

## URBAN SCIENCE AND PLANNING WITH COMPUTER SCIENCE (COURSE 11-6)

Department of Urban Studies and Planning (<https://catalog.mit.edu/schools/architecture-planning/urban-studies-planning>)

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

### Bachelor of Science in Urban Science and Planning with Computer Science

#### 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 satisfied by 11.001[]] and the required Policy/Ethics subjects (all HASS); additional HASS units may be included in urban science electives]; 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 from among 6.100A and 6.100B or 16.C20[]] and 6.1200[]] (if taken under joint number 18.062[])] in the Departmental Program]	2
Laboratory Requirement (12 units) [can be satisfied from among 6.1010, 6.3800, and 11.188 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.

Computer Science Requirements	Units
6.100A Introduction to Computer Science Programming in Python	6
6.100B Introduction to Computational Thinking and Data Science	6

or 16.C20[]] Introduction to Computational Science and Engineering

6.1010	Fundamentals of Programming	12
6.1200[]]	Mathematics for Computer Science	12
6.1210	Introduction to Algorithms	12

Select one of the following options: 12-24

Option 1 (12 units)

6.3800 Introduction to Inference

Option 2 (24 units)

18.06 Linear Algebra

or 18.Co6[]] Linear Algebra and Optimization

6.3900 Introduction to Machine Learning

#### Urban Planning Requirements

11.001[]] Introduction to Urban Design and Development 12

11.188 Introduction to Spatial Analysis and GIS Laboratory (CI-M) 12

Select one of the following options: 12

6.4590[]] Foundations of Information Policy

11.002[]] Making Public Policy

11.011 The Art and Science of Negotiation

11.165 Urban Energy Systems and Policy <sup>1</sup>

#### Urban Technology Workshop

Select one of the following options: 12

11.007 Urban and Environmental Technology Implementation Lab <sup>2</sup>

11.138 Crowd Sourced City: Civic Tech Prototyping <sup>2</sup>

11.154 Big Data, Visualization, and Society <sup>2,3</sup>

11.C35[]] Interactive Data Visualization and Society <sup>2,3</sup>

#### Senior Thesis/Project

Majors are required to write a senior thesis or complete a senior project. Select one of the following options: 18

Option 1

No more than 6 units of any MIT UROP

6.UAR Seminar in Undergraduate Advanced Research (CI-M)

Option 2

11.THT[]] Thesis Research Design Seminar (CI-M)

11.THU Undergraduate Thesis

#### Electives

Select Computer Science Electives for a minimum of 27 units from the list below 27

Select Urban Science Electives for a minimum of 30 units from the list below

<b>Units in Major</b>	<b>183-195</b>
<b>Unrestricted Electives</b>	<b>48-57</b>
Units in Major That Also Satisfy the GIRs	(48-60)
<b>Total Units Beyond the GIRs Required for SB Degree</b>	<b>180-195</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> 6.4590[*J*] and 11.165 can count towards either the Urban Planning Requirements or the Urban Science Electives, but not both.

<sup>2</sup> 11.007, 11.138, 11.154, and 11.C35 can count towards the Urban Technology Workshop or the Urban Science Electives, but not both.

<sup>3</sup> If you take both 11.154 and 11.C35, you may only count one of the classes towards all your major requirements.

**Computer Science Electives**

6.1020	Software Construction	15
6.1040	Software Design	15
6.1060	Software Performance Engineering	18
6.1100	Computer Language Engineering	12
6.1120	Dynamic Computer Language Engineering	12
6.1220[ <i>J</i> ]	Design and Analysis of Algorithms	12
6.1600	Foundations of Computer Security	12
6.1800	Computer Systems Engineering	12
6.1820[ <i>J</i> ]	Mobile and Sensor Computing	12
6.1850	Computer Systems and Society	12
6.1910	Computation Structures	12
6.1920	Constructive Computer Architecture	12
6.3260[ <i>J</i> ]	Networks	12
6.3720	Introduction to Statistical Data Analysis	12
6.3730[ <i>J</i> ]	Statistics, Computation and Applications	12
6.4130[ <i>J</i> ]	Principles of Autonomy and Decision Making	12
6.4210	Robotic Manipulation	15
6.4400	Computer Graphics	12
6.4510	Engineering Interactive Technologies	12
6.4530[ <i>J</i> ]	Principles and Practice of Assistive Technology	12
6.5081	Multicore Programming	12
6.5151	Large-scale Symbolic Systems	12
6.5831	Database Systems	12
6.5931	Hardware Architecture for Deep Learning	12
6.7201		12

6.8301	Advances in Computer Vision	15
6.8371	Digital and Computational Photography	12
6.8611	Quantitative Methods for Natural Language Processing	15
6.Co1	Modeling with Machine Learning: from Algorithms to Applications <sup>1</sup>	6
1.Co1	Machine Learning for Sustainable Systems <sup>1,2</sup>	6
or 2.Co1	Physical Systems Modeling and Design Using Machine Learning	
or 3.Co1[ <i>J</i> ]	Machine Learning for Molecular Engineering	
or 22.Co1	Modeling with Machine Learning: Nuclear Science and Engineering Applications	

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

<sup>2</sup> Students cannot receive credit without simultaneous completion of 6.Co1.

**Urban Science Electives**

2.00A	Designing for the Future: Earth, Sea, and Space	9
4.032	Design Studio: Information Design and Visualization	12
4.432	Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods	12
6.4590[ <i>J</i> ]	Foundations of Information Policy <sup>1</sup>	12
11.007	Urban and Environmental Technology Implementation Lab <sup>2</sup>	12
11.024	Modeling Pedestrian Activity in Cities	12
11.029[ <i>J</i> ]	Mobility Ventures: Driving Innovation in Transportation Systems	12
11.074	Cybersecurity Clinic	12
11.100	Introduction to Computational Thinking in Cities	3
11.113	The Economic Approach to Cities and Environmental Sustainability	12
11.123	Big Plans and Mega-Urban Landscapes	9
11.137	Financing Economic Development and Housing	12
11.138	Crowd Sourced City: Civic Tech Prototyping <sup>2</sup>	12
11.148	Environmental Justice: Law and Policy	12
11.149	Decarbonizing Urban Mobility	12
11.C35[ <i>J</i> ]	Interactive Data Visualization and Society <sup>2,3</sup>	12

11.154	Big Data, Visualization, and Society 2,3	12
11.155[J]	Data and Society	12
11.156	Healthy Cities: Assessing Health Impacts of Policies and Plans	12
11.158	Behavioral Science, AI, and Urban Mobility	12
11.165	Urban Energy Systems and Policy <sup>1</sup>	12
11.169	Global Climate Policy and Sustainability	12
12.010	Computational Methods of Scientific Programming	12
15.276	Communicating with Data	12
IDS.012[J]	Statistics, Computation and Applications	12
IDS.060[J]	Environmental Law, Policy, and Economics: Pollution Prevention and Control	12

<sup>1</sup> 6.4590[J] or 11.165 can count towards the Urban Planning Requirements or the Urban Science Electives, but not both.

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<sup>3</sup> If you take both 11.154 and 11.C35, you may only count one of them towards all your major requirements.