


Smart Cities

An Outline of the Lecture Course
PUP 598 & GPH 598 Spring 2013

Michael Batty

m.batty@ucl.ac.uk

 @j michaelbatty

<http://www.spatialcomplexcity.info/>

<http://www.casa.ucl.ac.uk/>

The lectures are divided into SIX sessions with two lectures in each, lasting about 50 minutes.

We have a break of 5-10 minutes in the middle of each session. In this first presentation, we will briefly sketch the topics.

Let me begin by saying this is not a technical course, it is an impressionistic set of lectures that introduces you to ideas about Smart Cities.

Smart Cities have many definitions. The one we will use is based on exploring the way information, specifically digital information is changing the physical as well as socio-economic structure of our cities. Computers and digital communications are being continuously embedded into the fabric of the city. The information they relay is changing the way we behave. This is what the course is all about.

SESSION I: THE CONTEXT

1. A Walk Through the Smart City

Examples of How the City is Being Automated and Instrumented. A Very Quick History of the Development of Wireless, TV, Computers, the Internet and Real Time Control in the City

2. Turing's Legacy

How Computers got Started, Miniaturization, and the Convergence with Telecommunications. The Underlying Technologies, Hardware, Software, Data and Orgware, Network Computation

SESSION II: SMART CITIES ARE ABOUT INFORMATION NETWORKS AND FLOWS

3. The Wired City: The Computable City

Graphics, and Convergence of IT and Communications. Automating, Instrumenting, Measuring, and Sensing How We Locate and Move in the City: Where the Hardware Really Resides, The Transformation of Physical Distance

4. Material and Electronic Networks: Transport

Cities as Flow Systems, Coupled Networks, Materials, People, Energy, Information

LECTURE III: NETWORKS, FLOWS AND BIG DATA

5. Sensing, Representing, and Simulating Flows in the City

Automating, Instrumenting, Measuring, and Sensing How We Locate and Move in the City. A Digression into Confidentiality, Privacy and the Surveillant Society

6. Urban Information Systems: From Small to Big Data

The Origins of Information, Transactions Processing, Municipal Information Systems, GIS and Interoperability: the Emergence of Big Data

LECTURE IV: CITIES AS SERVICES DELIVERY

7. Services Through the Web

Providing Web Access. Collecting Real Time Data, Embedding Computers into the Built Environment, Retail Services, Public Services, Information About Travel

8. From Web Mapping to City Dash Boards

Integrating Data, Open Data, Coordinating Services, Emergency Response and Location-Based Services, Web Mapping, Real Time Sensing and Information

LECTURE V: THE VIRTUAL CITY: REPRESENTATION, MODELLING, AND PREDICTION

9. The Virtual City: GIS, 3D and Virtual Reality Representations

The Development of 2D maps to 3D Environments, Virtual Reality, Augmented Reality, Serious Visual Gaming

10. Urban Simulation and Prediction

Building Mathematical Models of the City, The Science of Cities, and the Synthesis of Simulation with Representation, Data Driven Models, Prediction and Forecasting

LECTURE VI: DIGITAL PARTICIPATION AND SOCIAL MEDIA

11. The Participatory City

Making Cities Smarter, Coupling Networks, Services and People, New Forms of Electronic Community

12. Social Media and the City

The Rise of the Handheld Device, Social Networks, Email and Rapid Communications, Extracting Social Data from Text Messaging

Background Reading

The web site <http://www.spatialcomplexity.info/> is where the lectures will be placed and a taste of the material is available there with some key background readings.

If you wish to read something now then download the following paper from the site <http://link.springer.com/content/pdf/10.1140%2Fepjst%2Fe2012-01703-3>



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Smart cities of the future

M. Batty^{1,a}, K.W. Axhausen², F. Giannotti³, A. Pozdnoukhov⁴, A. Bazzani⁵,
M. Wachowicz⁶, G. Ouzounis⁷, and Y. Portugali⁸