



SMART CITIES – summer course

Course start date: July 22, 2019 (required arrival July 21)

Course end date: August 8, 2019 (check out from dorms August 9)

4 Credits (minimum 52 academic hours)

Urbanization is one of the great challenges and opportunities of this century. The last decades have witnessed unprecedented population growth with the implication that today, for the first time in human history, more than half of the world population lives in cities. Furthermore, the last decades have also witnessed unprecedented development of big data and data mining tools, IoT (Internet of Things), and AI (artificial intelligence). These have the potential to revolutionize the dynamics and structure of cities and the lives of those who inhabit them.

However, although the smartification of cities implies an integration of the real and virtual worlds, data integration is still scarce. Therefore, there is an urgent need to understand the multiple aspects of cities and urbanism; to develop and implement state-of-the-art theories, methodologies, data repositories, data analytics, and improved hardware and software technologies; and to deal with the complexity of the new urban era. The course will propose ways in which smartification—extensive use of sensors, on-demand location-based services, crowd-sourcing, and mechanism design in data collection, analytics and automation—can address current challenges of cities.

The course will bring together researchers studying cities and urbanism as well as urban planners, municipalities' and governmental officials, managers in related industries and other stakeholders that develop solutions in areas ranging from scalable data infrastructure such as the Internet of Things, supply chain management, the interrelations between crowd-sourcing apps and traffic, spatial configuration as key to urban dynamics and cognition, to tools for data analytics.

Urbanization is inextricably tied to global challenges ranging from climate change and sustainable use of energy and natural resources to social justice, personal health, safety and wellbeing. The course will cover the various theoretical and the practical aspects in class, labs, workshops and meetings with managers, entrepreneurs and researchers.

Tel Aviv University's **Research Center for Cities and Urbanism**, TAU "City Center", provides this unique interdisciplinary program for students from various fields. We believe that bringing students from different disciplines will enrich the learning experience.

We have launched this course on 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 the full 2019 syllabus and photo gallery: https://en-urban.tau.ac.il/news/Course_2018).

We will study the importance of 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 ethics of the algorithms, the products and the companies involved will be studied. The ethical implications of increasingly ubiquitous artificial intelligence integrated into personal, home and transport (and other) devices raise the debate about privacy and power. The impact of expanding data collection and embedded systems should be understood in the historical context of surveillance. At the same time, we are affected by the very trivial errors and biases of machine learning, and by the very basic and subjective feeling of being tracked and financialized. We will examine AI ethics and responsibility that matter in real world experience.

Instructor: Dr. Ronit Purian, TAU City Center's director. Her research is focused on smart cities and the behavioral, social and ethical aspects of information systems; for example, the informational elements of digital life (e.g., navigation) and the ecosystem of software development that sets design alternatives. She leads CoData's task group for Urban Life and Smart Cities; and works with municipalities and the central government on various topics of regional planning and development.

Topics & lectures

1. Introduction: The (smart) city in history.
2. Definitions of Smart Cities.
3. Big data, IoT, cloud computing.
4. Complexity theory and Smart Cities.
5. Ethics, privacy and human rights.
6. Environment, sustainability and resilience.
7. Smart transportation and mobility.
8. Planning and design in a Smart City.
9. Smart urban governance.
10. Presentations of groups' projects



Admission conditions

In order to be considered eligible for the program, applicants should be enrolled as a student in an institution of higher education, recognized by TAU. Because this program refers to a wide spectrum of topics, **it is open to students from every field of study.**

All application requirements and the online application itself are here:

https://international.tau.ac.il/Smart_Cities/?id=term-1

GPA: This summer program is open to qualified third year undergraduate students and Master Degree students with a minimum GPA of 3.0 (equivalent to a B or 80%). The students will have to submit both their undergraduate transcript and the grades of courses they already took in their Master. In exceptional cases, students with lower GPAs will be considered if their student essay, teacher recommendations and other factors show special circumstances to be taken into consideration.

In addition, applicants will have to submit:

- Online application
- Undergraduate or graduate degree from a recognized university.
- Proof of appropriate English skills – TOEFL/IELTS/CET.
- Two letters of recommendation.
- A CV/resume
- Short essay as part of the online application
- Application fee of \$60

For further details, please refer to the section on the application process:

https://international.tau.ac.il/Smart_Cities

Organization and Participation

Organized within the framework of [City Center](#) – TAU Research Center for Cities and Urbanism, the various topics will be covered in lecturers, labs and visits, by TAU researchers, industry experts, and managers in Tel Aviv municipality. Detailed schedule and bibliography will be provided to students.

Project

The students will form teams of 3-5 persons; each team will choose a research topic on which it will work during the course, and will present it twice: in the middle of the course as a proposal; and at the end of the course as a full-scale paper.

Grades: 30% presentation of the research proposal; 70% the final paper.

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