

## IB 411



### Instructor

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### Course Description

This fully online, 8-week course focuses on how experts in biology and technological fields find inspiration in nature and use it as a model to make technological innovation and solve human problems. In the future, our day-to-day living, health, and the environment will benefit from applying basic research in biology to technological innovation, as they have in the past. Topics to be explored include efficient architecture, cooperative control, robotics, multimodal sensory integration for controlling behavior, and advanced materials.

### Definition of a Course Week

In this course, a Week starts on MONDAY at 12:00 AM Central Time and ends on SUNDAY (+1 week) at 11:59 PM Central Time. Assignments are due by 11:55 PM unless otherwise specified (Quizzes open at 6 AM on Friday and **close at Noon on Monday**).

For more information, see the [University's Academic Calendar](#).

### Course Goals and Objectives

Upon completing this course, students will:

- Have a solid understanding of nature as inspiration for innovation.
- Be able to explain the concepts learned to a variety of audiences in a clear and concise manner.

- Be able to apply the tools learned to arrive at sustainable design, engineering, architecture, and/or business solutions.
- Conclude the course with an overview of bioinspired innovation in the form of a course glossary, a series of forum posts, and a final project

## Course Structure

This is a 3-credit hour course. The course is 8 weeks long; it consists of 8 content modules. Please be aware that this course is accelerated; 16 weeks' worth of content will be covered in an 8-week time span. You should dedicate approximately 12–16 hours per week to working on the course itself, but actual time commitments will vary depending on your input, needs, and personal study habits. You should be logging into the course every day to keep up with the workload and meet deadlines.

This course is designed with the principles of collaborative learning, constructivism, and active participation in mind. You are encouraged to share your thoughts and engage in problem-solving. The course has a consistent and predictable structure, organized around the modules, with a course website that is straightforward and easy to navigate. Instructions and due dates for activities and assignments are clearly articulated so that you know what is expected of you, and so you will be able to easily stay on track.

We realize that you have a life beyond the scope of this course. However, if you are unable to complete an assignment because of other obligations, you should notify the instructor or, better yet, prepare the assignment ahead of time and post it early. This will give your classmates a head start in reading and responding to your work. Most assignments are due by 11:55 PM CT on their respective due dates as listed with the assignment, giving you and your classmates time to read and comment on other participants' work before the next module begins.

## Text Books

There are no formal textbooks for this course.

## Readings and Resources

Other reading materials will be listed in the weekly Lesson, Readings, and Resources pages on the course website.

## Course Outline

### Week Overview Page

Each week will begin with an overview page. This page will explain what the module is about, what learning goals you are expected to achieve, and in what activities you will participate. Each week is designed with the same structure and activities unless otherwise specified. The weekly

activities are explained in greater detail below. You can find the due dates of specific assignments on the assignment page.

Week 1: Introduction to Bioinspiration and Biomimicry/Creativity and Innovation

Week 2: Biological Materials & Nanostructures

Week 3: Robotics

Week 4: Sensing the Environment

Week 5: Energy and Architecture

Week 6: Maintaining Community

Week 7: Bioinspiration and Human Health

Week 8: The Business of Bioinspiration

## Course Activities

You are expected to complete your work independently, in accordance with [University policy](#). Failure to do so will result in strict disciplinary action, including loss of all credit for the assignment, notification of a dean, and possible dismissal from the University. You may work with others on homework, but the final product must be your own.

## **Lessons, Readings, and Resources**

Lessons are designed to give an overview of the topic at hand. The lectures are delivered as Moodle lessons. They will include text, pictures, graphs, video, and audio. The lectures are designed specifically for the online environment. All content will be made accessible to all students.

Lessons may have questions included in them. Please answer the questions since they will help you remember what you have learned, or apply what you have learned and already know. The answers will be recorded and will inform the instructors of the student's interests and abilities. The next time you open the Lesson (to study for the quiz, for instance) you will notice that the answer blocks to the questions are empty. That is OK, your previous answers were recorded and you can now just skip the question.

No textbook is required. Each week has required readings that will allow you to gain more insight into the topic – beyond the lecture or to support the lecture. Readings will come from the primary literature, secondary literature, or current high-quality science writing on the web (including a bioinspiration blog by researchers at Illinois). Videos, podcasts, and audio recordings will also be included in the weeks. They also include interviews with (Illinois) scientists who do cutting-edge research in the field discussed that week.

## **Discussion Forum**

Each week, you will answer discussion questions or complete an assignment. You will post your work to the Discussion Forum. You are expected to contribute constructive feedback to your course-mates' posts and facilitate the discussion in your own thread. A little variety is found in the difference in expectations for the forum assignments from week to week. In fact, sometimes the discussion assignment is not really a discussion on a topic with multiple points of view - it is "just" an assignment - but since we encourage you to share your work and comment on the work of others we put the assignment in a discussion forum.

## **Bioinspiration Database**

Every other week (odd-numbered weeks), you will pick a topic from a list of choices on a bioinspired product or process. You will then contribute your own background research on that bioinspired product or process to a database. It is *extremely* important that you submit this particular assignment on time as your peers' will be reviewing it the following week. Peer assignments are assigned automatically so if your contribution is not in the system then your essay cannot be peer-reviewed by the other students.

On even-numbered weeks, you are expected to give constructive feedback to your course-mates entries from the prior week (the peer review). You are also expected to complete the "My Top 4" assignment during even-numbered weeks. For this assignment, you will choose your four favorite topics from the prior week and create a reflection post.

## **Assignments**

There are several activities in this course that will make up your Assignment grade:

- **Minute Papers**

Once per week consider the materials you have reviewed during the week—the lessons, the readings, and any other activities you undertook. You will write a reflective post. What was the most interesting thing you learned this week? Please mention any problems you might have had understanding any part of the week. How might this information have been presented differently to make it more clear? You should view this as a formative assessment exercise that will also help the instructor determine where your interests lie and improve on the course for the next time the course is offered.

- **Orientation Activities**

These activities help us orient ourselves to begin work on this course together. Please be sure to see all activities in the Orientation tab.

## **Quizzes**

At the end of each week, students will take a self-paced quiz to evaluate new knowledge obtained (from lectures, readings, videos, synchronous discussion, etc.). Tip: take notes as you

move through the content presented to you during the week. These weekly quizzes will be a mixture of multiple-choice, true/false, matching, and short-answer questions. You will get one attempt to take the weekly quiz. Once you start you have 90 minutes to complete the quiz. (You can take the Orientation quiz and the How to Research Scientific Literature quiz multiple times.)

### **Peer-Reviewed Teaching Tool Project**

Here, you are tasked to create a teaching tool on a topic related to bioinspiration. This can be a video or an audio podcast, a cartoon, a "BuzzFeed" post, etc. After you submit a proposal and then the final project, your peers will grade your work and you will grade the work of 5 of your peers, **and you will grade your own work too**. Please read the instructions carefully on the PRTT Project Information pages.

### **Community Participation**

Community participation in an online learning environment is essential. Additionally, in **sharing resources as biologists or engineers interested in bioinspired design**, we can amplify the impact of this topic even outside of the course. Thus, 5% (100 points) of your overall course grade will come from a measure of your participation in our Social Forum and in our Q & A Forum. Ways to attain points in this Community Participation category are listed below:

- 75 points: Social Forum postings and replies. Each post is worth 15 points and each reply is worth 5 points (for a maximum of 75 points total). You can receive a maximum of 25 points in a 2-week period, so plan to post something every 2 to 3 weeks. Ideas for posts include:
  - Current Events/News articles related to bioinspiration
  - Events/Other things related to bioinspiration
  - Link to your social media posts related to bioinspiration
  - Reply to any post with meaningful commentary
- 25 points: Q & A Forum postings and replies. Each post is worth 10 points and each reply is worth 5 points (for a maximum of 25 points total). Ideas for posts include:
  - Any non-personal (i.e. grade-related) questions related to the course
  - Meaningful reply to any question asked

We hope you will not see this "participation" as another box to check. I want to encourage you to share your findings and thoughts, sometimes beyond just the people in the course.

## **Course Grading**

Grading Distribution:

<b><u>Category</u></b>	<b>Grade Weight</b>
<b>Discussion Forum</b>	30%
<b>Bioinspiration Database</b>	20%

<b>Assignments</b>	15%
<b>Quizzes</b>	15%
<b>PRTT Project</b>	15%
<b>Community Participation</b>	5%
<b>Total</b>	100%

## Grading Scale

<b>Grade</b>	<b>Percent</b>
<b>A+</b>	97–100
<b>A</b>	92–96.99
<b>A–</b>	90–91.99
<b>B+</b>	87–89.99
<b>B</b>	82–86.99
<b>B–</b>	80–81.99
<b>C+</b>	77–79.99
<b>C</b>	72–76.99
<b>C–</b>	70–71.99
<b>D+</b>	67–69.99
<b>D</b>	62–66.99
<b>D–</b>	60–61.99
<b>F–</b>	0–59.99

## Getting Help

If you need help:

The instructors are available for virtual office hours by appointment. Please do not hesitate to reach out to set up an appointment to meet in person or virtually.

- Please only contact your instructor directly if you have a personal question.
- For all other questions about course content, activities, deadlines, technical problems, etc., please **check the General Q & A forum** to see if someone else has already asked your same question and received a response.
- If your question isn't there yet, **post your question** to the General Q & A forum. Feel free to help your peers out if you know the answer! Your instructor will also respond on this forum as well, so rest assured, we will all help to find answers!

- If you have technical problems with the course, please fill out this form.

## **Accommodations**

To obtain disability-related academic adjustments and/or auxiliary aids, students should contact both the instructor and the Disability Resources and Educational Services (DRES) as soon as possible. You can contact DRES at 1207 S. Oak Street, Champaign, (217) 333-1970, or via email at [disability@illinois.edu](mailto:disability@illinois.edu).

## **Participation**

### **Student Commitment**

By registering for this online course, you commit to self-motivated study, participation in online course activities, and timely submission of all assignments. Furthermore, you commit to accessing the course website and checking e-mail at least 4 days per week, as well as to devoting at least 12–16 hours weekly to preparing for each week and completing the required assignments and readings.

### **Late Submissions of Assignments, Reflective Essays, and Other Written Work**

Assignments, reflective essays, and other written work (collectively referred to as projects) are due by **11:55 PM** Central Time on the dates specified in the course calendar, unless otherwise noted. Unless permission from the instructor is obtained **at least 1 day before a due date**, work that is submitted late, but within 24 hours of the due date, may be graded depending on grader availability and the student's track record. Points will be deducted, at least 5-10 points, from late submissions. Work submitted more than 48 hrs late may not be graded.

### **Being Excused from Assignments**

If you wish to be excused from participation in class discussions or from submitting projects on time because of medical reasons or personal emergencies, you must address the issue with the course instructor. Because of this course's fast pace and the potential effect that such excusals may have on your ability to complete it successfully, such accommodation will be made on a case-by-case basis.

## **Instructor Responses**

### **Instructor Feedback Turnaround Time**

Questions posted to the **Course Q & A** forum generally will be answered within 48 hours. If possible, students are encouraged to answer questions posted by other students to the [Course Q & A forum](#), rather than waiting for an instructor's response.

Assignments submitted online will be reviewed and graded by the course instructor or teaching assistants within 3-4 business days.

## **Responding to E-mails**

The instructor will respond to e-mail messages within 24 hours of receiving them unless the instructor notifies you ahead of time of an inability to do so. **When sending e-mail, include a subject line that identifies the course number and nature of your question.** The instructor may not respond to questions sent to her that should be posted in the Course Q & A forum. Please don't be offended if you are asked to forward your question to the Course Q and A, we are trying to create a collaborative learning environment and answering your question might benefit others in the course too. The instructors will check the Course Q&A more often than their personal email.

## **Responding to the Discussion Forums**

The role of the instructor within the assignment forums is to help facilitate discussion by providing probing questions, asking for clarification, and helping solve conflicts, as necessary. The instructor will not respond to every post; you are encouraged to share your thoughts, experiences, and ideas with each other as well. Again, we want to create a collaborative learning environment where students also learn from each other.

## **Academic Integrity**

Academic dishonesty will not be tolerated. In order to assist with ensuring academic integrity, Turnitin has been integrated into this course, checking discussion posts against a repository of published material. Examples of academic dishonesty include the following:

- Cheating
- Fabrication
- Facilitating infractions of academic integrity
- Plagiarism
- Bribes, favors, and threats
- Academic interference
- Examination by proxy
- Grade tampering
- Non-original works

Should an incident arise in which a student is thought to have violated academic integrity, the student will be processed under the disciplinary policy set forth in the [Illinois Academic Integrity Policy](#). If you do not understand relevant definitions of academic infractions, contact your instructor for an explanation within the first week of class.

## **AI-Tools**

Please do not use any form of generative A.I. such as ChatGPT. If you rely on generative A.I. tools to answer questions in assignments, you run the risk of being flagged for plagiarism by Turnitin. This is because tools like ChatGPT may draw upon resources from other parts of the internet that Turnitin can monitor. If other



students are also using ChatGPT, and their answers will be similar to yours, Turnitin may pick on this as well. Additionally, if too many answers/essays are too similar, your instructors may also become suspicious. These tools are also known to produce incorrect or even completely fabricated citations.

It's best not to rely on AI-generated text to do your work for you. You can use AI-tools for anything that would be appropriate for a classmate to do. For example, it is OK to have a friend read over a paper you wrote and make suggestions. It is, however, inappropriate for a friend (or AI-tool) to write parts of the article. It is appropriate to ask a classmate questions about a scientific paper/topic to assess if you understood the content the same way, it is inappropriate to turn in a summary/answer to a question that was written by the classmate (or AI tool). It is appropriate to ask a friend to quiz you about a topic, but not for the friend to take the quiz. Also note that, like a classmate, AI may be incorrect! Relying submitting AI-generated work will be considered student misconduct.

## **Copyright**

### **Student Content**

Participants in University of Illinois courses retain copyright of all assignments and posts they complete; however, all materials may be used for educational purposes within the given course. In group projects, only the portion of the work completed by a particular individual is copyrighted by that individual. The University of Illinois may request that students' materials be shared with future courses, but such sharing will only be done with the students' consent. The information that students submit during a course may, however, be used for the purposes of administrative data collection and research. No personal information is retained without the students' consent.

### **Non-Student Content**

Everything on this site and within University of Illinois courses is copyrighted. The copyrights of all non-student work are owned by the University of Illinois Board of Trustees, except in approved cases where the original creator retains copyright of the material. Copyrights to external links are owned by or are the responsibility of those external sites. Students are free to view and print material from this site so long as

- The material is used for informational purposes only.
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These materials may not be mirrored or reproduced on non-University of Illinois websites without the express written permission of the University of Illinois Board of Trustees. To request permission, please contact the academic unit for the program.

## **Student Behavior**

### **Student Conduct**

Students are expected to behave in accordance with the penal and civil statutes of all applicable local, state, and federal governments, with the rules and regulations of the Board of Regents, and with University regulations and administrative rules.

For more information about the student code and handbook, see the [CITL Course Policies page](#).

### **Netiquette**

In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting online via e-mail or discussion board messages, adapted from guidelines originally compiled by Chuq Von Rospach and Gene Spafford (1995):

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect.
- Be brief; succinct, thoughtful messages have the greatest effect.
- Your messages reflect on you personally; take time to make sure that you are proud of their form and content.
- Use descriptive subject headings in your e-mails.
- Think about your audience and the relevance of your messages.
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-to-face communication, Internet messages are easy to misinterpret.
- When making follow-up comments, summarize the parts of the message to which you are responding.
- Avoid repeating what has already been said; needless repetition is ineffective communication.
- Cite appropriate references whenever using someone else's ideas, thoughts, or words.

## **Communications**

### **Daily Contact**

Your daily contact should be via the discussion forums in our Learning Management System and via e-mail.

### **Course Questions**

Questions pertaining to the course should be posted in our **Course Q & A** discussion forum. You can get to this forum from the course home page. Posting questions here allows everyone to benefit from the answers. If you have a question, someone else is probably wondering the same thing. Anyone submitting a question via e-mail will be directed to resubmit the question to the Q & A discussion forum. Also, participants should not hesitate to answer questions posed by peers

if they know the answers and the instructor has not yet responded. This not only expedites the process, but also encourages peer interaction and support.

### **Personal Questions**

Questions of a personal nature should first be sent to the instructor's e-mail address ([Instructor Information](#)). **When sending e-mail, include a subject that identifies the course number and nature of your question.**

### **Emergencies**

If you have an emergency that will keep you from participating in the course, please notify your instructor by using the instructor's e-mail address ([Instructor Information](#)). Provide callback information in your e-mail (if necessary). You should also notify your program director of any emergencies.

### **Zoom**

*Zoom* is a tool that allows multiple people to join together simultaneously via a computer to text chat, audio chat, video chat, collaborate on a digital whiteboard, and even share their computer desktops with one another. The Instructor's Virtual Office makes use of Zoom, as do the PRTT Project Proposal Meetings.

### **Instructor's Virtual Office**

Another way to communicate with the instructor is to make use of the virtual office hours. The instructor will be available for office hours via Zoom on the dates and during the times listed in the [Instructor Information](#) page.

### **Announcements**

The [Announcements](#) forum serves as a way for your instructor and University of Illinois administrators to make announcements within our online learning environment. Announcements posted here will also be sent to your Illinois e-mail address, so be sure to check your e-mail or the [Announcements](#) forum at least once a day to see whether any new announcements have been made.

### **Social Forum**

If you would like to discuss certain topics related to bioinspiration further, or if you just want to share a great resource you came across because it might interest other course participants, then you are encouraged to use the [Social Forum](#). Similarly, you can also use Twitter and include the hash tag #bioinspiration.

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