# COMPUTATION AND COGNITION (COURSE 6-9)

Computation and Cognition (*http://catalog.mit.edu/interdisciplinary/undergraduate-programs/degrees/computation-cognition*)

## Bachelor of Science in Computation and Cognition (Course 6-9)

### 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 [two subjects can be satisfied by 9.46 and 9.85 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 9.01 and 6.1200[J], 18.03, or 18.06 in the Departmental Program] | 2 |
| Laboratory Requirement (12 units) [can be satisfied by a laboratory in the Departmental Program] | 1 |
| **Total GIR Subjects Required for SB Degree** | **17** |

| 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.

| Required Subjects | | Units |
|---|---|---|
| 6.100A | Introduction to Computer Science Programming in Python | 6 |
| 9.01 | Introduction to Neuroscience | 12 |
| *Select one of the following:* | | 12 |
| 6.1200[J] | Mathematics for Computer Science | |
| 18.03 | Differential Equations | |
| 18.06 | Linear Algebra | |
| *Select one of the following:* | | 12 |
| 6.3700 | Introduction to Probability | |
| 6.3800 | Introduction to Inference | |

| | | |
|---|---|---|
| 9.07 | Statistics for Brain and Cognitive Science [1] | |

| **EECS Program Subjects** | | |
|---|---|---|
| 6.3000 | Signal Processing | 12 |
| or 6.4100 | Artificial Intelligence | |
| 6.3900 | Introduction to Machine Learning [1] | 12 |
| *Select two of the following:* | | 24 |
| 6.1010 | Fundamentals of Programming | |
| 6.1210 | Introduction to Algorithms | |
| 6.2000 | Electrical Circuits: Modeling and Design of Physical Systems | |

| **BCS Program Subjects** | | |
|---|---|---|

*Brain Systems/Neurophysiology*

| *Select one of the following:* | | 12 |
|---|---|---|
| 9.09[J] | Cellular and Molecular Neurobiology | |
| 9.13 | The Human Brain | |
| 9.18[J] | Developmental Neurobiology | |
| 9.21[J] | Cellular Neurophysiology and Computing | |
| 9.35 | Perception | |
| 9.40 | Introduction to Neural Computation [1] | |
| 9.67[J] | Materials Physics of Neural Interfaces (CI-M) | |

*Computation and Cognition*

| *Select one of the following:* | | 12 |
|---|---|---|
| 9.19 | Computational Psycholinguistics [1] | |
| 9.49 | Neural Circuits for Cognition | |
| 9.53 | Emergent Computations Within Distributed Neural Circuits | |
| 9.66[J] | Computational Cognitive Science | |
| 9.85 | Infant and Early Childhood Cognition (CI-M) [1] | |

| **Program Electives** | | |
|---|---|---|
| One subject from the BCS/EECS Joint Electives list | | 12 |
| One subject from the BCS Electives or BCS/EECS Joint Electives list | | 9-12 |

| **Laboratory** | | |
|---|---|---|
| One subject from the Laboratory Subjects list | | 12 |

| **Advanced Undergraduate Project** | | |
|---|---|---|
| *Select one of the following:* | | 9-18 |
| 6.UAR | Seminar in Undergraduate Advanced Research (12 units, CI-M) | |
| 6.UAT | Oral Communication (CI-M) | |
| 9.41 | Research and Communication in Neuroscience and Cognitive Science (CI-M) | |
| 9.58 | Projects in the Science of Intelligence (CI-M) | |

| | | |
|---|---|---|
| **Units in Major** | | **156-168** |
| **Unrestricted Electives** | | **48-84** |
| Units in Major That Also Satisfy the GIRs | | (36-60) |
| **Total Units Beyond the GIRs Required for SB Degree** | | **180** |

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

[1]   Subject has prerequisites that are outside of the program.

[2]   Subjects that also appear in one of the electives lists can count as either a BCS Program Subject or a Program Elective, but not both.

### BCS/EECS Joint Electives [1]

| | | |
|---|---|---|
| 6.4100 | Artificial Intelligence | 12 |
| 6.4200[J] | Robotics: Science and Systems | 12 |
| 6.8301 | Advances in Computer Vision | 15 |
| 6.8611 | Quantitative Methods for Natural Language Processing | 15 |
| 9.19 | Computational Psycholinguistics | 12 |
| 9.21[J] | Cellular Neurophysiology and Computing [2] | 12 |
| 9.35 | Perception | 12 |
| 9.40 | Introduction to Neural Computation | 12 |
| 9.49 | Neural Circuits for Cognition | 12 |
| 9.66[J] | Computational Cognitive Science | 12 |

### BCS Electives [1]

| | | |
|---|---|---|
| 9.09[J] | Cellular and Molecular Neurobiology | 12 |
| 9.13 | The Human Brain | 12 |
| 9.18[J] | Developmental Neurobiology | 12 |
| 9.24 | Disorders and Diseases of the Nervous System [2] | 12 |
| 9.26[J] | Principles and Applications of Genetic Engineering for Biotechnology and Neuroscience [2] | 12 |
| 9.36 | Neurobiology of Self | 12 |
| 9.42 | The Brain and Its Interface with the Body [2] | 12 |
| 9.53 | Emergent Computations Within Distributed Neural Circuits | 12 |
| 9.85 | Infant and Early Childhood Cognition [2] | 12 |

### Laboratory Subjects

| | | |
|---|---|---|
| 6.2040 | Analog Electronics Laboratory (CI-M) | 12 |
| 6.2050 | Digital Systems Laboratory | 12 |
| 6.2060 | Microcomputer Project Laboratory (CI-M) | 12 |
| 6.2370 | Modern Optics Project Laboratory (CI-M) | 12 |
| 6.4200[J] | Robotics: Science and Systems (CI-M) | 12 |
| 6.4880[J] | Biological Circuit Engineering Laboratory (CI-M) | 12 |
| 9.17 | Systems Neuroscience Laboratory (CI-M) | 12 |
| 9.59[J] | Laboratory in Psycholinguistics (CI-M) | 12 |
| 9.60 | Machine-Motivated Human Vision (CI-M) [2] | 12 |

[1]   Subjects that also appear in the list of BCS Program Subjects can count as either a BCS Program Subject or a Program Elective, but not both.

[2]   Subject has prerequisites that are outside of the program.