

**PISc 486/586: Plant Biochemistry**  
**Spring 2021**

- Credits:** 3 hours
- Lecture time:** Tuesday and Thursday 8:00 - 9:15 AM
- Lecture place:** Ag. Sci. 323
- Instructor:** Dr. Zonglie Hong  
Office: AgBiotech Building 207  
Phone: 885-5464; Email: zhong@uidaho.edu
- Prerequisite:** Biol 300 (*Survey of Biochemistry*), Biol 380 (*Biochemistry I*) or by permission.
- Textbook:** *Biochemistry and Molecular Biology of Plants*, 2<sup>nd</sup> edition, B. Buchanan, W. Gruissen & R. Jones, 2015, Wiley Blackwell (ISBN 9780470714218).
- Bb Learn:** Class handouts, previous exams and supplemental reading materials are available for download at <https://bblearn.uidaho.edu/> (for registered students).
- Zoom link:** Registered students can join the classroom of PISc 486/586 Plant Biochemistry via the Zoom link: <https://uidaho.zoom.us/j/921941527>

**Course description**

This course covers basic and exciting aspects of plant biochemistry and molecular biology including carbon and nitrogen metabolism, secondary plant products, and signal transduction pathways. The course is designed for upper-level undergraduate students and graduate students who are interested in the biochemical nature of plants and in the frontiers of research in plant biochemistry and molecular biology.

**Student learning outcomes:**

- Students will learn the biochemical reactions and molecular biology of photosynthesis, nitrogen fixation, nitrogen and sulfur metabolism, amino acid biosynthesis, flower and seed development and signal transduction pathways in higher plants.
- Students will learn the composition of plant cell walls, and understand the biochemical process of biofuel production.
- Students will demonstrate a comprehension of the molecular and biochemical basis of signal transduction, stem cell regulation and embryogenesis in plants.
- Students will develop the ability to communicate their acquired plant biochemistry experiences through oral presentations and written course reports.

**Grading:** There will be three exams, each covering the material presented after the previous exam. For undergraduate students, final grading will be based solely on the total points from the three exams (each worth 30, 30 and 40 points, respectively). Graduate students will be required to submit a minireview paper on a research topic in plant biochemistry. Final grading for graduate students will be determined on the basis of the minireview paper (20% of the final grade) and the total points of the three exams (80%). On the scale of a possible total of 100 points, final course grades will be determined as follows:

**A: > 90      B: 75-89      C: 50-74      F: < 49**

**Examinations:** The exams will test your knowledge and understanding of the materials covered in the course. All exams will be close-book! You may not bring your text, handouts and notes to exams.

**Minireview paper** (applicable to graduate students only): The review paper should focus on a current topic of research in plant biochemistry and molecular biology, and provide a critical-yet-balanced view of the topic so that it is accessible to researchers in other areas. The review may include: 1) a brief

introduction describing the nature and significance of the topic, 2) current status of knowledge and unsettled questions, and 3) future research directions. The length of the review should be in the range of 10-15 pages, excluding references cited. Students are strongly encouraged to discuss with the instructor before choosing a topic. The minireview is due on **April 30, 2021**.

**Assistance:** The instructor will have office hours between 9:30-11:00 am Tuesdays and Thursdays. Students are also encouraged to make an appointment to meet with the instructor in his office.

**Disability support services reasonable accommodations statement:**

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. Please notify the course instructor(s) during the first week of class regarding accommodation(s) needed for the course. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306.

\*phone: 885-6307                      e-mail: [dss@uidaho.edu](mailto:dss@uidaho.edu)  
website: <http://www.uidaho.edu/studentaffairs/asap/dss>

**University of Idaho classroom learning civility clause:**

In any environment in which people gather to learn, all members must feel free and safe as possible in their participation. To this end, I expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning. Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with me during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (5-6757), the UI Counseling & Testing Center's confidential services (5-6716), or the UI Office of Human Rights, Access, & Inclusion (5-4285).

**Firearms on University of Idaho property:**

The University of Idaho bans firearms from its property with only limited exceptions. One exception applies to persons who hold a valid Idaho enhanced concealed carry license, provided those firearms remain concealed at all times. If an enhanced concealed carry license holder's firearm is displayed, other than in necessary self-defense, it is a violation of University policy. Please contact local law enforcement (call 911) to report firearms on University property.

**In-person Class Attendance:**

Refrain from attending class in-person if you are ill, if you are experiencing any of the [known symptoms of coronavirus](#), or if you have tested positive for COVID-19 or been potentially exposed to someone with COVID-19.

- If you display symptoms and/or test positive, you should quarantine following the [CDC's recommendations](#). Do not return to class until you meet the [CDC's requirements](#).
- If you have been exposed but are asymptomatic, you should stay home for 14 days from the last exposure if you remain asymptomatic, adhering to the [CDC's requirements](#).

Documentation (*a doctor's note*) for medical excuses is not required; instead, email me to make arrangements to submit any missed work and make plans to use Zoom and/or online course materials to stay current with the course schedule.

**Face Covering Requirements:**

All faculty, staff, students and visitors across all U of I locations must use face coverings over the nose and mouth whenever in any U of I buildings. **Thus, you are required to wear a face covering in this classroom at all times.**

- If you have a medical condition that affects your ability to comply with the face covering policy, please contact the [Center for Disability Access and Resources \(CDAR\)](#) to request a reasonable accommodation.
- If you have other reasons you believe make you exempt from wearing face coverings, please contact the [COVID-19 Coordinator](#).
- Failure to wear a face covering over your nose and mouth will require you to leave the classroom. If a disruption to the learning experience occurs due to repeated offence and/or egregious behavior, you will be reported to the [Dean of Students Office](#) for a potential code violation.

### **Lecture Topics for PISc 486/586 Plant Biochemistry (Spring 2021)**

<b>Date (day)</b>	<b>Lecture</b>	<b>Topics</b>
01/14 (R)	Lecture 1.	Light absorption
01/19 (T)	Lecture 2.	Photosystems
01/21 (R)	Lecture 3.	The Calvin cycle
01/26 (T)	Lecture 4.	Photorespiration
01/28 (R)	Lecture 5.	Photosynthate transport
02/02(T)	Lecture 6.	Polysaccharides
02/04 (R)	Lecture 7.	Cell wall
02/09 (T)	Lecture 8.	Biofuels
02/11 (R)	<b>Review/study day</b>	
02/16 (T)	<b>Exam 1</b>	
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02/18 (R)	Lecture 09.	Nitrogen fixation
02/23 (T)	Lecture 10.	Nodule formation
02/25 (R)	Lecture 11.	Nitrogen assimilation
03/02 (T)	Lecture 12.	Aminotransferases
03/04 (R)	Lecture 13.	Aromatic amino acids
03/09 (T)	Lecture 14.	Aspartate-derived amino acids
03/11 (R)	Lecture 15.	Proline and osmoprotection
<b>03/16 (T)</b>	<b>spring recess</b>	
<b>03/18 (R)</b>	<b>spring recess</b>	
03/23 (T)	Lecture 16.	Sulfate assimilation
03/25 (R)	<b>Review/study day</b>	
03/30 (T)	<b>Exam 2</b>	
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04/01 (R)	Lecture 17.	Food safety & acrylamide
04/06 (T)	Lecture 18.	Signal perception in plant cells
04/08 (R)	Lecture 19.	Signal transduction pathways
04/13 (T)	Lecture 20.	Calcium and protein kinases 1
04/15 (R)	Lecture 21.	Protein kinases 2
04/20 (T)	Lecture 22.	Protein ubiquitination
04/22 (R)	Lecture 23.	Stem cells and floral meristem
04/27 (T)	Lecture 24.	Floral organ determination
04/29 (R)	Lecture 25.	Gametogenesis
05/04 (T)	Lecture 26.	Embryogenesis
05/06 (R)	<b>Review/study day</b>	
<b>05/14 (Friday) Final Exam (08:00-10:00) AgSc 323</b>		