German University in Cairo
الجامعة الألمانية بالقاهرة

Faculty of Engineering and Materials Science

Architecture and Urban Design Program

Winter 2019

Elective Course:

Introduction to Sustainable Energy Systems and the Built Environment

The aim of the seminar is to introduce the students to fundamental issues of sustainability and the built environment. More specifically, it will provide a brief background on low carbon urbanism and passive climatic design developing at the same time competences and knowledge on specific aspects of energy building design and sustainable energy applications.

Dates:

Oct 24-25, Nov 6-7, Dec 6-7, 2019.

Duration:

42 teaching hours (14 hours theory and 28 hours practice)

Place:

German University of Cairo Campus

Audience:

Graduate students of Engineering and Architecture at GUC

Instructors:

Paris Fokaides (PhD), Assist. Professor, Frederick University, Department of Mechanical Engineering

Byron Ioannou (PhD), Assist. Professor, Frederick University, Department of Architecture

Seminar Schedule:

October 24-25 2019

DAY/ PERIOD	Instructor	Subject
Day 1/ Period 1, 50′	Dr. Byron Ioannou	Introduction to sustainable built environment.
Day 1/ Period 2, 50′	Dr. Byron Ioannou	Low carbon urbanism.
Day 1/ Period 3, 50′	Dr. Byron Ioannou	Sustainable urbanism, densities, neighbourhood layout.
Day 1/ Period 4, 50′	Dr. Byron Ioannou	Sustainable urbanism and green neighbourhoods.
Day 1/ Period 5, 50′	Dr. Byron Ioannou	Social sustainability definitions and approaches for the built environment.
Day 1/ Period 6, 50′	Dr. Byron Ioannou	Vegetation and the green at the built environment.
Day 1/ Period 7, 50′	Dr. Byron Ioannou	Project 1 discussion in the class
Day 2/ Period 1, 50′	Dr. Byron Ioannou	Project 1 workshop
Day 2/ Period 2, 50′	Dr. Byron Ioannou	Project 1 workshop
Day 2/ Period 3, 50′	Dr. Byron Ioannou	Project 1 workshop
Day 2/ Period 4, 50′	Dr. Byron Ioannou	Urban heat island effect.
Day 2/ Period 5, 50′	Dr. Byron Ioannou	Fundamentals of passive climatic and energy, efficient design.
Day 2/ Period 6, 50′	Dr. Byron Ioannou	Bioclimatic strategies and passive climatic approaches.
Day 2/ Period 7, 50′	Dr. Byron Ioannou	Project 2 discussion in the class

November 6-7 2019

DAY/ PERIOD	Instructor	Subject
Day 1/ Period 1, 50′	Dr. Paris Fokaides	Theory: Renewable Energy Technologies Integrated into the Built Environment
Day 1/ Period 2, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies Integrated into the Built Environment: Energy yield of BIPVs
Day 1/ Period 3, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies Integrated into the Built Environment: Energy yield of PVs on roof top
Day 1/ Period 4, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies Integrated into the Built Environment: Energy yield of solar thermal plant on roof top
Day 1/ Period 5, 50′	Dr. Paris Fokaides	Practice: Energy Economics: Payback period, discounted cashflow, Net Present Value, Internal Rate of Return
Day 1/ Period 6, 50′	Dr. Paris Fokaides	Practice: Energy Economics, business Plan and Feasibility Assessment for Renewable Energy Project
Day 1/ Period 7, 50′	Dr. Paris Fokaides	Practice: Energy Economics, use of RETScreen (software)
Day 2/ Period 1, 50′	Dr. Paris Fokaides	Theory: Renewable Energy Technologies Integrated into the Built Environment
Day 2/ Period 2, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies Integrated into the Built Environment: Energy yield of BIPVs
Day 2/ Period 3, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies Integrated into the Built Environment: Energy yield of PVs on roof top
Day 2/ Period 4, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies Integrated into the Built Environment: Energy yield of solar thermal plant on roof top
Day 2/ Period 5, 50′	Dr. Paris Fokaides	Theory: Renewable Energy Technologies for Power Generation
Day 2/ Period 6, 50′	Dr. Paris Fokaides	Practice: Renewable Energy Technologies for Power Generation: Energy yield of PV farm, Energy yield of wind farm, Energy yield of biomass plant
Day 2/ Period 7, 50′	Dr. Paris Fokaides	Theory: Fundamentals of Energy Policy: The European Energy Roadmap 2030 and 2050

December 5-6 2019

DAY/ PERIOD	Instructor	Subject
Day 1/ Period 1, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 1/ Period 2, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 1/ Period 3, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 1/ Period 4, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 1/ Period 5, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 1/ Period 6, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 1/ Period 7, 50′	Dr. Byron Ioannou	Project 2 workshop
Day 2/ Period 1, 50′	Dr Paris Fokaides	Project workshop
Day 2/ Period 2, 50′	Dr Paris Fokaides	Project workshop
Day 2/ Period 3, 50′	Dr Paris Fokaides	Project workshop
Day 2/ Period 4, 50′	Dr Paris Fokaides	Project workshop
Day 2/ Period 5, 50′	Dr Paris Fokaides	Project workshop
Day 2/ Period 6, 50′	Dr Paris Fokaides	Project workshop
Day 2/ Period 7, 50′	Dr Paris Fokaides	Project workshop