | Previous course |
|------|---|---|---|---|--|---|-----------------|-----------------|
| Code | ELEC-E8753 Mittaustekniikan projekti 2–10 op                        | ELEC-E5750 Mittaustekniikan erikoistyö V 2-10 op    | S-108.3130 Project Work in Measurement Science and Technology 2–10 cr |   |  |   |                 |                 |
| Code | ELEC-E8754 Optiikan projekti 2–10 op                                | ELEC-E5760 Optisen teknologian erikoistyö V 2-10 op | S-108.3140 Project Work in Optical Technology 2–10 cr                 |   |  |   |                 |                 |
| Code | ELEC-E9111 Mathematical Computing 5 cr                              | ELEC-E3151 Mathematical Computing 5 cr              | ELEC-E3150 Mathematical Methods 5 cr                                  |   |  |   |                 |                 |
| Code | ELEC-E9430 Microwave engineering D 5 cr                             | ELEC-E4430 Microwave engineering II L 5 cr          | S-26.3100 RF and Microwave Engineering 5 cr                           | S-26.112 RF- ja mikroaaltotekniikka 3 ov  |  |   |                 |                 |
| Code | ELEC-E9450 Antennas and Wave Propagation D 5 cr                     | ELEC-E4450 Antennas 5 cr                            | S-96.3415 Antennas - Theory 5 cr                                      | S-96.3410 Antenniteoria 5 op  | S-96.410 Antenniteoria 2 ov                                  |   |                 |                 |
| Code | ELEC-E9540 Digital Microelectronics: Digital Design with HDL P 5 cr | ELEC-E3540 Digital Microelectronics II L 5 cr       | S-87.3186 Basic Course on VHDL Hardware Description Language P 2 cr   | S-87.3185 Digitaalisen mikroelektronikan suunnittelu II: Suunnittelun ja toteutuksen perusteet L 5 op | S-88.3133 Laitteistokuvauskielinen digitaalisuunnittelu 3 op | S-88.133 Laitteistokuvauskielinen digitaalisuunnittelu 2 ov |                 |                 |
|      |   |   | S-87.3187 Hardware description language design project P 3 cr         |   | S-88.3134 ASIC-piirien suunnittelu 4 op                      | S-88.134 ASIC-piirien suunnittelu 3 ov                      |                 |                 |
| Code | ELEC-E9710 Advanced Electromagnetic Techniques D 5 cr               | ELEC-E4710 Computational electromagnetics L 5 cr    | S-96.3330 Sähkömagneetiikan numeeriset menetelmät L V 5 op            | S-96.3171 Differenssimenetelmät sähkömagneetiikassa L 5 op  | S-96.171 Differenssimenetelmät sähkömagneetiikassa L 3 ov    | S-96.170 Numeerinen sähkömagneetiikka L 2 ov                |                 |                 |
|      |   |   |   | S-96.3173 Elementtimenetelmät sähkömagneetiikassa L 5 op  | S-96.3172 Elementtimenetelmät sähkömagneetiikassa L 5 op     | S-96.172 Elementtimenetelmät sähkömagneetiikassa L 3 ov     |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course   | Previous course   | Previous course  | Previous course  | Previous course  | Previous course | Previous course | Previous course |
|------|---|---|--|--|--|-----------------|-----------------|-----------------|
| Code | Electromagnetic Techniques D 5 op                                       |   |  | S-96.3174<br>Integraaliyhtälömenetelmät sähkö-magnetiikassa L 5 op       |  |                 |                 |                 |
|      |   | ELEC-E4730 Advanced Field Theory D 5 cr                               |  |  |  |                 |                 |                 |
|      |   | ELEC-E4810 Metamaterials and Nanophotonics D 5 cr                     |  |  |  |                 |                 |                 |
| Code | ELEC-E9720 Advanced Topics in Radio Engineering D 5 cr                  | ELEC-E4720 Advanced circuit theory L 5 cr                             | S-55.3150 Suodattimet  |  |  |                 |                 |                 |
|      |   | ELEC-E4750 Radiowave scattering and propagation L 5 cr                | S-96.3320 Radiowave Propagation 6 cr                             | S-96.3311 Radioaaltojen eteneminen 5 op                                  | S-96.310 Radioaaltojen eteneminen 2 ov                                 |                 |                 |                 |
|      |   |   |  | S-26.3142 Radioaaltojen eteneminen siirtyvässä tieto-liikenteessä L 3 op | S-26.185 Radioaaltojen eteneminen siirtyvässä tietoliikenteessä L 2 ov |                 |                 |                 |
|      |   | ELEC-E4760 Terahertz Techniques D 5 cr                                |  |  |  |                 |                 |                 |
| Code | ELEC-E9950 Research Seminar on Electronics and Nanoengineering P V 1 cr | ELEC-E4950 Research Seminar on Radio Science and Engineering P V 1 cr | S-26.3060 Research Seminar on Radio Science and Engineering 1 cr | S-26.3050 Radiotekniikan tutkijaseminaari 1                              | S-26.149 Radiotekniikan tutkijaseminaari 1                             |                 |                 |                 |
|      |   |   |  | S-55.3310 Piiriteorian tutkijaseminaari 1                                | S-55.167 Piiriteorian tutkijaseminaari 1                               |                 |                 |                 |
|      |   |   |  | S-92.3205 Avaruustekniikan tutkijaseminaari 1                            | S-92.205 Avaruustekniikan tutkijaseminaari 2                           |                 |                 |                 |
|      |   |   |  | S-96.1011 Sähkömagnetiikan tutkijaseminaari 2                            | S-96.011 Sähkömagnetiikan tutkijaseminaari 1                           |                 |                 |                 |



# Aalto University School of Electrical Engineering

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|------|---|--|---|---|--|---|--|-----------------|
| Code | ELEC-L0902 Introduction to Doctoral Studies 2 cr                                    | ELEC-L0901 Introduction to doctoral studies (P) 3 cr   | ELEC-0.9902 Introduction to Doctoral Studies P 2 cr                     |   |  |   |  |                 |
| Code | ELEC-L3212 Doctoral Course in Micro and Nanosciences I D 10 cr                      | ELEC-L3211 Postgraduate Course in Micro and Nanosciences I V 10 cr                               | ELEC-L3210 Postgraduate Course in Micro and Nanosciences I V            | S-69.4001 Postgraduate Course in Micro and Nanosciences I L 10 cr   | S-69.4114 Elektronifysiikan lisensiaattikurssi II L V ( op | S-69.4110 Elektronifysiikan lisensiaattikurssi I L V 5 op | S-69.198 Elektronifysiikan lisensiaattikurssi I L V 5 ov |                 |
|      |   |  |   |   | S-69.4123 Postgraduate Course in Electron Physics I        |   |  |                 |
| Code | ELEC-L3222 Doctoral Course in Micro and Nanosciences II D 10 cr                     | ELEC-L3221 Postgraduate Course in Micro and Nanosciences II V 10 cr                              | ELEC-L3220 Postgraduate Course in Micro and Nanosciences II V           | S-104.4002 Postgraduate Course in Micro and Nanosciences II L 10 cr | S-104.4350 Optoelektroniiikan lisensiaattikurssi L V 10 op | S-104.383 Optoelektroniiikan lisensiaattikurssi L V 5 ov  |  |                 |
|      |   |  |   |   | S-104.4650 Nanotekniikan lisensiaattikurssi L V 10 op      | S-104.382 Fysiikan lisensiaattikurssi L V 5 ov            |  |                 |
| Code | ELEC-L3511 Doctoral Course in Electronic Circuit Design I D 8 cr                    | ELEC-L3510 Postgraduate Course in Electronic Circuit Design I V 8 cr                             | S-87.4193 Postgraduate Course in Electronic Circuit Design I PV 1-8 cr  | S-87.193 Piiritekniikan lisensiaattikurssi I L V 2-5 ov             |  |   |  |                 |
| Code | ELEC-L3521 Doctoral Course in Electronic Circuit Design II D 1-8 cr                 | ELEC-L3520 Postgraduate Course in Electronic Circuit Design II V 1-8 cr                          | S-87.4198 Postgraduate Course in Electronic Circuit Design II PV 1-8 cr | S-87.198 Piiritekniikan lisensiaattikurssi II L V 2-5 ov            |  |   |  |                 |
| Code | ELEC-L8122 Doctoral Seminar in Automation, Systems and Control Engineering I D 5 cr | ELEC-L8120 Postgraduate seminar in Automation, Systems and Control Engineering - Series A V 5 cr | AS-116.4140 Automaation tietotekniikan jatko-opintoseminaari L          |   |  |   |  |                 |
|      |   |  | AS-74.4330 Postgraduate Course in Control Engineering                   |   |  |   |  |                 |

# Aalto University School of Electrical Engineering

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|      | Newest course  | Previous course   | Previous course  | Previous course  | Previous course | Previous course | Previous course | Previous course |
|------|--|---|--|--|-----------------|-----------------|-----------------|-----------------|
|      |  |   | AS-84.4340<br>Automaatiotekniikan jatko-<br>opintoseminaari  |  |                 |                 |                 |                 |
| Code | ELEC-L8123 Doctoral Seminar in<br>Automation, Systems and Control<br>Engineering II D 5 cr | ELEC-L8121 Postgraduate<br>seminar in Automation,<br>Systems and Control<br>Engineering - Series B V 5 cr | AS-116.4140 Automaation<br>tietotekniikan jatko-<br>opintoseminaari L  |  |                 |                 |                 |                 |
|      |  |   | AS-74.4330 Postgraduate<br>Course in Control<br>Engineering  |  |                 |                 |                 |                 |
|      |  |   | AS-84.4340<br>Automaatiotekniikan jatko-<br>opintoseminaari  |  |                 |                 |                 |                 |
| Code | ELEC-L8401 Postgraduate Seminar<br>on Electromechanics V 5 cr                              | S-17.4020 Postgraduate<br>Seminar on<br>Electromechanics 3-10 cr  | S-17.202 Postgraduate<br>Seminar on<br>Electromechanics 2-6 ov, S-<br>17.203 Postgraduate<br>Seminar on<br>Electromechanics, S-17.204<br>Sähkö-mekaniikan<br>lisensiaat-tiseminaari 2-6<br>ov, S-17.205 Sähkö-<br>mekaniikan lisensiaat-<br>tiseminaari 2-6 ov |  |                 |                 |                 |                 |
|      |  | S-17.4030 Postgraduate<br>Seminar on<br>Electromechanics P V 3-10<br>op                                   |  |  |                 |                 |                 |                 |
| Code | ELEC-L8704 Postgraduate seminar<br>on illumination engineering 5 cr                        | S-118.4250<br>Valaistustekniikan<br>lisensiaattiseminaari L 5-10<br>op                                    | S-118.250<br>Valaistustekniikan<br>lisensiaattiseminaari L V 2-6<br>ov   | S-18.250 Valaistustekniikan<br>lisensiaattiseminaari L V 2-6<br>ov |                 |                 |                 |                 |
| Code | ELEC-L8740 Postgraduate Course in<br>Applied<br>Electronics I 10 cr                        | S-66.4139 Postgraduate<br>Course in Applied<br>Electronics I 10 cr  | S-66.139 Sovelletun<br>elektroniikan<br>lisensiaattikurssi I L V 6 ov  |  |                 |                 |                 |                 |

# Aalto University School of Electrical Engineering

## List of course substitutes

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|      | Newest course  | Previous course  | Previous course  | Previous course  | Previous course | Previous course | Previous course | Previous course |
|------|--|--|--|--|-----------------|-----------------|-----------------|-----------------|
| Code | ELEC-L8741 Postgraduate Course in Applied Electronics II 10 cr           | S-66.4140 Postgraduate Course in Applied Electronics II 10 cr                  | S-66.140 Sovelletun elektroniikan lisensiaattikurssi II L V 6 ov |  |                 |                 |                 |                 |
| Code | ELEC-L8742 Design for portability in electronics 6 cr                    | S-66.4142 Design for portability in electronics P 6 op                         |  |  |                 |                 |                 |                 |
| Code | ELEC-L8743 Radar Electronics 6 cr  | S-66.4143 Radar electronics 6 cr   |  |  |                 |                 |                 |                 |
| Code | ELEC-L8744 Erikoismittaukset elektroniikassa 6 op                        | S-66.4144 Special Measurements in Electronics P 6 cr                           |  |  |                 |                 |                 |                 |
| Code | ELEC-L8745 Doctoral Course in Measurement Science and Technology D 10 cr | ELEC-E5780 Postgraduate Course in Measurement Science and Technology L V 10 cr | S-108.4010 Postgraduate Course in Measurement Technology 10cr    | S-108.911 Mittaustekniikan lisensiaattikurssi L V 7,5 ov |                 |                 |                 |                 |
|      |  | ELEC-E5781 Postgraduate Course in Measurement Science and Technology V D 10 cr |  |  |                 |                 |                 |                 |

## Aalto University School of Electrical Engineering

Discontinued ELEC -courses without a substitute course. The courses can be used in major / minor studies if applicable or in the elective studies

|      | Deleted ELEC-course   | Previous course                                | Previous course                         | Previous course | Previous course | Previous course |
|------|---|--|---|-----------------|-----------------|-----------------|
| Code | ELEC-A0211 Kotimainen työharjoittelu (kandidaatin tutkinto) 1-4 op  | Harj-0.100 Työympäristö-harjoittelu            |   |                 |                 |                 |
| Code | ELEC-A0212 Kansainvälinen harjoittelu (kandidaatin tutkinto) 1-4 op   |  |   |                 |                 |                 |
| Code | ELEC-A4920 Sähkötekniikan historia ja innovaatiot L 3 op  | S-96.1020 Sähkötekniikan historia L 3 op       | S-96.020 Sähkötekniikan historia L 3 op |                 |                 |                 |
| Code | ELEC-A7050 Basics in programming 5 cr. <i>Teaching for the last time: I-II/2019. Substitute course: CS-A1111 Ohjelmoinnin peruskurssi Y1.</i>                                 |  |   |                 |                 |                 |
| Code | ELEC-A7160 Algorithms and data structures for digital systems 5 cr. <i>Teaching for the last time: I-II/2019. Substitute course: CS-A1141 Tietorakenteet ja algoritmit Y.</i> |  |   |                 |                 |                 |
| Code | ELEC-C7410 Introduction to digital systems and design 2 cr. <i>Teaching for the last time: I-II/2019.</i>   |  |   |                 |                 |                 |
| Code | ELEC-C7430 Industrial training 3 op. <i>DSD students, check course ELEC-C9822</i>   |  |   |                 |                 |                 |
| Code | ELEC-C9821 Desing Thinking and Advanced Prototyping 5cr. <i>DSD students, check course ELEC-C9822</i>   | ELEC-9820 Electronics and design workshop 5 cr |   |                 |                 |                 |

## Aalto University School of Electrical Engineering

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|      |  |   |   |  |  |  |
|------|--|---|---|--|--|--|
| Code | ELEC-C9610 Basics in Electronics 2 cr. Ask course substitute from programme planning officer / coordinator.  |   |   |  |  |  |
| Code | ELEC-D0301 Protopaja 10 op   |   |   |  |  |  |
| Code | ELEC-D4110 Radio Science for Space and Environmental Applications 2 cr   | S-92.2110 Radio Science for Space and Environmental Applications 2 cr | S-92.3110 Radio Science for Space and Environmental Applications 2 cr |  |  |  |
| Code | ELEC-D8723 Laboratory course of biomedical engineering 5 cr. Teaching for the last time: IV-V/2018. Contact person Tomi Laurila.   | S-113.3241 Bioadaptiivisen tekniikan laboriotyöt 3 op                 | S-113.3240 Bioadaptiivisen tekniikan laboriotyöt 1-5 op               | S-113.230 Solu- ja kudostekniikan laboriotyöt 3 ov |  |  |
| Code | ELEC-E0221 Kotimainen työharjoittelu (diplomi-insinöörin tutkinto) 1-4 cr  | Harj-0.101 Ammattiharjoittelu   |   |  |  |  |
| Code | ELEC-E0222 Kansianvälinen työharjoittelu (diplomi-insinöörin tutkinto) 1-8 cr  |   |   |  |  |  |
| Code | ELEC-E0903 Producing a Scientific Publication P 5 op. Teaching for the last time: I-V/2019-2020. Substitute courses: LC-1330 Presenting Doctoral Research (o) and LC-1349 Writing Doctoral Research (w). |   |   |  |  |  |

## Aalto University School of Electrical Engineering

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|      |  |  |  |  |  |  |
|------|--|--|--|--|--|--|
| Code | ELEC-E3285 NST Grand Exercise in Micro and Nanotechnology 3 cr   | S-69.3118 NST Grand Exercise in Micro and Nanotechnology               |  |  |  |  |
| Code | ELEC-E4510 Earth Observation P 5 cr. Teaching for the last time: III/2018.                                       |  |  |  |  |  |
| Code | ELEC-E4540 Space Climate D   |  |  |  |  |  |
| Code | ELEC-E4770 MIMORadios P 5 cr. Teaching for the last time: IV/2017.   |  |  |  |  |  |
| Code | ELEC-E4910 Postgraduate course in radio science and engineering L V 5 cr. Teaching for the last time: year 2016. | S-26.4000 Postgraduate Course in Radio Science and Engineering 3-10 cr | S-26.4100 Radiotekniikan liseniaattikurssi L V 3-8 op  | S-26.200 Postgraduate Course in Radio Engineering/ Radiotekniikan liseniaattikurssi L V 2-5 ov |  |  |
|      |  |  | S-26.4300 Radiotekniikan liseniaattikurssi L V 3-8 op  | S-26.300 Postgraduate Course in Radioengineering/ Radiotekniikan liseniaattikurssi L V 2-5 ov  |  |  |
|      |  |  | S-55.4100 Piiriteorian liseniaattikurssi L V 1-15 op   | S-55.200/201 Piiriteorian liseniaattikurssi L V 1-10 ov  |  |  |
|      |  |  | S-96.4610 Sähkömagneetiikan liseniaattikurssi L V 8 op | S-96.610 Sähkömagneetiikan liseniaattikurssi L V 5 ov  |  |  |
| Code | ELEC-E4910 Postgraduate course in radio science and engineering L V 5 cr. Teaching for the last time: year 2016. | S-26.4000 Postgraduate Course in Radio Science and Engineering 3-10 cr | S-96.4620 Sähkömagneetiikan liseniaattikurssi L V 8 op | S-96.620 Sähkömagneetiikan liseniaattikurssi L V 5 ov  |  |  |

## Aalto University School of Electrical Engineering

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|      |   |  |   |   |  |  |
|------|---|--|---|---|--|--|
| Code | ELEC-E5450 Signal Processing Seminar 1 L V 2-5 cr   | S-88.4221 Postgraduate Seminar on Signal Processing 1 P 4-8 cr | S-88.221 Postgraduate Seminar on Signal Processing 1 L V 4 ov |   |  |  |
|      |   | S-88.4223 Postgraduate Seminar on Signal Processing 3 4-8 cr   | S-88.223 Postgraduate Seminar on Signal Processing 3 L V 4 ov |   |  |  |
| Code | ELEC-E5460 Signal Processing Seminar 2 L V 2-5 cr   | S-88.4222 Postgraduate Seminar on Signal Processing 2 P 4-8 cr | S-88.222 Postgraduate Seminar on Signal Processing 2 L V 4 ov |   |  |  |
|      |   | S-88.4224 Postgraduate Seminar on Signal Processing 4 4-8 cr   | S-88.224 Postgraduate Seminar on Signal Processing 4 L V 4 ov |   |  |  |
| Code | ELEC-E5470 Advanced Topics in Statistical Learning 5 cr. <i>Teaching for the last time: III-IV/2018.</i>  |  |   |   |  |  |
| Code | ELEC-E5530 Speech and Language Processing Seminar L V 3-5 cr. <i>Teaching for the last time: III-IV/2018. The course is replaced by CS-E4070 Special Course in Machine Learning and Data Science.</i> | S-89.3680 Speech Processing Seminar 3 cr                       | S-89.680 Puheenkäsitteilytekniikan seminaari V 2 ov           | S-89.174 Puheenkäsitteilytekniikan seminaari V 2 ov           |  |  |
|      |   | S-89.4830 Postgraduate Course in Speech Processing P 8 cr      | S-89.830 Puheenkäsitteilytekniikan jatko-opintokurssi LV 6 ov | S-89.175 Puheenkäsitteilytekniikan lisensiaattikurssi LV 6 ov |  |  |
| Code | ELEC-E5540 Special Assignment in Speech and Language Processing 1-10 cr. <i>Teaching for the last time: I-V/2017-2018. The course is replaced by CS-E4004 Individual Studies in Computer Science.</i> | S-89.3690 Speech Processing, special assignment P              |   |   |  |  |

## Aalto University School of Electrical Engineering

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|      |  |   |   |  |  |  |
|------|--|---|---|--|--|--|
| Code | ELEC-E5770 Sähkömagneettisten kenttien ja optisen säteilyn biologiset vaikutukset ja mittaukset L 5 op. <a href="#">Teaching for the last time: year 2017. Contact person Petri Kärhä.</a> | S-108.4110 Biological Effects and Measurements of Electromagnetic Fields and Optical Radiation 4 cr | S-108.198 Sähkömagneettisten kenttien ja optisen säteilyn biologiset vaikutukset ja mittaukset L 2 ov |  |  |  |
| Code | ELEC-E5690 Immersive Sound D   |   |   |  |  |  |
| Code | ELEC-E7110 Trends in Communications Engineering Research 5 cr  |   |   |  |  |  |
| Code | ELEC-E7220 Radio Resource and Spectrum Management P 5 cr. <a href="#">Teaching for the last time IV-V/2020.</a>  | S-72.3265 Radio Resource and Spectrum Management  | S-72.3260 Radio Resource Management Methods P 3 op  |  |  |  |
| Code | ELEC-E7420 Network service provisioning L 5 cr   | S-38.3191 Verkkopalvelujen tuotanto L 5 op  | S-38.3192 Verkkopalvelujen tuotanto L 4 op  | S-38.192 Verkkopalvelujen tuotanto L 2 ov            | S-38.191 Televerkot yrityksissä                      |  |
|      |  |   | S-38.3180 Palvelunlaatu Internetissä 4 op   | S-38.180 Palvelunlaatu Internetissä 2 ov             |  |  |
| Code | ELEC-E7450 Performance Analysis L 5 cr   | S-38.3141 Teletraffic Theory L 5 cr   | S-38.141 Teleliikenneteoria L 3 ov  |  |  |  |
|      |  |   | S-72.3235 Network Access P 3 op   | S-72.3235 Radio Transmission and Network Access 3 op | S-72.3230 Radio Transmission and Network Access 3 op |  |
| Code | ELEC-E7460 Modelling and Simulation L 5 cr   | S-38.3148 Simulation of Data Networks 5 cr  | S-38.148 Tietoverkkojen simulointi 2 ov   | S-38.147 Televerkkojen simulointi                    |  |  |



## Aalto University School of Electrical Engineering

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|      |  |  |   |   |   |  |
|------|--|--|---|---|---|--|
| Code | ELEC-E7490 Challenged Networks<br>P. Teaching for the last time:<br>academic year 2014-2015.   | S-38.3455 Challenged<br>Networks L   |   |   |   |  |
| Code | ELEC-E7830 Value Network Design<br>for Internet Services   | S-38.3046 Value Network<br>Design for Internet 5 cr                                  |   |   |   |  |
| Code | ELEC-E7880 Quality of Experience   |  |   |   |   |  |
| Code | ELEC-E7890 User Research D   |  |   |   |   |  |
| Code | ELEC-E8112 Hybrid powertrains in<br>vehicles 5 cr. Teaching for the last<br>time: IV/2017. Contact person<br>Tatiana Minav.                  | AS-84.3210 Electric Power<br>Transmission in Vehicles<br>and<br>Mobile Machines      |   |   |   |  |
| Code | ELEC-E8114 Manufacturing<br>Automation Systems Modelling 5<br>cr. Teaching for the last time: IV-<br>V/2018. Contact person Seppo<br>Sierla. |  |   |   |   |  |
| Code | ELEC-E8116 Model-Based Control<br>Systems L 5 cr   | AS-74.3123 Mallipohjaiset<br>säätöjärjestelmät 4 op                                  |   |   |   |  |
| Code | ELEC-E8117 Modelling and<br>Control of Field Systems L 5cr.<br>Teaching for the last time: III-<br>IV/2017. Contact person Ville<br>Kyrki.   | AS-74.3179 Modelling and<br>Control of Space and<br>Time Dependent Processes<br>5 cr | AS-74.3179 Aika- ja<br>paikkariippuvaisten<br>prosessien mallintaminen<br>ja säätö L 5 op | AS-74.3177 Aika- ja<br>paikkariippuvaisten<br>prosessien mallintaminen<br>ja säätö 3-4 op | AS-74.3176<br>Säätösuunnittelun<br>ohjelmistot 3 op |  |
| Code | ELEC-E8118 Robotic Vision P 5 cr.<br>The course is replaced by CS-<br>E4850 Computer Vision.   | AS-84.3126 Machine<br>Perception   |   |   |   |  |

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|      |  |   |  |  |   |  |
|------|--|---|--|--|---|--|
| Code | ELEC-E8122 Multivariate regression methods L 5 cr.<br>Teaching for the last time: I-II/2016. Contact person Ville Kyrki. | AS-74.4191 Multivariate regression methods                    |  |  |   |  |
| Code | ELEC-E8123 Networked Control Systems D   |   |  |  |   |  |
| Code | ELEC-E8401 Condition Monitoring of Electrical Equipment L 5 cr.<br>Teaching for the last time: IV-V/2018.                | S-18.4149 Condition Monitoring of Electrical Equipment P 4 cr | S-18.149 Sähkölaitteiden kunnonvalvonta 2 ov L |  |   |  |
| Code | ELEC-E8410 Materials in Energy Applications 5 cr. Teaching for the last time: IV-V/2020.                                 |   |  |  |   |  |
| Code | ELEC-E8414 Seminar on Electromechanics P. Teaching for the last time: V/2020.  |   |  |  |   |  |
| Code | ELEC-E8418 Sähköenergian käyttösovelluksia 5 op. Teaching for the last time: IV-V/2018.                                  | S-18.3161 Sähköenergian käyttösovelluksia 4 op                | S-18.161 Sähköenergian käyttösovelluksia 2 ov  |  |   |  |
| Code | ELEC-E8419 Sähkönsiirtojärjestelmät 1 5 op.<br>Teaching for the last time: I-II/2017.                                    | S-18.3200 Sähkönsiirtojärjestelmät 1 6 op                     | S-18.3113 Sähkönsiirtojärjestelmät 6 op        | S-18.113 Sähkönsiirtojärjestelmät 6 op | S-18.112 Voimalaitosten yhteiskäytön tekniikka 2,5 ov |  |
| Code | ELEC-E8420 Sähkönsiirtojärjestelmät 2 5 op.<br>Teaching for the last time: IV-V/2018.                                    | S-18.3201 Sähkönsiirtojärjestelmät 2 4 op                     |  |  |   |  |
| Code | ELEC-E8724 Biomaterials Science 5 cr   | S-113.2210 Biomateriaalitiede 6 op                            | S-113.200 Biomateriaalitiede 3 ov              |  |   |  |

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|      |  |                                       |   |   |  |  |
|------|--|---------------------------------------|---|---|--|--|
| Code | ELEC-E8731 Design of electronic prototype 5cr. <a href="#">Teaching for the last time: III-IV/2020.</a>                                | S-66.3204 Product design 5 cr         | S-66.204<br>Elektroniikkatuotteen suunnittelu II 4 ov | S-66.200 Suunnittelu tuotantoa varten 2 ov AND<br>S-66.202<br>Elektroniikkatuotteen suunnittelu II 3 ov |  |  |
| Code | ELEC-E8732<br>Instrumentointielektroniikka 5 op.<br><a href="#">Teaching for the last time: I-II/2019.</a>                             |                                       |   |   |  |  |
| Code | ELEC-E8733 Bioelectric Phenomena. <a href="#">Contact person Raimo Sepponen.</a>   | S-66.3169 Bioelectric Phenomena 4 cr  | S-66.169 Biosähköiset ilmiöt 2,5 ov                   | S-55.184 Biosähköiset ilmiöt 2,5 ov   |  |  |
| Code | ELEC-E8735 NMR- Basics L 5 cr.<br><a href="#">Teaching for the last time: I-II/2017. Contact person Lauri Palva.</a>                   | S-66.3320 NMR- Basics 5 cr            |   |   |  |  |
| Code | ELEC-E8737 Instrumentation of MRI L 5 cr. <a href="#">Teaching for the last time: I-II/2019.</a>                                       | S-66.3324 Instrumentation of MRI 5 cr |   |   |  |  |
| Code | ELEC-E8738 Applications of MRI L 5 cr. <a href="#">Teaching for the last time: II/2017. Contact person Lauri Palva.</a>                | S-66.3326 Applications of MRI 5 cr    |   |   |  |  |
| Code | ELEC-E9250 Advanced physics and applications of optical fibers 5 cr  |                                       |   |   |  |  |
| Code | ELEC-E9550 Magnetism and applications 5 cr   |                                       |   |   |  |  |
| Code | ELEC-E9910 Networked partnering and product innovation technology - NEPPI 5 cr. <a href="#">Teaching for the last time III-V/2020.</a> |                                       |   |   |  |  |

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|      |   |   |   |  |  |  |
|------|---|---|---|--|--|--|
| Code | ELEC-L3530 Postgraduate Course in Electronic Circuit Design III V 1-8 cr  | S-87.4199 Postgraduate Course in Electronic Circuit Design III PV 1-11 cr | S-87.199 Piiritekniikan lisensiaattikurssi III L V 1-7 ov |  |  |  |
| Code | ELEC-L3998 Micronova Individual Study Module 2 V D 1-10 cr  |   |   |  |  |  |
| Code | ELEC-L3999 Micronova Individual Study Module V D 1-10 cr  |   |   |  |  |  |
| Code | LEC-L7100 Postgraduate Seminar in Communications Engineering V D 5-10 cr  |   |   |  |  |  |
| Code | ELEC-L8402 Special Topics in Industrial Electronics I 5 cr. <a href="#">Teaching for the last time: I-II/2017.</a>      | S-81.4200 Special Course in Industrial Electronics I P 5 cr               | S-81.220 Teollisuuselektroniikan erikoiskurssi L V 3 ov   |  |  |  |
| Code | ELEC-L8403 Special Topics in Industrial Electronics II 5 cr. <a href="#">Teaching for the last time: III-IV/2018.</a>   | S-81.4210 Special Course in Industrial Electronics II P                   |   |  |  |  |
| Code | ELEC-L8739 Quantitative MRI 6 cr. <a href="#">Teaching for the last time: IV-V/2017. Contact person Lauri Palva.</a>    | S-66.4141 Quantitative MRI 6 cr   |   |  |  |  |
| Code | ELEC-L8740 Sovelletun elektroniikan lisensiaattikurssi I P V. <a href="#">Teaching for the last time: I-II/2019.</a>    |   |   |  |  |  |
| Code | ELEC-L8741 Sovelletun elektroniikan lisensiaattikurssi II P V. <a href="#">Teaching for the last time: III-IV/2020.</a> |   |   |  |  |  |