Master in Urban Planning
Urban Analytics Concentration
2021-2022

Advisors: Carole Voulgaris
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Other Concentration Faculty: Ann Forsyth, Jerold Kayden, Rick Peiser, Rachel Meltzer, Bing Wang

The Urban Analytics concentration introduces students to describing, analyzing and prescribing solutions to urban planning problems using spatial data and analysis methods. An increasing share of urban planning work today addresses spatial interactions between numerous geographically bound actors and processes that are too complex to visualize and analyze without computational tools. Geographic Information Systems, spatial statistics and algorithmic approaches to spatial data analysis are used in public and private planning practices at the local, regional and international scales to describe urban challenges, to evaluate the impacts of alternative solutions and to visualize complex information.

A range of urban and spatial analytics courses are available at the GSD and other Harvard schools, especially the Engineering School, FAS, the School of Public Health, Kennedy School and the Graduate School of Education. Students can also enlist in courses at MIT. The Harvard Center for Geographic Analysis offers data and software support as well as focused seminars and conferences relevant to the concentration topic.

Please note that course offerings often change, and new courses may be offered while these recommended courses may not be offered each year. This memo is subject to change depending on the availability of courses. Other courses may be approved with the permission of the Concentration Advisor. Also many courses overlap with methods requirements—they can only fulfil one requirement, methods or concentration.

Recommended basic course:
The following courses are recommended to those interested in the concentration. They are introductory level courses that give a good overview of the topics and subject matter covered in more depth by other courses in the concentration:

| GSD   | 5394 | Travel Behavior and Forecasting (Spring) | Voulgaris |

FALL 2021

<p>| GSD   | 3483 | Mapping Urbanization: Forms, Processes, and Systems | Heller |
| EDU   | S504 | Introduction to Qualitative Research | Duraisingh |
| FAS   | STAT 121A | Data Science 1: Introduction | Protopapas, Pillai |
| FAS   | COMPSCI 50 | Intro to Computer Science I | Malan |
| FAS   | GOV 1008 | Introduction to Geographic Information Systems | Kelly |
| FAS   | GOV 1021 | Spatial Models of Social Science | Kelly |</p>
<table>
<thead>
<tr>
<th>Institution</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>HKS</td>
<td>API 222</td>
<td>Machine Learning and Big Data Analytics**</td>
<td>Saghafian</td>
</tr>
<tr>
<td>HKS</td>
<td>DPI 662</td>
<td>Digital Government: Technology, Policy, and Public Service Innovation</td>
<td>Eaves</td>
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<tr>
<td>HKS</td>
<td>DPI 678M</td>
<td>Product Management, Tech, and Society</td>
<td>Pham</td>
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<tr>
<td>HSPH</td>
<td>BST 260</td>
<td>Introduction to Data Science</td>
<td>Mattie</td>
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<tr>
<td>HSPH</td>
<td>SBS 245</td>
<td>Social and Behavioral Research Methods***</td>
<td>Chen</td>
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<tr>
<td>HSPH</td>
<td>SBS 288</td>
<td>Qualitative Research Methods in Public Health****</td>
<td>Goldman</td>
</tr>
<tr>
<td>MIT</td>
<td>6.0001</td>
<td>Introduction to Computer Science Programming in Python</td>
<td>Bell</td>
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<tr>
<td>MIT</td>
<td>6.0002</td>
<td>Introduction to Computational Thinking and Data Science*</td>
<td>D’Ignazio</td>
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<tr>
<td>MITMIT</td>
<td>11.205</td>
<td>Introduction to Spatial Analysis and GIS</td>
<td>D’Ignazio</td>
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<tr>
<td>MIT</td>
<td>11.454</td>
<td>Big Data, Visualization, and Society</td>
<td>Williams</td>
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<tr>
<td>MIT</td>
<td>11.154</td>
<td>Big Data, Visualization, and Society</td>
<td>Williams</td>
</tr>
<tr>
<td>MIT</td>
<td>11.520</td>
<td>Workshop on Geographic Information Systems (GIS)*</td>
<td>D’Ignazio</td>
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</tbody>
</table>

* Requires permission of instructor.
** Suggested prerequisites: An understanding of intermediate-level statistics and probability theory (e.g., API-201, API-202, or equivalent courses)
*** A multivariate statistics course strongly recommended; course primarily for doctoral students.
**** By August 30, 2021, interested students must request instructor permission in my.harvard and write a brief explanation about why they want to take this course. Selected students will be approved by September 2, 2021.

**SPRING 2022**

*NOTE: This list is subject to change pending the release of and updates to Spring 2022 course offerings—some of those listed as no longer offered may just not have been listed yet.

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<tbody>
<tr>
<td>GSD</td>
<td>6322</td>
<td>Mapping: Geographic Representation and Speculation</td>
<td>Huntley</td>
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<tr>
<td>GSD</td>
<td>6276</td>
<td>Product and Experience Design for Desirability (at SEAS)</td>
<td>Altringer</td>
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<tr>
<td>GSD</td>
<td>SXXX</td>
<td>Policy Analysis</td>
<td>Meltzer</td>
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<tr>
<td>GSD</td>
<td>5394</td>
<td>Travel Behavior and Forecasting</td>
<td>Voulgaris</td>
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<tr>
<td>EDU</td>
<td>5052</td>
<td>Intermediate and Advanced Statistical Methods for Applied Educational Research</td>
<td>Ho</td>
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<tr>
<td>EDU</td>
<td>S513</td>
<td>Introduction to Qualitative Program and Policy Evaluation</td>
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<td>FAS</td>
<td>GOV 1009</td>
<td>Advanced Geographical Information Systems Workshop</td>
<td>Kelly</td>
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<td>FAS</td>
<td>COM/SCI 50</td>
<td>Intro to Computer Science I</td>
<td>Malan</td>
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<td>FAS</td>
<td>GOV 2014</td>
<td>Research Design in Political Science: Qualitative and Mixed Methods</td>
<td>Cammett, Hagopian</td>
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<tr>
<td>HKS</td>
<td>MLD 620M</td>
<td>The Data Smart City: Driving Innovation with Technology</td>
<td>Goldsmith</td>
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<td>HSPH</td>
<td>GHP 504</td>
<td>Introduction to Qualitative Research for Global Health</td>
<td>Yousafzai</td>
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<tr>
<td>HSPH</td>
<td>HPM 559</td>
<td>Introduction to Qualitative Research Methods for Public Health (priority to HSPH students)</td>
<td>Aveling</td>
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<td>MIT</td>
<td>6.009</td>
<td>Fundamentals of Programming</td>
<td>Hartz</td>
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<td>11.205</td>
<td>Introduction to Spatial Analysis</td>
<td>D’Ignazio</td>
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<td>MIT</td>
<td>11.318</td>
<td>SENSEABLE CITIES</td>
<td>TBA</td>
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<td>MIT</td>
<td>11.320</td>
<td>Digital City Design Workshop</td>
<td>Ratti</td>
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<td>MIT</td>
<td>11.321</td>
<td>Data Science and Machine Learning for Real Estate</td>
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<td>Crowdsourced City: Civic Technology Prototyping</td>
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<td>Spatial Database Management and Advanced GIS</td>
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<tr>
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<td>Advanced Geographic Information System Project</td>
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<tr>
<td>MIT</td>
<td>11.545</td>
<td>Transportation Systems Analysis: Demand and Economics</td>
<td>TBA</td>
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Pre-approved, but not offered in 2021-2022:

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<tr>
<td>GSD</td>
<td>3356</td>
<td>Field Methods and Living Collections</td>
<td>Elkin</td>
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<tr>
<td>GSD</td>
<td>2314</td>
<td>Mapping: Geographic Representation and Speculation</td>
<td>Sayegh</td>
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<tr>
<td>GSD</td>
<td>6322</td>
<td>Mapping: Geographic Representation and Speculation <em>(Spring 2021)</em></td>
<td>Huntley</td>
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<td>EDU</td>
<td>S022</td>
<td>Social and Behavioral Research Methods</td>
<td>McIntyre</td>
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<td>FAS</td>
<td>SOCIOL 313</td>
<td>Urban Data Lab</td>
<td>Sampson, Small</td>
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<td>FAS</td>
<td>209B</td>
<td>Autonomous Vehicles and Local Government Lab</td>
<td>Protopapas</td>
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<td>API 206</td>
<td>Digital Government</td>
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<td>Applied Urban Analytics*</td>
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<tr>
<td>MIT</td>
<td>11.544</td>
<td>Transportation Systems Analysis: Performance and Optimization</td>
<td>Wu</td>
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</tbody>
</table>

*Requires permission of the instructor*