

Introduction:

Over the past decade, there has been an increasing interest in exploring the capacity of built spaces to respond dynamically and adapt to changes in the external and internal environments and to different patterns of use. Such explorations are technologically and socially motivated, in response to recent technological and cultural developments. Advances in embedded computation, material design, and kinetics on the technological side, and increasing concerns about sustainability, social and urban changes on the cultural side, provide a background for responsive/interactive architectural solutions that have started to emerge.

The class will focus on theories behind the responsive architecture and on the field of responsive architecture in general. It will examine architecture in relation to the latest research in biology, material science, synthetic biology, bioengineering, and will address possible shifts in imagining and re-envisioning materialization of architecture. The course will underline architecture's inseparable link to technology and speculate on new possibilities for architecture that is integrated, responsive, adaptive and productive participant within larger ecologies.

Objectives:

1. To learn about developments that had brought forward ideas of responsive architecture.
2. To expand the understanding of the responsive systems and their role in architecture.
3. To engage broader social and technological issues triggered by the deployment of responsive systems.

Teaching Approach:

This seminar course has two aspects. At the beginning of the semester there will be series of lectures covering major topics of the course. Readings will be assigned and discussions conducted during some of the classes. Students will have an opportunity to further engage the course topic by either writing a 4000 word paper or by developing a small scale design research project focusing on dynamic systems. Consultations about their research paper or project will be conducted on a weekly basis in the second part of the semester.

Content:

As the external socio-economic, cultural, and technological context changes, so do conceptions of space, shape, form and performance in architecture. Over the past decade, we have seen an increasing interest in exploring the capacity of built spaces to respond dynamically to changes in the external and internal environments. The idea that two-way relationships could be established among the space/component/surface, the environment, and the users is not new. The first concepts of an adaptive, responsive architecture were born in the late 1960s and early 1970s, primarily as a result of parallel developments in cybernetics, artificial intelligence, and information technologies. This class is interested in the territory where the cybernetics and architecture meet. New digital technologies of modeling, fabrication and simulation, new materials and material technologies, and responsive architecture informed by mechatronics and robotics have an extensive impact on the way we build and

imagine architecture. Responsive Architecture seminar explores the importance of those new technologies in contemporary design. The course will cover the following topics:

1. Architecture and kinetics
2. Architecture and biology
3. Architecture, matter and formation
4. Architecture and cyborgs

Evaluation:

The course evaluation will be based on assignment completed during the term. Students can chose between writing a 4000 word paper addressing one of the topics of the course **or** doing a small scale research project. Regardless of the chosen assignment (paper or project) students will meet with the instructor to present weekly progress of the assignment.

The EVDS standard grading scale will be used in all evaluations for this course.

A+ (92.5-100), A (85-92.49), A- (80-84.99), B+ (76-79.99), B (73-75.99), B- (70-72.99), C+ (66-69.99), C (63-65.99), C- (60-62.99), D+ (56-59.99), D (50-55.99), F (0-49.99)

Schedule:

Jan 11	Introductory lecture
Jan 18	Architecture and kinetics
Jan 25	Architecture and biology
Feb 01	Discussion/Project proposal
Feb 08	Architecture, matter and formation
Feb 15	Architecture and cyborgs
Feb 22	BLOCK WEEK
Mar 01	Discussion/Project proposal
Mar 08	Consultation
Mar 15	Consultation
Mar 22	Consultation
Mar 29	Good Friday
Apr 05	Consultation
Apr 12	Review of student projects

Readings:

Kas Oosterhuis, *Hyperbody*

Michael Weinstock, *The Architecture of Emergence*

Beesley Philip, *Responsive Architectures: Subtle Technologies 2006*

Saarah Bonnemaïson and Christine Macy, *Responsive Textile Environments*

David Benjamin + Soon-in Yang, *Life Size*

Michael Fox and Miles Kemp, *Interactive Architecture*

Robert Kronenburg, *Flexible: Architecture that Responds to Change*

Bullivant Lucy, *4dsocial: Interactive Design Environments*

Neill Spiller and Rachel Armstrong, eds, *Protocell Architecture: Architectural Design*

Notes:

1. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor.

2. It is the student's responsibility to request academic accommodations. If you are a student with a documented disability who may require academic accommodation and have not registered with the Disability Resource Centre, please contact their office at 220-8237. Students who have not registered with the Disability Resource Centre are not eligible for formal academic accommodation. You are also required to discuss your needs with your instructor no later than fourteen (14) days after the start of this course.

3. Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when:(a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(b) parts of the work are taken from another source without reference to the original author,(c) the whole work (e.g., an essay) is copied from another source, and/or,(d) a student submits or presents work in one course which has also been submitted in another course(although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.