CE 2201 – Materials for Constructed Facilities

Fall 2021

Group Assignment I – Bio-Inspired Materials

**Due date:** By 11:59 PM on October 18th, 2021.

**Grade:** This assignment has five bonus grade points that will be added to your assignment grade.

**Teams:** The same five-member teams working in the lab sections

**Instructions:**

* Each team must work on a different topic.
* Select your topic and check with the instructor to ensure that another group has not selected the topic.
* Each team is expected to submit one report.
* The report should not be more than three pages, excluding the cover page.
* The report should be uploaded on Blackboard in **PDF** format as a single file.
* The course-section number, course name, project title, and team members' names should be shown on the cover page of the report.

**Problem Statement**

Biologically inspired engineering design uses analogies to biological systems to develop solutions for engineering problems and can be beneficial for developing sustainable solutions to engineering problems. The innate complexity of natural systems can inspire engineers attempting to create designs involving higher levels of complexity. Several bio-inspired designs have been used in solving problems, such as the imitation of the design of pinecones to design body heat regulating clothes and the design of micro-robots that can walk on water mimicking the basilisk lizard.

In this assignment, you are required to

1. Explore the world of biological materials and select one material for a detailed study that can act as inspiration in the development of new engineering materials. The material you choose can be from the plant or animal species.
2. Describe the selected material by addressing its uses in the natural world, its evolution, constituents, characteristics, and unique performance features.
3. Propose, in detail, an idea(s) to develop a novel, sustainable engineering material solution (i.e., material + application) that is inspired by the biological material you selected.
4. **For extra credit**: Based on your study of the selected biological material, present a new bio-inspired design concept for a construction material that can help find solutions to existing problems. (Optional)