



BIOdesign

AE T480-001 / AE T580-001 / WEST T480-004
Spring Term, Wednesday 9:00-11:50 am



Drexel University
College of Engineering
Department of Civil, Architectural & Environmental Engineering
Dr. Eugenia Victoria Ellis

Politecnico di Milano
School of Architecture Urban Planning and Construction Engineering
Prof. Giuliana Iannaccone



POLITECNICO
MILANO 1863

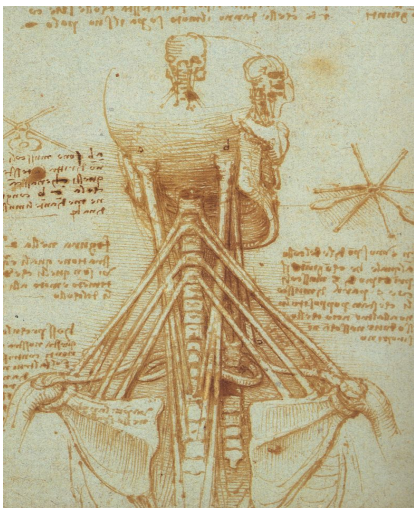
This real-time Global Classroom meets simultaneously in Philadelphia with students in Lecco, Italy.



The introduction of bio-informed sciences into design is providing a new paradigm for the creation of built environments that can promote human health and wellbeing.



Originally a branch of biology, **Neuroscience** is an interdisciplinary science that studies the human brain and nervous system. The experience of space is a sensory perception; understanding space through the lens of perception can augment how the built environment is designed through an understanding of how the brain processes information. **Photobiology** is the scientific study of the interactions of light and living organisms. For example, the effect of light on circadian rhythms, the internal mechanism that regulates hormone production, sleep cycles and stress levels. Circadian rhythms affect the general wellbeing of the human body and overall cognitive functioning. **Biomimicry** studies nature, its models, systems and processes to solve human problems sustainably by using biological prototypes to inspire engineering solutions in design. **Biophilia** literally means the love of nature and all living things; the biophilia hypothesis suggests that there is an instinctive bond between human beings and nature. Biophilic design promotes natural lighting and ventilation and because of this is a methodology that dovetails well with sustainability. **Chronobiology** is a field of biology that examines periodic (cyclic) phenomena in living organisms and their adaptation to solar- and lunar-related rhythms. **Bioengineering** translates these observations and concepts into practical application.



This course explains why designers and engineers need to consider relationships between the built environment and nature by providing the scientific and medical reasons behind the effects of the natural environment on health and wellbeing. Through the case study model, students will discover techniques to incorporate the natural environment into design of the built environment and will translate this knowledge into new knowledge, inventions and design strategies.