

## ELECTRICAL SCIENCE AND ENGINEERING (COURSE 6-1)

Department of Electrical Engineering and Computer Science (<http://catalog.mit.edu/schools/engineering/electrical-engineering-computer-science/#undergraduatestudytext>)

### Bachelor of Science in Electrical Science and Engineering

#### General Institute Requirements (GIRs)

The General Institute Requirements include a Communication Requirement that is integrated into both the HASS Requirement and the requirements of each major; see details below.

| Summary of Subject Requirements   | Subjects  |
|---|-----------|
| Science Requirement   | 6         |
| Humanities, Arts, and Social Sciences (HASS) Requirement [one subject can be satisfied by 6.805]] in the Departmental Program]; at least two of these subjects must be designated as communication-intensive (CI-H) to fulfill the Communication Requirement. | 8         |
| Restricted Electives in Science and Technology (REST) Requirement [satisfied from among 6.002, 6.003, 6.004, or 6.007 and 18.03, 18.05, or 18.600 in the Departmental Program]  | 2         |
| Laboratory Requirement (12 units) [satisfied by 6.01, 6.02, or 6.03 together in the Departmental Program]   | 1         |
| <b>Total GIR Subjects Required for SB Degree</b>  | <b>17</b> |

#### Physical Education Requirement

Swimming requirement, plus four physical education courses for eight points.

#### Departmental Program

Choose at least two subjects in the major that are designated as communication-intensive (CI-M) to fulfill the Communication Requirement.

| Departmental Requirements                                     | Units |
|---|-------|
| 6.0001 Introduction to Computer Science Programming in Python | 6     |
| 18.03 Differential Equations                                  | 6-12  |
| or 2.087 Engineering Mathematics: Linear Algebra and ODEs     |       |
| 6.UAT Oral Communication (CI-M) <sup>1</sup>                  | 9     |
| <i>Select one of the following:</i>                           | 12    |
| 6.01 Introduction to EECS via Robotics                        |       |
| 6.02 Introduction to EECS via Communications Networks         |       |

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| 6.03 Introduction to EECS via Medical Technology                             |            |
| <b>Electrical Engineering Requirements</b>                                   |            |
| 6.002 Circuits and Electronics   | 12         |
| 6.003 Signals and Systems  | 12         |
| 6.004 Computation Structures   | 12         |
| or 6.007 Electromagnetic Energy: From Motors to Solar Cells                  |            |
| <i>Select three of the following:</i>  | 36         |
| 6.011 Signals, Systems and Inference   |            |
| 6.012 Microelectronic Devices and Circuits                                   |            |
| 6.013 Electromagnetics and Applications                                      |            |
| 6.021]] Cellular Neurophysiology and Computing                               |            |
| 6.036 Introduction to Machine Learning                                       |            |
| <b>Elective Subjects <sup>2</sup></b>  |            |
| Select two subjects from the list of Advanced Undergraduate Subjects         | 24-27      |
| Select two subjects from the departmental list of EECS subjects <sup>3</sup> | 24         |
| <b>Units in Major</b>  | 153-165    |
| <b>Unrestricted Electives</b>  | 51-63      |
| Units in Major That Also Satisfy the GIRs                                    | (24-48)    |
| <b>Total Units Beyond the GIRs Required for SB Degree</b>                    | <b>180</b> |

The units for any subject that counts as one of the 17 GIR subjects cannot also be counted as units required beyond the GIRs.

<sup>1</sup> 6.UAR Seminar in Undergraduate Advanced Research is also an acceptable option.

<sup>2</sup> Chosen electives must satisfy each of the following categories: Advanced Departmental Laboratory, Independent Inquiry, and Probability. A subject may count toward more than one category.

<sup>3</sup> See departmental website (<http://www.eecs.mit.edu/academics-admissions/undergraduate-programs>) for list of acceptable EECS subjects.

#### Advanced Undergraduate Subjects

|   |    |
|---|----|
| 6.023]] Fields, Forces and Flows in Biological Systems    | 12 |
| 6.025]] Medical Device Design (CI-M)                      | 12 |
| 6.035 Computer Language Engineering                       | 12 |
| 6.047 Computational Biology: Genomes, Networks, Evolution | 12 |
| 6.061 Introduction to Electric Power Systems              | 12 |
| 6.101 Introductory Analog Electronics Laboratory (CI-M)   | 12 |
| 6.111 Introductory Digital Systems Laboratory             | 12 |

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|--|--|----|-------------------------------------|---|----|
| 6.115  | Microcomputer Project Laboratory (CI-M)                  | 12 | 6.161                               | Modern Optics Project Laboratory (CI-M)                       | 12 |
| 6.131  | Power Electronics Laboratory (CI-M)                      | 12 | 6.163                               | Strobe Project Laboratory (CI-M)                              | 12 |
| 6.172  | Performance Engineering of Software Systems              | 18 | 6.170                               | Software Studio   | 12 |
| 6.175  | Constructive Computer Architecture                       | 12 | 6.172                               | Performance Engineering of Software Systems                   | 18 |
| 6.301  | Solid-State Circuits                                     | 12 | 6.175                               | Constructive Computer Architecture                            | 12 |
| 6.302  | Feedback System Design                                   | 12 | 6.182                               | Psychoacoustics Project Laboratory (CI-M)                     | 12 |
| 6.602  | Fundamentals of Photonics                                | 12 | 6.302                               | Feedback System Design  | 12 |
| 6.701  | Introduction to Nanoelectronics                          | 12 | 6.804[J]                            | Computational Cognitive Science                               | 12 |
| 6.717[J]   | Design and Fabrication of Microelectromechanical Systems | 12 | 6.806                               | Advanced Natural Language Processing                          | 12 |
| 6.801  | Machine Vision   | 12 | 6.816                               | Multicore Programming   | 12 |
| 6.802[J]   | Foundations of Computational and Systems Biology         | 12 | 6.819                               | Advances in Computer Vision                                   | 12 |
| 6.803  | The Human Intelligence Enterprise                        | 12 | 6.837                               | Computer Graphics   | 12 |
| 6.804[J]   | Computational Cognitive Science                          | 12 | <b>Independent Inquiry Subjects</b> |   |    |
| 6.806  | Advanced Natural Language Processing                     | 12 | 6.035                               | Computer Language Engineering                                 | 12 |
| 6.813  | User Interface Design and Implementation                 | 12 | 6.047                               | Computational Biology: Genomes, Networks, Evolution           | 12 |
| 6.814  | Database Systems   | 12 | 6.100                               | Electrical Engineering and Computer Science Project           | 12 |
| 6.815  | Digital and Computational Photography                    | 12 | 6.111                               | Introductory Digital Systems Laboratory                       | 12 |
| 6.816  | Multicore Programming                                    | 12 | 6.1151                              | Microcomputer Project Laboratory - Independent Inquiry (CI-M) | 15 |
| 6.819  | Advances in Computer Vision                              | 12 | 6.129[J]                            | Biological Circuit Engineering Laboratory (CI-M)              | 12 |
| 6.837  | Computer Graphics  | 12 | 6.1311                              | Power Electronics Laboratory - Independent Inquiry (CI-M)     | 15 |
| 6.905  | Large-scale Symbolic Systems                             | 12 | 6.141[J]                            | Robotics: Science and Systems (CI-M)                          | 12 |
| <b>Advanced Departmental Laboratory Subjects</b> |  |    | 6.161                               | Modern Optics Project Laboratory (CI-M)                       | 12 |
| 6.025[J]   | Medical Device Design (CI-M)                             | 12 | 6.163                               | Strobe Project Laboratory (CI-M)                              | 12 |
| 6.035  | Computer Language Engineering                            | 12 | 6.170                               | Software Studio   | 12 |
| 6.047  | Computational Biology: Genomes, Networks, Evolution      | 12 | 6.172                               | Performance Engineering of Software Systems                   | 18 |
| 6.073[J]   | Creating Video Games                                     | 12 | 6.182                               | Psychoacoustics Project Laboratory (CI-M)                     | 12 |
| 6.101  | Introductory Analog Electronics Laboratory (CI-M)        | 12 | 6.805[J]                            | Foundations of Information Policy (CI-M)                      | 12 |
| 6.111  | Introductory Digital Systems Laboratory                  | 12 | 6.806                               | Advanced Natural Language Processing                          | 12 |
| 6.115  | Microcomputer Project Laboratory (CI-M)                  | 12 | 6.811[J]                            | Principles and Practice of Assistive Technology               | 12 |
| 6.129[J]   | Biological Circuit Engineering Laboratory (CI-M)         | 12 | 6.819                               | Advances in Computer Vision                                   | 12 |
| 6.131  | Power Electronics Laboratory (CI-M)                      | 12 |                                     |   |    |
| 6.141[J]   | Robotics: Science and Systems (CI-M)                     | 12 |                                     |   |    |
| 6.152[J]   | Micro/Nano Processing Technology (CI-M)                  | 12 |                                     |   |    |

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| 6.905 | Large-scale Symbolic Systems | 12 |
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**Probability Subjects**

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| 6.008 | Introduction to Inference | 12 |
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| 6.041A | Introduction to Probability I | 6 |
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| 18.05 | Introduction to Probability and Statistics | 12 |
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| 18.600 | Probability and Random Variables | 12 |
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