

## **Lightweight structure, origami, structural analysis, deployable structure, structural mechanics**

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### **Course Description:**

Lightweight structures are widely used in engineering applications ranging from large structures (e.g., solar panels, space habitats, and disaster relief structures), sports/leisure equipment, to small biomedical devices. Topics in this course include truss structures, space frames, thin-walled membrane structures, and state-of-the-art architecture based on origami design principles. Related knowledge in mathematics, physics, and mechanics will be taught, and useful software and fabrication skills will be also covered. Final project will be on the design, analysis, and fabrication of lightweight structures, and the learning process and outcome will be shared with classmates in the format of short video clips.

### **Prerequisite:**

Undergraduate level “linear algebra” and “mechanics of solids”

### **Textbook:**

K. Miura and S. Pellegrino, Forms and Concepts for Lightweight Structures, Cambridge University Press

### **Reference:**

E. Hernandez, D. Hartl, D. Lagoudas, Active Origami: Modeling, Design, and Applications, Springer

### **Computational software:**

MATLAB, Python, Excel, or any computational software of your choice will be required to do homework