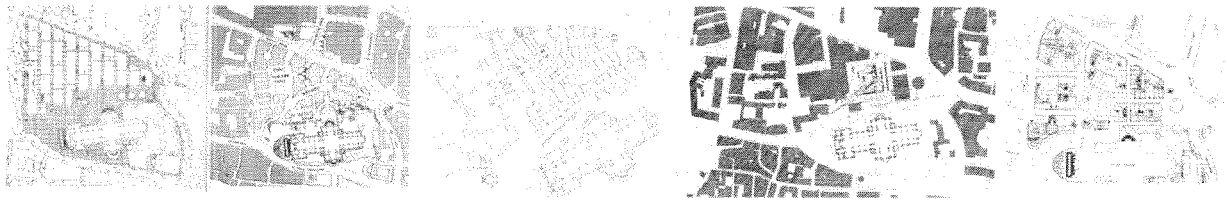
Analytical investigations in urban design

Outline

Streets and public open spaces - their dimensions, their layout and their connectivity - are the long-term framework within which patterns of architecture and land use change. In their own right, streets and public spaces constitute the character and functions of the city as an architectural, social, and cultural artifact. This course introduces theories and methodologies for the analysis of street network connectivity and the spatial design of streets. Prominent analytical methodologies include *urban morphology* and *space syntax*. Urban morphology focuses on the interaction between urban streets, urban blocks, property boundaries and building footprints. Space syntax is useful for developing models of urban function, particularly models of urban spatial cognition, patterns of movement and co-presence, and the interaction between street networks and land use. The aim is to support the analysis of the local and mid-scale context of a site so as to inform architectural and urban design, as well as to facilitate the evaluation of alternative design proposals.



Outcomes and assessment

Students taking the course will be able to: (1) Understand and analyze the relationship between building design and urban context. This will be evaluated through a short paper presenting and critically discussing alternative design proposals for major urban sites, in both qualitative and quantitative terms. (2) Express in quantitative and comparative terms the qualitative differences between different historic types of street layouts and urban designs. This will be evaluated through a short paper presenting a syntactic analysis of the spatial structure of a large urban area around a site of particular interest. (3) Be able to use quantitative spatial analysis as a means towards assessing the potential of particular sites and to evaluate alternative design proposals. This will be evaluated based on a paper and slide presentation (powerpoint) comparing different design proposals for the same site. (4) Be knowledgeable about quantitative models of the functional, social and cultural effects of urban layouts. This will be evaluated through a take home exam, in which short essays (no more than 700 words) will be offered in response to questions.

Grading

First paper 22% ; Second paper 22%; Third paper 22%; Take home exam 22%. Participation in class 12%.

Other requirements

Class attendance is critical. More than two unjustified absences incur a 5% reduction of the final grade per absence.

Students are expected to read a small list of article- or chapter-length reading assignments as part of their preparation for the course exam.

Syllabus

Week 1: 1.1 General introduction to the course.

Part 1: Background ideas

Week 1: 1.2 The city as architecture.
Readings; Rossi, A. (1982): *The Architecture of the City,* MIT Press, Cambridge Mass, London. Rowe, C., Koetter, F. (1978): *Collage City*, MIT Press, Cambridge Mass, London.

Week 2:2.1 The nature of streets
Reading: Anderson S(ed) (1978): *On Streets*, MIT Press

Week 2:2.2 Simple measures of urban form
Reading: Jacobs A, 1993, *Great Streets* (Boston, MA: MIT Press); Hess P M, 1997, "Measures of connectivity" Places **11** 2, 58-65

Week 3:3.1 Simple typologies of urban form
Readings: Southworth M, Ben-Joseph E, 2003, *Streets and the shaping of towns and cities* (Washington: Island Press); Southworth M, P M Owens, 1993, "The evolving metropolis, studies of community, neighborhood, and street form at the urban edge", *Journal of the American Planning Association* **59** 3, 271-286

Week 3: 3.2 Elements of urban cognition
Reading: Lynch, K. (1960): *The Image of the City*, The MIT Press, Cambridge Mass, London

Part 2: Introduction of spatial analysis – space syntax

Week 4: 4.1 Introduction to space syntax
Readings: Hillier B, 1996, *Space is the Machine.* (Cambridge: Cambridge University Press); Hillier B, Hanson J, Peponis J, Hudson J, Burdett R, 1983, "Space syntax: a different urban perspective" *AJ, 30 November, 47-63*. Hillier B, 1989, "The Architecture of the Urban Object", *Ekistics 334/335*, 5-21. Peponis J, Wineman J, 2002, "The Spatial Structure of Environment and Behavior" in Bechtel R, Churchman A (eds) *Handbook of Environmental Psychology* (New York: John Wiley and Sons) 271-291

Week 4: 4.2 Theory of natural movement. How urban grids affect the distribution of movement.
Readings: Hillier B, A Penn, J Hanson, T Grajewski, and J Xu, 1993, "Natural movement: or configuration and attraction in urban pedestrian movement," *Environment and planning B: Planning and Design* **20** (1) 29-66. Hillier B, Burdett R, Peponis J, Penn A, 1987, "Creating life: or does architecture determine anything?" *Architecture and Behavior* **3**, 3, 233-250. Ozbil A, Peponis J, Stone B, 2011, "Understanding the link between street connectivity, land use and pedestrian flows" *Urban Design International* **16** 125-141

Week 5: 5.1 Towards a syntactic theory of spatial cognition
Readings: Hillier B, Iida S, 2005, "Network and Psychological Effects of Urban Movement" in Cohn A G and Mark D M (eds) *COSIT 2005* (Berlin: Springer-Verlag) 475-490. Penn A, 2003, "Space syntax and spatial cognition" *Environment and Behavior* **35** 1, 30-65.

Week 5: 5.2 Syntactic models of land use
Readings: Scoppa M, 2012. PhD dissertation, Georgia Tech. Porta S, Latora V, Wang F, Strano E, Cardillo A, Scellato S, Iacoviello V, Messora R, 2008, "Street centrality and densities of retail and services in Bologna, Italy" Environment and Planning B: Planning and Design, **36** (3), 450-465

Week 6: 6.1 Measures of connectivity on a GIS platform
Reading: Peponis J, Bafna S, Yang Z, 2008, "The connectivity of streets: reach and directional distance" *Environment and Planning B: Planning and Design* **35** 881-901

Week 6: 6.2 Introduction to DepthMap
Readings: Depth Map tutorials. http://www.vr.ucl.ac.uk/depthmap/tutorials/

Week 7: 7.1 Introduction to Spatialist_Lines
Readings: Spatialist_Lines manual

Week 7: 7.2 Worked examples
In-class exercises in the use of analytical tools.

Week 8: 8.1 Worked examples
In-class exercises in the use of analytical tools.

Week 8: 8.2. Worked examples
In-class exercises in the use of analytical tools.

Part 3: Case studies

Week 9: 9.1. Case study 1. Kings Cross development, London (Case study may alter)
Readings: Foster N, 1997, 1997, "Opening Address", *Space Syntax, First International Symposium*, **3**, i-vi (London: University College London). Hillier B, 1993, "Specifically Architectural Knowledge" *The Harvard Architecture Review* **9** 8-27

Week 9: 9.2 Case study 2. Paternoster Square development and its history, London (Case study may alter)
Readings: Architectural Review, Jan 1988, 1091; Architectural Review, Nov 1988, 1101; Architectural Review, May 1989, 1107; Architects' Journal, 6 July 1998, 24-26 (ARUP unveiled); Architects' Journal, 20 July 1988, 28-29 (John Simpson and Partners 1); Architects' Journal, 15 November 1989 30-31 (John Simpson and Partners 2); Architects' Journal, 27 November 1997, 10-12 (New master-plan); Architects' Journal, 3 October 2003, 28-45 (Present scheme completed); Architectural Design **62** 5/6 May-June 1962 8-59 (Simpson Farrell scheme)

Week 10: 10.1 Case study 3. Ground Zero redevelopment, New York. (Case study may alter)
Readings: Architectural Record 92, 2003; Architectural record, March 2002; Architectural Record, Feb 2003; Casabella January 2011; Domus, February 2003.

Week 10: 10.2 Case study 4. Peachtree Center, Atlanta. (Case study may alter).
Readings: Peponis J, Ross C, Rashid M, 1997, "The Structure of Urban Space, Movement and Co-presence: The case of Atlanta", *Geoforum v.28, n.3-4,* 341-358; Rashid M, 1997, "Revisiting John Portman's Peachtree Center Complex in Atlanta" First Space Syntax Symposium Proceedings, University College London)

Week 11: 11.1 Case study 5. Tower Place, Buckhead, Atlanta (Case study may vary)
Reading: Jiang P, Peponis J, 2009, "Tower Place Drice: A Private Road" in Koch D, Marcus L, Steen J (eds)

Proceedings of the 7th International Space Syntax Symposium (Stockholm: KTH) 47.1-47.11

Part 4: Developments

Week 11: 11.2 Benchmarking and the development of data bases (Topic may vary)
Reading: Peponis J, Allen D, Haynie D, Scoppa M, Zhang Z, 2007, "Measuring the configuration of street networks: the spatial profile of 118 urban areas in the 12 most populated metropolitan regions in the US", in Kubat A S, Ertekin Ö, Güney Y I, Eyüboğlu E (eds): *Proceedings, 6th International Space Syntax Symposium* (Istanbul: ITU Faculty of Architecture) 2-1 – 2-14; Peponis J, Allen D, French S, Scoppa M, Brown JU, 2007, "Street connectivity and urban density: spatial measures and their correlation", in Kubat A S, Ertekin Ö, Güney Y I, Eyüboğlu E (eds): *Proceedings, 6th International Space Syntax Symposium* (Istanbul: ITU Faculty of Architecture) 4 -1 – 4-12

Week 12: 12.1 Looking forward to new measures. Higher order elements. (Topic may vary)
Reading: Lucas Figueiredo, 2009, "Continuity Lines: Network analysis in urban morphology" (Ph.D. Thesis. University College London).

Week 12: 12.2 Looking forward to new measures. Scale. (Topic may vary)
Reading: Hillier B, 1999, "Centrality as a process: accounting for attraction inequalities in deformed grids", *Urban Design International*, **4**, 107-127; Batty M, Longley P, 1994, *Fractal Cities* (New York: Academic Press, Harcourt Brace and Co)

Week 13: 13.1 Discussion of student work 1

Week 13: 13.2 Discussion of student work 2

Week 14: 14.1 Discussion of student work 3

Week 14: 14.2 Discussion of student work 4

Week 15: 15.1 Discussion of student work 5

Week 15: 15.2 Overview of course conclusions

Week 16: Design Reviews Week – no classes