TEL AVIV UNIVERSITY
INTERNATIONAL

NON-STOP
DISCOVERY

Smart Cities – Summer 2020
Interface Design, Big Data and Urban-tech Utilization

Program Dates:
Arrival Day: June 24, 2020
Mandatory Orientation: June 25, 2020
Course Dates: June 28, 2019 – July 23, 2019
Last Day in Dorms: July 24, 2020

Course Information:
Faculty: Dr. Ronit Purian (purianro@tau.ac.il)
4 semester credits
Minimum 52 content hours

Course Description:
The unprecedented growth of population in cities over the last decades makes the smartification of cities an urgent topic, mutually embedding software development and urban planning. In a new economy of platforms which are ubiquitous, pervasive and subsidized, the digital is augmented in the physical world, from transportation to social interaction, pollution and food, stress and speed.

While smart ecosystems co-evolve and turn urban life into digital life, we will emphasize the integration of urban data from different sources, and try to better frame and understand the human condition – considering economy, ecology, societal issues, and other aspects that impact and are affected by the accelerated pace of digitation.

The focus of the course will be on the design of human-technology interfaces, understanding the beliefs we constantly form and update regarding the surrounding artifacts, and the relationships we create with apps, bots, machines, and with other people.

Pedestrian cognition, for example, is extremely affected by new modes of sensation, perception, behavioral intentions and actual behaviors. How will the endless bulks of interactions we experience in the city affect future behavioral patterns? The appropriation of the smart city by the citizens is a major component of urban-tech utilization.

Accordingly, group projects and personal papers will include topics such as:

- Interface design: Auditory and haptic interfaces; cognitive maps; conflict and coordination in mixed environments; trust building; etc.
- Data formats: Mobility and micro-mobility; traffic lights; planning (BIM); micro-climate conditions; engineered nano-materials; human movement; etc.

In addition, we will study the technological and organizational design elements for smart cities:

- Smart integration: The cyberinfrastructure, technologies and tools used to make the rich set of urban open data available were designed primarily to support the analysis of individual data sets rather than exploring

relationships among many data sets. Consequently, urban managers and scientists lack the tools and infrastructure to fully harness urban data in the smart city.

- Trust building: The ethical implications of increasingly ubiquitous artificial intelligence integrated into personal, home and other devices should be understood in a historical context: the long history of surveillance, and the short history of machine learning. We will examine AI ethics and responsibility, from errors and biases of the machine to the emotional implications in our real-world experience.

We launched this course in summer 2018 with students from all over the world – from the US and Brazil through Paris and Berlin to India and China, Macau, Vietnam and Sydney – with tours, workshops and lectures by start-ups and the high-tech industry, and visits to Tel Aviv municipality's various divisions and departments (Computing Division, Security Control Center & Municipal Situation Room; Transportation, Traffic Control and Traffic Lights Operation Center; Planning Department; and The Center for Environmental Education at Hiriya Recycling Park. For 2019 course: https://en-urban.tau.ac.il/events/Course_2019; 2018 photo gallery: https://urban.tau.ac.il/CourseTAU2018

Instructor: Dr. Purian studies the technological interfaces, cognition and movement in the smart city, with an emphasis on pedestrians; applies psychological models and big data tools for smart city solutions (urban-tech, MaaS, AV). She leads CoData's task group for Urban Life and Smart Cities; and collaborates with high-tech companies, municipalities and the central government. For example: route planning and interfaces for different preferences and criteria (green places, disabilities); communication modes between pedestrians and autonomous vehicles; micro-mobility (scooters and bicycles) cognition, physiology and injuries; a set of simple and necessary design principles for the human-nature-city system in a tech-saturated era.

Organization and Participation

The various topics will be covered in lecturers and labs. Detailed schedule and bibliography will be provided to students.

Attendance: Students are required to attend all classes and visits.

Work outline: Students will choose a research topic and will present their work in the middle of the course as a proposal (including literature review and market analysis); and at the end of the course as a full-scale paper.

In your group project and personal paper, you will:

1. Identify the potential impact of technological mechanisms on their surroundings.
2. Integrate silos into a holistic view; choose and analyze systems, services and products.
3. Design technological interfaces that take into account psychological principles, applying behavioral (big) data.
4. Plan partnerships between the public and the private sectors, civil society organizations, NGOs etc. and define conditions and responsibility-authority boundaries.
5. Propose principles for collective action; trace the roots of principal-agent problems.
6. Design your own life, not only the system\ society, by observing reality.

Project & paper

Group project: Literature review and market analysis in a certain area.
Will be written according to guidelines and presented in the middle of the course.

Proposal – personal: Based on group's knowledge base.
Will be written according to guidelines and presented in the middle of the course.

Final paper – personal: Developing your research question into a full-scale paper.
Will be written according to guidelines and presented at the end of the course.

Grades

30%: Group project	Literature review and market analysis	in the middle of the course
40%: Proposal (personal):	Extend group work to your specific question	to be scheduled
30%: Paper (personal):	Developing a full-scale paper	at the end of the course