

## COMPUTATION AND COGNITION (COURSE 6-9P)

Computation and Cognition (<https://catalog.mit.edu/interdisciplinary/graduate-programs/computation-cognition>)

### Master of Engineering in Computation and Cognition

The Master of Engineering degree is awarded only to students who have already received, or who will simultaneously receive, the Bachelor of Science in Computation and Cognition (Course 6-9). Refer to the undergraduate degree chart (<https://catalog.mit.edu/degree-charts/computation-cognition-6-9>) for requirements.

The graduate component of the MEng program is described below.

#### Course 6-9P Graduate Requirements

##### Required Subjects

##### Restricted Electives

Four graduate subjects, including at least one EECS advanced subject and at least one BCS advanced subject 42-48

Two mathematics restricted elective subjects 24

##### Thesis

9.THM Master of Engineering Program Thesis <sup>1</sup> 24

**Total Units 90-96**

#### EECS Advanced Subjects

6.2532	Nanoelectronics	12
6.3952	AI, Decision Making, and Society	12
6.4812[[]]	Cellular Neurophysiology and Computing	12
6.4822[[]]	Quantitative Physiology: Organ Transport Systems	12
6.4832[[]]	Fields, Forces, and Flows in Biological Systems	12
6.4842[[]]	Molecular, Cellular, and Tissue Biomechanics	12
6.4861[[]]	Medical Device Design	12
6.5080	Multicore Programming	12
6.5110	Foundations of Program Analysis	12
6.5150	Large-scale Symbolic Systems	12
6.5160[[]]	Classical Mechanics: A Computational Approach	12
6.5210[[]]	Advanced Algorithms	12
6.5220[[]]	Randomized Algorithms	12
6.5230	Advanced Data Structures	12
6.5250[[]]	Distributed Algorithms	12

6.5310	Geometric Folding Algorithms: Linkages, Origami, Polyhedra	12
6.5320	Geometric Computing	12
6.5340	Topics in Algorithmic Game Theory	12
6.5400[[]]	Theory of Computation	12
6.5410[[]]	Advanced Complexity Theory	12
6.5420	Randomness and Computation	12
6.5430	Quantum Complexity Theory	12
6.5610	Applied Cryptography and Security	12
6.5620[[]]	Foundations of Cryptography	12
6.5630	Advanced Topics in Cryptography	12
6.5660	Computer Systems Security	12
6.5810	Operating System Engineering	12
6.5820	Computer Networks	12
6.5830	Database Systems	12
6.5840	Distributed Computer Systems Engineering	12
6.5900	Computer System Architecture	12
6.5910	Complex Digital Systems Design	12
6.5920	Parallel Computing	12
6.5940	TinyML and Efficient Deep Learning Computing	12
6.6010	Analysis and Design of Digital Integrated Circuits	12
6.6020	High-Frequency Integrated Circuits	12
6.6220	Power Electronics	12
6.6300	Electromagnetics	12
6.6310	Optics and Photonics	12
6.6370	Optical Imaging Devices, and Systems	12
6.6400	Applied Quantum and Statistical Physics	12
6.6420[[]]	Quantum Information Science	12
6.6500[[]]	Integrated Microelectronic Devices	12
6.6510	Physics for Solid-State Applications	12
6.6520	Semiconductor Optoelectronics: Theory and Design	12
6.6530	Physics of Solids	12
6.6600[[]]	Nanostructure Fabrication	12
6.6630[[]]	Control of Manufacturing Processes	12
6.7000	Discrete-Time Signal Processing	12
6.7010	Digital Image Processing	12
6.7020	Array Processing	12
6.7100[[]]	Dynamic Systems and Control	12
6.7110	Multivariable Control Systems	12
6.7210[[]]	Introduction to Mathematical Programming	12



9.530	Emergent Computations Within Distributed Neural Circuits <sup>1</sup>	12
9.583[J]	Functional Magnetic Resonance Imaging: Data Acquisition and Analysis	12
9.660	Computational Cognitive Science <sup>1</sup>	12
9.822[J]	Psychology and Economics	12
24.949	Language Acquisition I	9

<sup>1</sup> No more than one subject in this area can count toward the requirement.

<sup>2</sup> Cannot count as Mathematics Restricted Elective if taken as part of the Course 6-9 SB degree.

<sup>3</sup> Subject can count as BCS Advanced Subject or Mathematics Restricted Elective, but not both.

<sup>1</sup> Cannot count as BCS Advanced Subject if undergraduate version is taken as part of the Course 6-9 SB degree.

<sup>2</sup> Subject can count as BCS Advanced Subject or Mathematics Restricted Elective, but not both.

**Mathematics Restricted Electives**

**Probability and Statistics <sup>1</sup>**

6.3700	Introduction to Probability <sup>2</sup>
6.3800	Introduction to Inference <sup>2</sup>
6.7700[J]	Fundamentals of Probability
9.07	Statistics for Brain and Cognitive Science <sup>2</sup>
9.073[J]	Statistics for Neuroscience Research <sup>3</sup>
9.272[J]	Topics in Neural Signal Processing <sup>3</sup>
18.05	Introduction to Probability and Statistics
18.600	Probability and Random Variables
18.650[J]	Fundamentals of Statistics

**Discrete Mathematics <sup>1</sup>**

6.1200[J]	Mathematics for Computer Science <sup>2</sup>
18.200	Principles of Discrete Applied Mathematics

**Linear Algebra <sup>1</sup>**

18.06	Linear Algebra <sup>2</sup>
18.703	Modern Algebra

**Complex Variables <sup>1</sup>**

18.04	Complex Variables with Applications
18.0751	Methods for Scientists and Engineers

**Real Analysis <sup>1</sup>**

18.1001	Real Analysis
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**Other Subjects**

8.044	Statistical Physics I
18.0851	Computational Science and Engineering I
18.0861	Computational Science and Engineering II
18.330	Introduction to Numerical Analysis
18.781	Theory of Numbers