

## COMPUTER SCIENCE AND ENGINEERING (COURSE 6-3)

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

### Bachelor of Science in Computer 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[ <i>J</i> ] 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 [can be satisfied by 6.004 and 6.042[ <i>J</i> ] (if taken under joint number 18.062[ <i>J</i> ]) in the Department Program]  | 2         |
| Laboratory Requirement (12 units) [satisfied by 6.01, 6.02, 6.03 or 6.08 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     |
| 6.042[ <i>J</i> ] Mathematics for Computer Science                | 12    |
| Select one of the following:                                      | 9-12  |
| 6.UAT Oral Communication (CI-M)                                   |       |
| 6.UAR Seminar in Undergraduate Advanced Research (12 units, CI-M) |       |
| Select one of the following:                                      | 12    |
| 6.01 Introduction to EECS via Robotics                            |       |

|      |  |
|------|--|
| 6.02 | Introduction to EECS via Communication Networks          |
| 6.03 | Introduction to EECS via Medical Technology              |
| 6.08 | Introduction to EECS via Interconnected Embedded Systems |

#### Computer Science Requirements

|                      |                                     |    |
|----------------------|-------------------------------------|----|
| 6.004                | Computation Structures              | 12 |
| 6.006                | Introduction to Algorithms          | 12 |
| 6.009                | Fundamentals of Programming         | 12 |
| 6.031                | Elements of Software Construction   | 15 |
| 6.033                | Computer Systems Engineering (CI-M) | 12 |
| 6.034                | Artificial Intelligence             | 12 |
| or 6.036             | Introduction to Machine Learning    |    |
| 6.045[ <i>J</i> ]    | Computability and Complexity Theory | 12 |
| or 6.046[ <i>J</i> ] | Design and Analysis of Algorithms   |    |

#### Elective Subjects <sup>1</sup>

|   |       |
|---|-------|
| Select two Advanced Undergraduate Subjects                                  | 24-30 |
| Select one subject from the departmental list of EECS subjects <sup>2</sup> | 12    |

**Units in Major** **162-171**

**Unrestricted Electives** **48-66**

Units in Major That Also Satisfy the GIRs (36-48)

Total Units Beyond the GIRs Required for SB Degree 180-183

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> Of the three required AUS and EECS subjects, at least one must be from the list of Independent Inquiry Subjects.

<sup>2</sup> See departmental website (<http://www.eecs.mit.edu/academics-admissions/undergraduate-programs>) for list of acceptable EECS subjects.

#### Advanced Undergraduate Subjects

|                   |   |    |
|-------------------|---|----|
| 6.023[ <i>J</i> ] | Fields, Forces and Flows in Biological Systems      | 12 |
| 6.025[ <i>J</i> ] | Medical Device Design (CI-M)                        | 12 |
| 6.026[ <i>J</i> ] | Biomedical Signal and Image Processing              | 12 |
| 6.027[ <i>J</i> ] | Biomolecular Feedback Systems                       | 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             | Digital Systems Laboratory                          | 12 |

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|          |  |    |
|----------|--|----|
| 6.115    | Microcomputer Project Laboratory (CI-M)                                      | 12 |
| 6.1151   | Microcomputer Project Laboratory - Independent Inquiry                       | 15 |
| 6.131    | Power Electronics Laboratory (CI-M)  | 12 |
| 6.1311   | Power Electronics Laboratory - Independent Inquiry                           | 15 |
| 6.170    | Software Studio  | 15 |
| 6.172    | Software Performance Engineering   | 18 |
| 6.175    | Constructive Computer Architecture   | 12 |
| 6.207[J] | Networks   | 12 |
| 6.215    | Optimization Methods   | 12 |
| 6.301    | Solid-State Circuits   | 12 |
| 6.302    | Feedback System Design   | 12 |
| 6.401    | Introduction to Statistical Data Analysis                                    | 12 |
| 6.402    | Modeling with Machine Learning: from Algorithms to Applications <sup>1</sup> | 6  |
| 6.419[J] | Statistics, Computation and Applications                                     | 12 |
| 6.580[J] | Principles of Synthetic Biology  | 12 |
| 6.602    | Fundamentals of Photonics  | 12 |
| 6.701    | Introduction to Nanoelectronics  | 12 |
| 6.717[J] | Design and Fabrication of Microelectromechanical Systems                     | 12 |
| 6.801    | Machine Vision   | 12 |
| 6.802[J] | Computational Systems Biology: Deep Learning in the Life Sciences            | 12 |
| 6.803    | The Human Intelligence Enterprise  | 12 |
| 6.804[J] | Computational Cognitive Science  | 12 |
| 6.806    | Advanced Natural Language Processing   | 12 |
| 6.808[J] | Mobile and Sensor Computing  | 12 |
| 6.810    | Engineering Interactive Technologies   | 12 |
| 6.814    | Database Systems   | 12 |
| 6.815    | Digital and Computational Photography  | 12 |
| 6.816    | Multicore Programming  | 12 |
| 6.817[J] | Principles of Autonomy and Decision Making                                   | 12 |
| 6.818    | Dynamic Computer Language Engineering  | 12 |
| 6.819    | Advances in Computer Vision  | 12 |
| 6.837    | Computer Graphics  | 12 |
| 6.905    | Large-scale Symbolic Systems   | 12 |
| 18.404   | Theory of Computation  | 12 |

**Independent Inquiry Subjects**

|          |  |    |
|----------|--|----|
| 6.035    | Computer Language Engineering  | 12 |
| 6.047    | Computational Biology: Genomes, Networks, Evolution                          | 12 |
| 6.111    | Digital Systems Laboratory   | 12 |
| 6.1151   | Microcomputer Project Laboratory - Independent Inquiry (CI-M)                | 15 |
| 6.129[J] | Biological Circuit Engineering Laboratory (CI-M)                             | 12 |
| 6.1311   | Power Electronics Laboratory - Independent Inquiry (CI-M)                    | 15 |
| 6.141[J] | Robotics: Science and Systems (CI-M)   | 12 |
| 6.161    | Modern Optics Project Laboratory (CI-M)                                      | 12 |
| 6.163    | Strobe Project Laboratory (CI-M)   | 12 |
| 6.170    | Software Studio  | 15 |
| 6.172    | Software Performance Engineering   | 18 |
| 6.182    | Psychoacoustics Project Laboratory (CI-M)                                    | 12 |
| 6.185[J] | Interactive Music Systems  | 12 |
| 6.338[J] | Parallel Computing and Scientific Machine Learning                           | 12 |
| 6.402    | Modeling with Machine Learning: from Algorithms to Applications <sup>1</sup> | 6  |
| 6.419[J] | Statistics, Computation and Applications                                     | 12 |
| 6.439[J] | Statistics, Computation and Applications                                     | 12 |
| 6.804[J] | Computational Cognitive Science  | 12 |
| 6.805[J] | Foundations of Information Policy (CI-M)                                     | 12 |
| 6.806    | Advanced Natural Language Processing   | 12 |
| 6.807    | Computational Design and Fabrication   | 12 |
| 6.808[J] | Mobile and Sensor Computing  | 12 |
| 6.810    | Engineering Interactive Technologies   | 12 |
| 6.811[J] | Principles and Practice of Assistive Technology                              | 12 |
| 6.818    | Dynamic Computer Language Engineering  | 12 |
| 6.819    | Advances in Computer Vision  | 12 |
| 6.864    | Advanced Natural Language Processing   | 12 |
| 6.869    | Advances in Computer Vision  | 12 |
| 6.871[J] | Machine Learning for Healthcare  | 12 |

|          |   |    |
|----------|---|----|
| 6.878[J] | Advanced Computational Biology:<br>Genomes, Networks, Evolution | 12 |
| 6.9041   | Ethics for Engineers - Independent<br>Inquiry                   | 12 |
| 6.905    | Large-scale Symbolic Systems                                    | 12 |
| 6.945    | Large-scale Symbolic Systems                                    | 12 |
| 6.UAR    | Seminar in Undergraduate Advanced<br>Research                   | 6  |

<sup>1</sup> *Students cannot receive credit without simultaneous completion of a 6-unit Common Ground disciplinary module. See subject description for more information.*