

## ULUDAĞ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES 2017-2018 ACADEMIC YEAR COURSE PLAN

# **DEPARTMENT OF** ELECTRONIC ENGINEERING

## **DEPARTMENT / PROGRAM** ELECTRONIC ENGINEERING / MASTER'S DEGREE PROGRAM

|              |         | I. TERM / FALL                                     |      |   |   |   |        |      |         | II. TERM / SPRING  |      |   |   |   |        |      |
|--------------|---------|--|------|---|---|---|--------|------|---------|--|------|---|---|---|--------|------|
|              | Code    | Course Title                                       | Туре | Т | U | L | Credit | ECTS | Code    | Course Title   | Туре | Т | U | L | Credit | ECTS |
|              | ELN5181 | SPECIAL TOPICS IN MSC THESIS I                     | С    | 4 | 0 | 0 | 0      | 5    | ELN5182 | SPECIAL TOPICS IN MSC THESIS II  | C    | 4 | 0 | 0 | 0      | 5    |
|              | ELN5191 | MSC THESIS CONSULTING I                            | С    | 0 | 1 | 0 | 0      | 1    | ELN5192 | MSC THESIS CONSULTING II   | C    | 0 | 1 | 0 | 0      | 1    |
|              |         |  |      |   |   |   |        |      | ELN5504 | ADVANCED TOPICS IN ENGINEERING<br>MATHEMATICS I                            | C    | 3 | 0 | 0 | 3      | 6    |
|              |         |  |      |   |   |   |        |      | ELN5000 | RESEARCH TECHNIQUES and<br>PUBLICATION ETHICS in ELECTRONIC<br>ENGINEERING | C    | 2 | 0 | 0 | 2      | 2    |
|              | ELN5503 | NUMERICAL COMPUTING AND<br>PROGRAMMING             | 0    | 3 | 0 | 0 | 3      | 6    | ELN5172 | SEMINAR  | C    | 0 | 2 | 0 | 0      | 4    |
|              | ELN5101 | ANALOG FILTERS                                     | 0    | 3 | 0 | 0 | 3      | 6    | ELN5504 | TRANSFORMS AND ENGINEERING<br>APPLICATIONS                                 | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5201 | MICROWAVE TECHNIQUES                               | 0    | 3 | 0 | 0 | 3      | 6    | ELN5102 | ADVANCED MICROPROCESSORS   | 0    | 3 | 0 | 0 | 3      | 6    |
| IAGE         | ELN5203 | ANALYSIS AND DESIGN OF RF<br>CIRCUITS AND SYSTEMS  | 0    | 3 | 0 | 0 | 3      | 6    | ELN5104 | DIGITAL FILTERS  | 0    | 3 | 0 | 0 | 3      | 6    |
| SE SI        | ELN5205 | HIGH FREQUENCY METHODS IN<br>ELECTROMAGNETIC I     | 0    | 3 | 0 | 0 | 3      | 6    | ELN5202 | MICROWAVE CIRCUITS   | 0    | 3 | 0 | 0 | 3      | 6    |
| COURSE STAGE | ELN5207 | PRINCIPLES OF ELECTROMAGNETIC<br>THEORY            | 0    | 3 | 0 | 0 | 3      | 6    | ELN5204 | MICROWAVE SYSTEMS ENGINEERING  | 0    | 3 | 0 | 0 | 3      | 6    |
| ~            | ELN5209 | ADVANCED ANTENNA THEORY                            | 0    | 3 | 0 | 0 | 3      | 6    | ELN5206 | RADAR SYSTEMS  | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5211 | BOUNDARY VALUE PROBLEMS I                          | 0    | 3 | 0 | 0 | 3      | 6    | ELN5208 | HIGH FREQUENCY METHODS IN<br>ELECTROMAGNETIC II                            | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5213 | BIOELECTROMAGNETISM                                | 0    | 3 |   | 0 | 3      | 6    | ELN5210 | SPECIAL FUNCTIONS  | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5301 | OPTOELECTRONIC CIRCUITS                            | 0    | 3 | 0 | 0 | 3      | 6    | ELN5212 | BOUNDARY VALUE PROBLEMS II   | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5303 | ADVANCED MICROELECTRONIC DEVICES                   | 0    | 3 | 0 | 0 | 3      | 6    | ELN5214 | QUASI-OPTIC ELECTROMAGNETIC<br>DIFFRACTION                                 | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5305 | SEMICONDUCTOR DEVICE<br>MANUFACTURING TECHNOLOGIES | 0    | 3 | 0 | 0 | 3      | 6    | ELN5302 | OPTOELECTRONIC CONVERTERS  | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5401 | ADVANCED SIGNAL PROCESSING                         | 0    | 3 | 0 | 0 | 3      | 6    | ELN5304 | INTEGRATED OPTICS  | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5403 | MOBILE COMMUNICATION SYSTEMS                       | 0    | 3 | 0 | 0 | 3      | 6    | ELN5306 | PHOTONIC DEVICES   | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5405 | DIGITAL COMMUNICATION SYSTEMS                      | 0    | 3 | 0 | 0 | 3      | 6    | ELN5402 | RANDOM SIGNAL ANALYSIS   | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5407 | FIBER OPTIC SENSORS                                | 0    | 3 | 0 | 0 | 3      | 6    | ELN5404 | INFORMATION THEORY   | 0    | 3 | 0 | 0 | 3      | 6    |
|              | ELN5409 | OPTICAL FIBER COMMUNICATION                        | 0    | 3 | 0 | 0 | 3      | 6    | ELN5406 | RADIO COMMUNICATION SYSTEMS  | 0    | 3 | 0 | 0 | 3      | 6    |

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|-----|--------|--|----|-------|------------------|------|----|----|-----------|--|----------|-------|-------|--------|----|---|
|     |        |  |    | tal ( | -                |      | 0  | 30 |           |  | <u> </u> |       | -     | v      | 0  |   |
|     | LN5193 | MSC THESIS CONSULTING III                          | Z  | 0     | 1                | 0    | 0  | 25 | ELN5194   | MSC THESIS CONSULTING IV                             | Z        | 0     | 1     | 0      | 0  |   |
| F   | LN5183 | SPECIAL TOPICS IN MSC THESIS III                   | Z  | 4     | 0                | 0    | 0  | 5  | ELN5184   | SPECIAL TOPICS IN MSC THESIS IV                      | Z        | 4     | 0     | 0      | 0  |   |
| ┢── |        | III. TERM / FALL                                   | 10 | (a)   |                  | 1113 | 14 | 50 | <u>_ </u> | IV. TERM / SPRING                                    | 10       |       | 100   | 1113   | 11 | 1 |
|     |        |  | To | tal ( | <sup>~</sup> rec | lits | 12 | 30 |           |  | Tof      | tal C | 'rec  | lits   | 11 |   |
|     |        |  |    |       |                  |      |    |    |           |  |          |       |       |        |    |   |
|     |        |  |    |       |                  |      |    |    | ELN5704   | COMPUTER SECURİTY                                    | 0        | 3     | 0     | 0      | 3  |   |
|     |        |  |    | -     |                  |      |    |    | ELN5702   | MACHINE LEARNING                                     | 0        | 3     | ļ     | ļļ     | 3  | - |
|     |        |  |    |       |                  |      |    |    | ELN5604   | COMPUTER AIDED POWER SYSTEM<br>ANALYSIS              | 0        | 3     | 0     |        | 3  |   |
| E   | LN5703 | CRYPTOGRAPHY AND NETWORK<br>SECURITY               | 0  | 3     | 0                | 0    | 3  | 6  | ELN5602   | ADVANCED COMPENSATION<br>TECHNIQUES IN POWER SYSTEMS | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5701 | INFORMATION RETRIEVAL SYSTEMS                      | 0  | 3     | 0                | 0    | 3  | 6  | ELN5422   | ADVANCED DIGITAL IMAGE<br>PROCESSING                 | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5603 | ELECTRIC POWER SYSTEM ANALYSIS                     | 0  | 3     | 0                | 0    | 3  | 6  | ELN5420   | MULTIMEDIA SECURITY                                  | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5601 | ELECTRIC POWER QUALITY                             | 0  | 3     | 0                | 0    | 3  | 6  | ELN5418   | PATTERN RECOGNITION WITH NEURAL NETWORKS             | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5423 | ANALYSIS OF DYNAMICAL SYSTEMS                      | 0  | 3     | 0                | 0    | 3  | 6  | ELN5416   | ADAPTIVE FILTER THEORY                               | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5417 | MEDICAL IMAGING AND ANALYSIS<br>TECHNIGUES         | 0  | 3     | 0                | 0    | 3  | 6  | ELN5414   | PHOTONIC AND OPTICAL SWITCHING<br>METHODS            | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5415 | PATTERN RECOGNITION                                | 0  | 3     | 0                | 0    | 3  | 6  | ELN5412   | STADE-SPACE AND LINEAR SYSTEM THEORY                 | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5413 | DESIGN AND MANAGEMENT OF<br>COMMUNICATION NETWORKS | Ο  | 3     | 0                | 0    | 3  | 6  | ELN5410   | HIGH SPEED OPTICAL FIBER<br>COMMUNICATION SYSTEMS    | 0        | 3     | 0     | 0      | 3  |   |
| E   | LN5411 | LOCAL AND METROPOLITAN AREA<br>NETWORK             | 0  | 3     | 0                | 0    | 3  | 6  | ELN5408   | DIGITAL TELEVISION TECHNOLOGY<br>AND STANDARDS       | 0        | 3     | 0     | 0      | 3  |   |

Not: The student is expected to take a total of 24 ECTS. credited 4 selective courses in fall term and a total of 12 ECTS. credited 2 selective courses in every academic term. The student have the option of choosing one selective course from another department with the endorsement of the supervisor.



## ULUDAĞ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES 2017-2018 ACADEMIC YEAR COURSE PLAN

|          | EPARTMENT | <b>COF</b> ELECTRONICS ENGIN                                       |      |     |   | CTOR | AI PR | COGRAN | 1       |   |      |   |   |   |        |      |
|----------|-----------|--|------|-----|---|------|-------|--------|---------|---|------|---|---|---|--------|------|
|          |           | I. TERM / FALL   |      | 571 |   |      |       |        |         | II. TERM / SPRING                                 |      |   |   | — |        |      |
|          | Code      | Course Title   | Туре | Т   | U | LC   | redit | ECTS   | Code    | Course Title                                      | Туре | Т | U | L | Credit | ECTS |
|          | ELN6191   | DISSERTATION SUPERVISION I   | С    | 0   | 1 | 0    | 0     | 1      | ELN6192 | DISSERTATION SUPERVISION II                       | C    | 0 | 1 | 0 | 0      | 1    |
|          | ELN6181   | ADVANCED TOPICS IN PHD<br>THESIS I                                 | C    |     | 0 | ļļ   | 0     | 5      | ELN6182 | ADVANCED TOPICS IN PHD THESIS II                  | C    | 4 | 0 | 0 | 0      | 5    |
|          | ELN6503   | ADVANCED TOPICS IN<br>ENGINEERING MATHEMATICS II                   | C    | 3   | 0 | 0    | 3     | 6      | ELN6172 | SEMINAR   | C    | 0 | 2 | 0 | 0      | 4    |
|          |           |  |      |     |   |      |       |        | FEN6000 | RESEARCH TECHNIQUES and<br>PUBLICATION ETHICS     | C    | 2 | 0 | 0 | 2      | 2    |
|          | ELN6101   | WAVELET TRANSFORMS AND<br>THEIR APPLICATIONS                       | 0    | 3   | 0 | 0    | 3     | 6      | ELN6102 | FUZZY LOGIC                                       | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6201   | ADVANCED MICROWAVE<br>TECHNIC                                      | 0    | 3   | 0 | 0    | 3     | 6      | ELN6104 | EVOLUTIONARY ALGORITHMS                           | Ο    | 3 | 0 | 0 | 3      | 6    |
| ĴΕ       | ELN6203   | APPLICATIONS OF WIENEER-HOPF<br>TECNIGUE IN DIFFRACTIONN<br>THEORY | 0    | 3   | 0 | 0    | 3     | 6      | ELN6202 | ADVANCED RADAR TECHNICS                           | 0    | 3 | 0 | 0 | 3      | 6    |
| SE STAGE | ELN6205   | RADAR CROSS SECTION<br>PREDICTION AND REDUCTION<br>TECHNIQUES      | 0    | 3   | 0 | 0    | 3     | 6      | ELN6204 | INTEGRAL EGUATION METHODS FOR<br>ELECTROMAGNETICS | 0    | 3 | 0 | 0 | 3      | 6    |
| COURSE   | ELN6207   | ANALYTICAL METHODS FOR<br>ELEKTROMAGNETICS                         | 0    | 3   | 0 | 0    | 3     | 6      | ELN6206 | RADIOWAVE PROPAGATION OVER<br>GROUND              | 0    | 3 | 0 | 0 | 3      | 6    |
| C        | ELN6209   | ADVANCED ELECTROMAGNETIC<br>SCATTERING                             | 0    | 3   | 0 | 0    | 3     | 6      | ELN6208 | NUMERICAL METHODS FOR<br>ELEKTROMAGNETICS         | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6301   | OPTPELEKCTRONIC SYSTEMS  | Ο    | 3   | 0 | 0    | 3     | 6      | ELN6302 | LASER BASED SYSTEMS                               | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6401   | ESTIMATION THEORY  | 0    | 3   | 0 | 0    | 3     | 6      | ELN6402 | SPECTRUM ESTIMATION                               | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6403   | COMMUNICATION THEORY   | 0    | 3   | 0 | 0    | 3     | 6      | ELN6404 | DIGITAL MODULATION AND CODING                     | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6405   | NONLINEAR EFFECTS IN OPTICAL<br>FIBERS                             | 0    | 3   | 0 | 0    | 3     | 6      | ELN6406 | APPLICATIONS OF NONLINEAR FIBER<br>OPTICS         | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6407   | ANALYSIS AND SYNTHESIS OF SPEECH SIGNALS                           | 0    | 3   | 0 | 0    | 3     | 6      | ELN6408 | TELE-TRAFFIC ENGINEERING                          | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6409   | ADVANCED SWITCHING SYSTEMS   | 0    | 3   | 0 | 0    | 3     | 6      | ELN6410 | DETECTION THEORY                                  | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6413   | CHAOS THEORY AND NONLINEAR SIGNAL PROCESSING                       | 0    | 3   | 0 | 0    | 3     | 6      | ELN6412 | OPTICAL SWITCHING NETWORKS                        | 0    | 3 | 0 | 0 | 3      | 6    |
|          | ELN6415   | STATICAL PATTERN ANALYSIS<br>AND CLASSIFICATION                    | 0    | 3   | 0 | 0    | 3     | 6      | ELN6414 | ADVANCED COMPUTER VISION<br>METHODS               | 0    | 3 | 0 | 0 | 3      | 6    |
|          |           |  |      |     |   |      |       |        |         |   |      |   |   |   |        |      |

|         |         |                                      | Toplam Kredi | 12          | 30      |                     |                                    | Top | lam H | Kred | i 11 | 30 |
|---------|---------|--------------------------------------|--------------|-------------|---------|---------------------|------------------------------------|-----|-------|------|------|----|
|         |         | III. TERM / FALL                     |              |             |         |                     | IV. TERM / SPRING                  |     |       |      |      |    |
|         | ELN6183 | ADVANCED TOPICS IN PHD<br>THESIS III | C 4 0 0      | 0           | 5       | ELN6184             | ADVANCED TOPICS IN PHD THESIS IV   | С   | 4     | 0 0  | 0    | 5  |
|         | ELN6193 | DISSERTATION SUPERVISION III         | C 0 0 0      | 0           | 10      | ELN6194             | DISSERTATION SUPERVISION IV        | С   | 0     | 0 0  | 0    | 25 |
|         | YET6177 | PHD PROFICIENCY                      | C 0 0 0      | 0           | 15      |                     |                                    |     |       |      |      |    |
|         |         |                                      |              |             |         |                     |                                    |     |       |      |      |    |
| THESIS  |         |                                      | Toplam Kredi | 0           | 30      |                     |                                    | Top | lam I | Kred | i 0  | 30 |
| HE      |         | V. TERM / FALL                       |              |             |         |                     | VI. TERM / SPRING                  |     |       |      |      |    |
| STAGE T | ELN6185 | ADVANCED TOPICS IN PHD<br>THESIS V   | C 4 0 0      | 0           | 5       | ELN6186             | ADVANCED TOPICS IN PHD THESIS VI   | С   | 4     | 0 0  | 0    | 5  |
| TA      | ELN6195 | DISSERTATION SUPERVISION V           | C 0 0 0      | 0           | ELN6196 | 0                   | 25                                 |     |       |      |      |    |
|         |         |                                      | Toplam Kredi | 0           | 30      |                     |                                    | Top | lam H | Kred | i 0  | 30 |
| ĺ       |         | VII. TERM / FALL                     | I            |             |         | VIII. TERM / SPRING |                                    |     |       |      |      |    |
|         | ELN6187 | ADVANCED TOPICS IN PHD<br>THESIS VII | C 4 0 0      | 0           | 5       | ELN6188             | ADVANCED TOPICS IN PHD THESIS VIII | С   | 4     | 0 0  | 0    | 5  |
|         | ELN6197 | DISSERTATION SUPERVISION VII         | C 0 0 0      | 0           | 25      | ELN6198             | DISSERTATION SUPERVISION VIII      | С   | 0     | 0 0  | 0    | 25 |
|         |         |                                      |              |             |         |                     |                                    |     |       |      |      |    |
|         |         |                                      | Toplam Kredi |             | Top     | lam I               | Kred                               | i 0 | 30    |      |      |    |
|         |         |                                      | TOTAL C      | <b>REDI</b> | TS: 23  | - <b>TOT</b>        | AL ECTS: 240                       |     |       |      |      |    |

Not: The student is expected to take a total of 15 ECTS. credited 3 selective courses in fall term and a total of 20 ECTS. credited 4 selective courses in every academic term.. The student have the option of choosing one selective course from another department with the endorsement of the supervisor. \*Success in Ph.D. qualifying exam is a prerequisite.



## ULUDAĞ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES 2017-2018 ACADEMIC YEAR COURSE PLAN

# **DEPARTMENT OF** ELECTRONIC ENGINEERING

#### DEPARTMENT / PROGRAM ELECTRONIC ENGINEERING / UNIFIED DOCTORAL PROGRAM

|         | I. TERM / FALL                                     |      |   |   |   |        |      |         | II. TERM / SPRING                               |      |   |   |   |        |      |
|---------|--|------|---|---|---|--------|------|---------|---|------|---|---|---|--------|------|
| Code    | Course Title                                       | Туре | Т | U | L | Credit | ECTS | Code    | Course Title                                    | Туре | Т | U | L | Credit | ECTS |
| ELN6191 | DISSERTATION SUPERVISION I                         | C    | 0 | 1 | 0 | 0      | 1    | ELN6192 | DISSERTATION SUPERVISION II                     | C    | 0 | 1 | 0 | 0      | 1    |
| ELN6181 | ADVANCED TOPICS IN PHD THESIS I                    | C    | 4 | 0 | 0 | 0      | 5    | ELN6182 | ADVANCED TOPICS IN PHD THESIS II                | C    | 4 | 0 | 0 | 0      | 5    |
|         |  |      |   |   |   |        |      | ELN5504 | ADVANCED TOPICS IN ENGINEERING<br>MATHEMATICS I | C    | 3 | 0 | 0 | 3      | 6    |
| ELN5503 | NUMERICAL COMPUTING AND<br>PROGRAMMING             | 0    | 3 | 0 | 0 | 3      | 6    |         |   |      |   |   |   |        |      |
| ELN5101 | ANALOG FILTERS                                     | 0    | 3 | 0 | 0 | 3      | 6    | ELN5504 | TRANSFORMS AND ENGINEERING<br>APPLICATIONS      | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5201 | MICROWAVE TECHNIQUES                               | 0    | 3 | 0 | 0 | 3      | 6    | ELN5102 | ADVANCED MICROPROCESSORS                        | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5203 | ANALYSIS AND DESIGN OF RF<br>CIRCUITS AND SYSTEMS  | 0    | 3 | 0 | 0 | 3      | 6    | ELN5104 | DIGITAL FILTERS                                 | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5205 | HIGH FREQUENCY METHODS IN<br>ELECTROMAGNETIC I     | 0    | 3 | 0 | 0 | 3      | 6    | ELN5202 | MICROWAVE CIRCUITS                              | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5207 | PRINCIPLES OF ELECTROMAGNETIC THEORY               | 0    | 3 | 0 | 0 | 3      | 6    | ELN5204 | MICROWAVE SYSTEMS ENGINEERING                   | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5209 | ADVANCED ANTENNA THEORY                            | 0    | 3 | 0 | 0 | 3      | 6    | ELN5206 | RADAR SYSTEMS                                   | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5211 | BOUNDARY VALUE PROBLEMS I                          | 0    | 3 | 0 | 0 | 3      | 6    | ELN5208 | HIGH FREQUENCY METHODS IN<br>ELECTROMAGNETIC II | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5213 | BIOELECTROMAGNETISM                                | 0    | 3 | 0 | 0 | 3      | 6    | ELN5210 | SPECIAL FUNCTIONS                               | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5301 | OPTOELECTRONIC CIRCUITS                            | Ο    | 3 | 0 | 0 | 3      | 6    | ELN5212 | BOUNDARY VALUE PROBLEMS II                      | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5303 | ADVANCED MICROELECTRONIC DEVICES                   | 0    | 3 | 0 | 0 | 3      | 6    | ELN5214 | QUASI-OPTIC ELECTROMAGNETIC<br>DIFFRACTION      | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5305 | SEMICONDUCTOR DEVICE<br>MANUFACTURING TECHNOLOGIES | 0    | 3 | 0 | 0 | 3      | 6    | ELN5302 | OPTOELECTRONIC CONVERTERS                       | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5401 | ADVANCED SIGNAL PROCESSING                         | 0    | 3 | 0 | 0 | 3      | 6    | ELN5304 | INTEGRATED OPTICS                               | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5403 | MOBILE COMMUNICATION SYSTEMS                       | 0    | 3 | 0 | 0 | 3      | 6    | ELN5306 | PHOTONIC DEVICES                                | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5405 | DIGITAL COMMUNICATION SYSTEMS                      | 0    | 3 | 0 | 0 | 3      | 6    | ELN5402 | RANDOM SIGNAL ANALYSIS                          | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5407 | FIBER OPTIC SENSORS                                | 0    | 3 | 0 | 0 | 3      | 6    | ELN5404 | INFORMATION THEORY                              | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5409 | OPTICAL FIBER COMMUNICATION<br>SYSTEMS             | 0    | 3 | 0 | 0 | 3      | 6    | ELN5406 | RADIO COMMUNICATION SYSTEMS                     | 0    | 3 | 0 | 0 | 3      | 6    |
| ELN5411 | LOCAL AND METROPOLITAN AREA<br>NETWORK             | 0    | 3 | 0 | 0 | 3      | 6    | ELN5408 | DIGITAL TELEVISION TECHNOLOGY<br>AND STANDARDS  | 0    | 3 | 0 | 0 | 3      | 6    |

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|         |  | Тс | otal ( | Crec | lits | 12 | 30 |         |  | Tot | tal ( | Cree | dits | 12 | 30 |
|---------|--|----|--------|------|------|----|----|---------|--|-----|-------|------|------|----|----|
|         |  |    |        |      |      |    |    |         |  |     |       |      |      |    |    |
|         |  |    |        |      |      |    |    |         |  |     |       |      |      |    |    |
|         |  |    |        |      |      |    |    | ELN5704 | COMPUTER SECURİTY                                    | 0   | 3     | 0    | 0    | 3  | (  |
|         |  | 1  |        |      |      |    |    | ELN5702 | MACHINE LEARNING                                     | 0   | 3     | 0    | 0    | 3  | (  |
|         |  |    |        |      |      |    |    | ELN5604 | COMPUTER AIDED POWER SYSTEM<br>ANALYSIS              | 0   | 3     | 0    | 0    | 3  |    |
| ELN5703 | CRYPTOGRAPHY AND NETWORK<br>SECURITY               | 0  | 3      | 0    | 0    | 3  | 6  | ELN5602 | ADVANCED COMPENSATION<br>TECHNIQUES IN POWER SYSTEMS | 0   | 3     | 0    | 0    | 3  |    |
| ELN5701 | INFORMATION RETRIEVAL SYSTEMS                      | 0  | 3      | 0    | 0    | 3  | 6  | ELN5422 | ADVANCED DIGITAL IMAGE<br>PROCESSING                 | 0   | 3     | 0    | 0    | 3  |    |
| ELN5603 | ELECTRIC POWER SYSTEM ANALYSIS                     | 0  | 3      | 0    | 0    | 3  | 6  | ELN5420 | MULTIMEDIA SECURITY                                  | 0   | 3     | 0    | 0    | 3  |    |
| ELN5601 | ELECTRIC POWER QUALITY                             | 0  | 3      | 0    | 0    | 3  | 6  | ELN5418 | PATTERN RECOGNITION WITH NEURAL NETWORKS             | 0   | 3     | 0    | 0    | 3  |    |
| ELN5423 | ANALYSIS OF DYNAMICAL SYSTEMS                      | 0  | 3      | 0    | 0    | 3  | 6  | ELN5416 | ADAPTIVE FILTER THEORY                               | 0   | 3     | 0    | 0    | 3  |    |
| ELN5417 | MEDICAL IMAGING AND ANALYSIS<br>TECHNIGUES         | 0  | 3      | 0    | 0    | 3  | 6  | ELN5414 | PHOTONIC AND OPTICAL SWITCHING METHODS               | 0   | 3     | 0    | 0    | 3  | e  |
| ELN5415 | PATTERN RECOGNITION                                | 0  | 3      | 0    | 0    | 3  | 6  | ELN5412 | STADE-SPACE AND LINEAR SYSTEM<br>THEORY              | 0   | 3     | 0    | 0    | 3  | (  |
| ELN5413 | DESIGN AND MANAGEMENT OF<br>COMMUNICATION NETWORKS | 0  | 3      | 0    | 0    | 3  | 6  | ELN5410 | HIGH SPEED OPTICAL FIBER<br>COMMUNICATION SYSTEMS    | 0   | 3     | 0    | 0    | 3  |    |

Not: The student is expected to take a total of 24 ECTS. credited 4 selective courses in fall term and a total of 18 ECTS. credited 3 selective courses in every academic term.. The student have the option of choosing one selective course from another department with the endorsement of the supervisor.

|        |         | III. TERM / FALI                                  | 1    |     |     |        |      |         | IV. TERM / SPRING                             |      |   |   |   |        |      |
|--------|---------|---|------|-----|-----|--------|------|---------|---|------|---|---|---|--------|------|
|        | Code    | Course Title                                      | Туре | ΤI  | UL  | Credit | ECTS | Code    | Course Title                                  | Туре | Т | U | L | Credit | ECTS |
|        | ELN6191 | DISSERTATION SUPERVISION III                      | C    | 0   | 1 0 | 0      | 1    | ELN6192 | DISSERTATION SUPERVISION IV                   | C    | 0 | 1 | 0 | 0      | 1    |
| TAGE   | ELN6181 | ADVANCED TOPICS IN PHD<br>THESIS III              | С    | 4 ( | 0 0 | 0      | 5    | ELN6182 | ADVANCED TOPICS IN PHD THESIS IV              | С    | 4 | 0 | 0 | 0      | 5    |
| S IS   | ELN6503 | ADVANCED TOPICS IN<br>ENGINEERING MATHEMATICS III | C    | 3 ( | 0 0 | 3      | 6    | ELN6172 | SEMINAR                                       | C    | 0 | 2 | 0 | 0      | 4    |
| COURSE |         |   |      |     |     |        |      | FEN6000 | RESEARCH TECHNIQUES and<br>PUBLICATION ETHICS | C    | 2 | 0 | 0 | 2      | 2    |
|        | ELN6101 | WAVELET TRANSFORMS AND<br>THEIR APPLICATIONS      | 0    | 3 ( | 0 0 | 3      | 6    | ELN6102 | FUZZY LOGIC                                   | 0    | 3 | 0 | 0 | 3      | 6    |
|        | ELN6201 | ADVANCED MICROWAVE                                | 0    | 3   | 0 0 | 3      | 6    | ELN6104 | EVOLUTIONARY ALGORITHMS                       | 0    | 3 | 0 | 0 | 3      | 6    |

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|         | TECHNIC  |     |     |    |     |    |    |          |   |          |      |            |     |    |    |
|---------|--|-----|-----|----|-----|----|----|----------|---|----------|------|------------|-----|----|----|
| ELN6203 | APPLICATIONS OF WIENEER-HOPF<br>TECNIGUE IN DIFFRACTIONN<br>THEORY | 0   | 3   | 0  | 0   | 3  | 6  | ELN6202  | ADVANCED RADAR TECHNICS                           | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6205 | RADAR CROSS SECTION<br>PREDICTION AND REDUCTION<br>TECHNIQUES      | 0   | 3   | 0  | 0   | 3  | 6  | ELN6204  | INTEGRAL EGUATION METHODS FOR<br>ELECTROMAGNETICS | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6207 | ANALYTICAL METHODS FOR<br>ELEKTROMAGNETICS                         | 0   | 3   | 0  | 0   | 3  | 6  | ELN6206  | RADIOWAVE PROPAGATION OVER<br>GROUND              | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6209 | ADVANCED ELECTROMAGNETIC<br>SCATTERING                             | 0   | 3   | 0  | 0   | 3  | 6  | ELN6208  | NUMERICAL METHODS FOR<br>ELEKTROMAGNETICS         | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6301 | OPTPELEKCTRONIC SYSTEMS  | 0   | 3   | 0  | 0   | 3  | 6  | ELN6302  | LASER BASED SYSTEMS                               | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6401 | ESTIMATION THEORY  | 0   | 3   | 0  | 0   | 3  | 6  | ELN6402  | SPECTRUM ESTIMATION                               | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6403 | COMMUNICATION THEORY   | 0   | 3   | 0  | 0   | 3  | 6  | ELN6404  | DIGITAL MODULATION AND CODING                     | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6405 | NONLINEAR EFFECTS IN OPTICAL<br>FIBERS                             | Ο   | 3   | 0  | 0   | 3  | 6  | ELN6406  | APPLICATIONS OF NONLINEAR FIBER<br>OPTICS         | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6407 | ANALYSIS AND SYNTHESIS OF<br>SPEECH SIGNALS                        | 0   | 3   | 0  | 0   | 3  | 6  | ELN6408  | TELE-TRAFFIC ENGINEERING                          | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6409 | ADVANCED SWITCHING SYSTEMS   | 0   | 3   | Ļ  | 0   | 3  | 6  | ELN6410  | DETECTION THEORY                                  | 0        | 3    | . <b>.</b> |     | 3  | 6  |
| ELN6413 | CHAOS THEORY AND NONLINEAR<br>SIGNAL PROCESSING                    | 0   | 3   | 0  | 0   | 3  | 6  | ELN6412  | OPTICAL SWITCHING NETWORKS                        | 0        | 3    | 0          | 0   | 3  | 6  |
| ELN6415 | STATICAL PATTERN ANALYSIS<br>AND CLASSIFICATION                    | Ο   | 3   | 0  | 0   | 3  | 6  | ELN6414  | ADVANCED COMPUTER VISION<br>METHODS               | 0        | 3    | 0          | 0   | 3  | 6  |
|         |  | Тор | lam | Kr | edi | 14 | 30 |          |   | Тој      | olam | Kre        | edi | 12 | 30 |
|         | V. TERM / FALL   |     |     |    |     |    |    |          | VI. TERM / SPRING                                 |          |      |            |     |    |    |
| ELN6185 | ADVANCED TOPICS IN PHD<br>THESIS V                                 | С   | 4   | 0  | 0   | 0  | 5  | ELN6186  | ADVANCED TOPICS IN PHD THESIS VI                  | С        | 4    | 0          | 0   | 0  | 5  |
| ELN6195 | DISSERTATION SUPERVISION V   | С   |     | ÷  | 0   | 0  | 10 | ELN6196  | DISSERTATION SUPERVISION VI                       | С        | 0    | 0          | 0   | 0  | 25 |
| YET6177 | PHD PROFICIENCY  | С   | 0   | 0  | 0   | 0  | 15 |          |   |          |      |            |     |    |    |
|         |  |     |     |    |     |    |    |          |   |          |      |            |     |    |    |
|         |  | Тор | lam | Kr | edi | 0  | 30 |          |   | Тор      | olam | Kre        | edi | 0  | 30 |
|         | VII. TERM / FALI   | 1   |     | 1  |     |    | 1  | <u> </u> | VIII. TERM / SPRING                               |          |      | 1          |     |    |    |
| ELN6187 | ADVANCED TOPICS IN PHD<br>THESIS VII                               | С   | 4   | Ļ  | 0   | 0  | 5  | ELN6188  | ADVANCED TOPICS IN PHD THESIS VIII                | С        |      | 0          |     | 0  | 5  |
| ELN6197 | DISSERTATION SUPERVISION VII                                       | C   |     |    | 0   | 0  | 25 | ELN6198  | DISSERTATION SUPERVISION VIII                     | <u>C</u> |      | 0          |     | 0  | 25 |
|         |  | Тор | lam | Kr | edi | 0  | 30 |          | V MEDIA (ODDING                                   | Тор      | olam | Kre        | edi | 0  | 30 |
|         | IX. TERM / FALL  |     |     |    |     |    |    |          | X. TERM / SPRING                                  |          |      |            |     |    |    |
| ELN6189 | ADVANCED TOPICS IN PHD<br>THESIS IX                                | С   | 4   | 0  | 0   | 0  | 5  | ELN6190  | ADVANCED TOPICS IN PHD THESIS X                   | С        | 4    | 0          | 0   | 0  | 5  |

| ELN6199 | DISSERTATION SUPERVISION IX | C 0 0 0 0      | 25      | ELN6200 DISSERTATION SUPERVISION X | C 0 0 0 0 25      |
|---------|-----------------------------|----------------|---------|------------------------------------|-------------------|
|         |                             |                |         |                                    |                   |
|         |                             | Toplam Kredi 0 | 30      |                                    | Toplam Kredi 0 30 |
|         |                             | TOTAL CRED     | ITS: 47 | - TOTAL ECTS: 300                  |                   |

Not: The student is expected to take a total of 15 ECTS. credited 3 selective courses in fall term and a total of 20 ECTS. credited 4 selective courses in every academic term.. The student have the option of choosing one selective course from another department with the endorsement of the supervisor. \*Success in Ph.D. qualifying exam is a prerequisite.