Built Environment

CODE1231
Ubiquitous Cities

Dr Nicole Gardner
Disclaimer
This abbreviated course outline is indicative of the outcomes, delivery and assessment. While Course Learning Outcomes will remain constant, other details may be subject to change. The full and most accurate course outline will be available in Moodle.

1. COURSE STAFF

<table>
<thead>
<tr>
<th>Course Convenor</th>
<th>Dr Nicole Gardner</th>
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<tbody>
<tr>
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2. COURSE DETAILS

Credit Points: 6 UoC

<table>
<thead>
<tr>
<th>Learning Activity</th>
<th>Hours per week</th>
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<tr>
<td>Lecture</td>
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<tr>
<td>Tutorial</td>
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<td>Studio</td>
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<tr>
<td>Online learning activity</td>
<td>1</td>
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Description
This course introduces and critiques discourses, policies, and case examples of regional and global digital, ubiquitous, and smart city thinking and initiatives. This knowledge further informs an exploration of the application of computational thinking and methods to urban and spatial analysis, and the creation of design projects that adopt principles of physical computing, interaction design and human-machine interaction. The course culminates in the creation, construction, and presentation of interaction design proposals and working interaction design prototypes that engage sensing and actuating technologies.

Program Learning Outcomes (PLOs)
The Computational Design Program Learning Outcomes addressed in this course are:

1. Synthesise interdisciplinary knowledge of cultural, natural, and technological systems in local and global contexts.
2. Apply interdisciplinary knowledge using computational design thinking and methods to built environment challenges.
3. Critically analyse complex environmental conditions through digital technologies and computational methods.
4. Apply computational design knowledge and skills for professional work and, or further learning.
5. Practice the ethical application of digital and computational technologies in and for the design of the built environment.

Course Learning Outcomes (CLOs) with Alignment to PLOs and Assessment

<table>
<thead>
<tr>
<th>CLO #</th>
<th>CLO Statement</th>
<th>PLO #</th>
<th>Related Assessment</th>
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</thead>
<tbody>
<tr>
<td>CLO 1</td>
<td>Critique discourse, policies, case studies of regional and global smart / ubiquitous / digital cities.</td>
<td>1</td>
<td>Assignment 1 / Assignment 3 / Assignment 4</td>
</tr>
<tr>
<td>CLO 2</td>
<td>Apply computational thinking and methods to urban and spatial analysis.</td>
<td>2, 4</td>
<td>Assignment 2 / Assignment 3</td>
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<tr>
<td>CLO 3</td>
<td>Create design projects that adopt principles of physical computing, interaction design and human-machine interaction.</td>
<td>4, 5</td>
<td>Assignment 3</td>
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3. ASSESSMENT

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Weight</th>
<th>CLOs Assessed</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assignment 1: Smart Cities initiatives case study (20%) and Comparative Analysis (10%) (Individual)</td>
<td>30%</td>
<td>CLO 1 / CLO 4</td>
<td>Week 3 / Week 4</td>
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<tr>
<td>TASK 1 SMART CITY CASE STUDY (20% / Week 3)</td>
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<td>Smart city case study (20%) During the first tutorial students will undertake preliminary research and select a ‘smart city’ case example (speculative and/or implemented). Students are required to undertake detailed case study research about their chosen smart city through a range of resources including scholarly material such as journal articles and book chapters, as well as other resources such as commercial (business) and institutional (i.e. local government) publications. The 500-750word case study should outline details of the smart city/region including location, population, and any other relevant statistics/facts. The writing should outline why the case example is considered to constitute a ‘smart city’, i.e. in what ways does it align to academic definitions of a ‘smart city’, and/or who promotes it as a ‘smart city’? Further information should address when the case study smart city strategy was developed, and what ‘smart’ initiatives, strategies, or designs that it advances? What sort of hard and soft technologies does the case example discuss and prioritise? Who organises, implements and manages these initiatives? How have the objectives of the case study smart city proposal been realised and put into action? What can be said about any of the outcomes and resulting quality of urban life? In what ways has the initiative developed and changed over time? The written and graphic presentation is required to situate the smart city case study within the broader paradigm of smart city discourse. From this perspective, the written text should be expository; it should make an argument about the efficacy and/or fallacy of ‘smart’ city rhetoric, policy, planning, and design issues. TASK 2: COMPARATIVE ANALYSIS (10% / WEEK 4) Students are required to write a 500word (minimum) comparative analysis that compares the initiatives of their own smart city case example with one other smart city case example presented by another student. Students will be allocated a comparative smart city prior to the presentation.</td>
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<td>2. Assignment 2: Urban Interaction Design Research (individual)</td>
<td>30%</td>
<td>CLO 2 / CLO 4</td>
<td>Week 6</td>
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| Students will be allocated a design site. Assignment 2 involves two key tasks: 1) Precinct site analysis to inform a problem definition framework; 2) Digital placemaking/interaction design precedent research. TASK 1: The TBC precinct analysis should communicate information that defines the precinct (physically, socially, conceptually) in the form of photos, video, diagrams, drawings (plans, sections, elevations, 3D model) or other to address various questions. From this analysis, and with consideration of course readings, construct/design a ‘problem definition framework’, that identifies a series of ‘problems’ to be solved, or issues and opportunities to be addressed, to inform a
design brief for Assignment 3.

**TASK 2:** Drawing on the analysis and reflecting on the role(s) ‘smart’ technologies can play in addressing the issues/opportunities identified select a minimum x4 precedent examples of urban interaction design projects (existing or speculative) and outline their relevance and applicability (to the student’s site).

### 3. Urban Interaction Design (Group)

In groups students will design and prototype an urban interaction design project for their allocated public realm site. This will include writing a conceptual statement of 250 words (minimum) that outlines how the proposed project addresses the refined problem definition framework (see Assignment 2). For example, the analysis may have emphasised a community or social issue, or contextual condition (such as environmental awareness, historical interpretation, or a site-specific issue such as a safety or a pedestrian optimisation strategy) This design should innovatively propose ways to enhance and activate the public realm (or even reinterpret/reinvigorate not-so-public areas) and engage users through the designed synthesis of material (physical components) and immaterial (informational) conditions. The project MUST propose ways to sense and collect relevant data and ‘meaningfully’ respond to it, in other words, it must integrate interactive real-time content – such as light/visualisations (LEDs / projection), sound, pressure, and/or movement, through applying skills learned in the Arduino workshops, and lectures, and utilising various data and sensing collection methods and electronic technologies (actuators, sensors, detectors etc). The project MUST outline ways the ‘data’ from sensing and actuating technologies can be fed-back into the interactive system or potentially other institutional/city systems in ethical ways.

### 4. Online Exam: Moodle Quiz

Multiple choice questions based on material presented in lectures and tutorial readings.

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<tr>
<th>Week</th>
<th>Topic</th>
<th>Activity</th>
<th>Related CLO</th>
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| Week 1 | Techno-urban imaginaries: A brief history of digital, ubiquitous, sentient, wired and smart cities | • Activity: Workshop – Library database skills research  
• Activity: Students will undertake desktop research during the tutorial and select a digital/smart city case example and present its key points/ objectives to the class and tutors will approve their smart city case study selections.  
ONLINE: Read suggested readings and answer set questions on Moodle. | CLO 1 |
| Week 2 | Delivering ‘smart cities: Industry perspectives on implementation and lessons learned | • Activity: Peer-to-peer knowledge exchange of smart city case studies  
• Activity: Interim presentations smart city case study selections  
• Activity: Workshop: Adobe InDesign template, graphic representation of statistics, | CLO 1 CLO 4 |
<table>
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<tr>
<th>Week</th>
<th>Activity</th>
<th>Online Activity</th>
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| Week 3 | Smart urban knowledge: Beyond urban immersion | • Activity: Introduction to Assignment 2  
• Activity: Workshop: Introduction to Arduino 1, group organization and allocation of interaction design site and Arduino kit loans.  
• Activity: individual consultations  
ONLINE: Submit Smart city case study as PDF poster to Moodle & select alternate city for comparative analysis. | CLO 2  
CLO 4 |
| Week 4 | Introduction to Interaction Design (IxD) thinking and methods | • Activity: Immersion - site and precedent research  
• Activity: Assignment 2- Defining your audience and stakeholder (user) profiling  
ONLINE: Submit smart city comparative analysis. | CLO 1  
CLO 2  
CLO 4 |
| Week 5 | Interactive and Responsive Environments: Case studies | • Activity: Workshop: Introduction to Arduino 2  
• Studio: individual consultations  
ONLINE: Locate and upload links / images and attributions of x3 relevant IxD precedents to Course Moodle forum & comment on x2 other posts. | CLO 1  
CLO 2  
CLO 3 |
| Week 6 | Introduction to User Experience Design (UX) and human-centred design principles | • Activity: Presentation of urban interaction design research (Individual)  
• Activity: Introduce Assignment 3.  
• Studio: Precedent mash-up (group)  
ONLINE: Submit Urban interaction design research report. | CLO 4  
CLO 3 |
| Week 7 | Interactive and responsive Environments: Industry case study | • Activity: Presentation of urban interaction design problem definition framework (Group)  
• Studio: Group consultations | CLO 3 |
| Week 8 | Interactive and Responsive Environments: Industry case study | • Activity: Presentation of urban interaction design precedent & mash-up (Group)  
• Studio: Group consultations & prototype scale discussions | CLO 3  
CLO 5 |
| Week 9 | Interactive and Responsive Environments: Industry case study | • Studio: Group presentations and consultations, technical troubleshooting | CLO 3  
CLO 5 |
| Week 10 | The future of work: Smart knowledge | • Activity: Presentation of urban interaction design proposals (Group)  
ONLINE: Moodle Quiz to be completed by Week 12. | CLO 3  
CLO 4  
CLO 5  
CLO 1 |