



## Grading

The course grade will be determined by a combination of assignments, individual and team presentations, participation during discussion of assigned papers, and a final mini-symposium presentation for a maximum total of 450 points, distributed as follows:

Date	Subject	Points (450)
08/27/20	Discussion paper 1 (Gavelis and Gile, 2018)	25
09/15/20	Discussion paper 2 (Schluter <i>et al.</i> , 2017)	25
09/17/20	Presentation 1: Strategies for Genetic Manipulation of Photosynthesis (team presentations)	50
09/22/20	Discussion paper 3 (Seung <i>et al.</i> , 2020)	25
10/06/20	Discussion paper 4 (Rekhter <i>et al.</i> , 2019; Torrens-Spence <i>et al.</i> , 2019)	25
10/13/20	Discussion paper 5 (Li <i>et al.</i> , 2018)	25
10/15/20	Presentation 2: Genetic Engineering of Lipids (team presentations)	50
10/20/20	Discussion paper 6 (Li <i>et al.</i> , 2020)	25
10/27/20	Discussion papers 7 (Qian <i>et al.</i> , 2019; Lynch <i>et al.</i> , 2020)	25
10/29/20	Discussion paper 8 (Ha <i>et al.</i> , 2019)	25
11/03/20	Discussion paper 9 (Henry <i>et al.</i> , 2018)	25
11/05/20	Discussion paper 10 (Nett <i>et al.</i> , 2020)	25
11/12-24/20	Mini-symposium presentations	100

Students scoring a total score of 375 - 450 points will be given a grade of A, further sub-divided as follows:

- 425 - 450 = A+
- 400 - 424 = A
- 375 - 399 = A-

Students scoring a total of 300 - 374 points will be given a grade of B, further sub-divided as follows:

- 350 - 374 = B+
- 325 - 349 = B
- 300 - 324 = B-

Students scoring a total of 225 - 299 points will be given a grade of C, further sub-divided as follows:

- 275 - 299 = C+
- 250 - 274 = C
- 225 - 249 = C-

Students scoring a total of 150 - 224 points will be given a grade of D, further sub-divided as follows:

- 200 - 224 = D+
- 175 - 199 = D
- 150 - 174 = D-

Students scoring a total of less than 150 points will be given a grade of F:

- Less than 150 = F

**Mini-symposium (100 points):** During the last two weeks of classes, each student will be required to give a 15-minute presentation (12 minutes for talk and 3 minutes for questions) on a specialized metabolite chosen from a list provided by the instructors in late September. Students will be expected to cover aspects related to the compound's distribution in the plant kingdom, its ecological function and if applicable, examples of its practical usage for humans. Students should also incorporate elements learned in the course to describe the metabolism of the compound, including primary metabolic pathway(s) providing precursors for biosynthesis of the compound, genes/enzymes involved in its biosynthesis, subcellular architecture of the pathway and what steps remain to be elucidated. Students should also discuss how the compound is extracted from plant tissues and what efforts, if any, have been made to produce it via metabolic engineering, breeding or other approaches.

### **Lecture Schedule (assigned readings are from Biochemistry & Molecular Biology of Plants)**

#### **Lecture 1, Week 1**

Lecture title: Introduction (Widhalm, Dudareva)

Date: August 25, 2020

Assigned reading: Chapter 1 "Membrane Structure and Membranous Organelles"

Objectives/topics covered:

- Provide an overview of course syllabus, resources, goals, assignments, and grades
- Why is plant metabolism unique?
- Introduce metabolic networks and subcellular architecture

#### **Discussion paper 1 assigned (Gavelis and Gile, 2018)**

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#### **Lecture 2, Week 1**

Lecture title: Evolution of Photosynthesis (Guest lecture by Dr. Gavelis)

Date: August 27, 2020

Assigned reading: Discussion paper 1 (Gavelis and Gile, 2018)

Objectives/topics covered: How did cyanobacteria first embark on the path to becoming plastids?

#### **Discussion paper 1 for class today: Gavelis and Gile, 2018 (25 points possible)**

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#### **Lecture 3, Week 2**

Lecture title: Overview of photosynthesis (Dudareva)

Date: September 1, 2020

Assigned Reading: Chapter 12: "Photosynthesis"

Objectives/topics covered:

- To introduce some of the fundamental principles of photosynthesis, and to introduce some of the key players in the light and carbon reactions of photosynthesis.
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### **Lecture 4, Week 2**

Lecture title: Photosynthesis: Light Reactions (Dudareva)

Date: September 3, 2020

Assigned Reading: Chapter 12: "Photosynthesis"

Objectives/topics covered:

- Antennae: auxiliary light-harvesting pigment protein complexes in the photosystems
- Structures of the photosystems in relation to their function
- Electron transport pathways in chloroplast membranes
- The Q-cycle in the chloroplast
- ATP synthesis
- Oxidation of water
- Photosynthetic inhibitors

**Presentation 1 assigned. Student teams should receive approval of their paper from the instructors via email by Friday September 5<sup>th</sup>.**

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### **Lecture 5, Week 3**

Lecture title: Carbon reactions in C<sub>3</sub> plants (Dudareva)

Date: September 8, 2020

Assigned Reading: Chapter 12: "Photosynthesis" and Chapter 13: "Carbohydrate Metabolism"

Objectives/topics covered: This lecture will focus on the carbon reactions of photosynthesis with special reference to C<sub>3</sub> plants. Specific topics to be considered are:

- The Calvin Cycle - intermediates, enzymes, and stoichiometry
  - Rubisco - structure, activity, regulation
  - Light-linked regulation of other enzymes of photosynthesis
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### **Lecture 6, Week 3**

Lecture title: Variations in CO<sub>2</sub> fixation: C<sub>3</sub> and C<sub>4</sub> plants (Dudareva)

Date: September 10, 2020

Assigned reading: Chapter 14 "Respiration and Photorespiration" and Chapter 12: "Photosynthesis"

Objectives/topics covered: This lecture will focus on the reactions of photosynthesis in C<sub>3</sub> plants when oxygen, rather than CO<sub>2</sub>, is used as a substrate by Rubisco. It will also focus on variations in mechanisms of photosynthesis (CO<sub>2</sub> fixation) in the plant kingdom. Specific topics to be considered are:

- Rubisco - kinetics with respect to CO<sub>2</sub> and O<sub>2</sub>
- Photorespiratory carbon oxidation (PCO) cycle

- Role of photorespiration in plants
- C<sub>4</sub> plant photosynthesis:
  - general mechanism
  - anatomy of a C<sub>4</sub> leaf
  - energetic costs of concentrating CO<sub>2</sub>
  - light regulation of C<sub>4</sub> pathway enzymes
- Crassulacean Acid Metabolism (CAM); difference in regulation of PEP carboxylase between C<sub>4</sub> and CAM plants

### Discussion paper 2 assigned (Schluter *et al.*, 2017)

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#### Lecture 7, Week 4

Lecture title: Variations in CO<sub>2</sub> fixation: C<sub>3</sub> and C<sub>4</sub> plants (continued) (Dudareva)

Date: September 15, 2020

Assigned reading: Chapter 14 “Respiration and Photorespiration” and Chapter 12: “Photosynthesis”

Objectives/topics covered: This lecture will focus on the reactions of photosynthesis in C<sub>3</sub> plants when oxygen, rather than CO<sub>2</sub>, is used as a substrate by Rubisco. It will also focus on the variations in mechanisms of photosynthesis (CO<sub>2</sub> fixation) in the plant kingdom.

### Discussion paper 2 for class today: Schluter *et al.*, 2017 (25 points possible)

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#### Lecture 8, Week 4

Lecture title: Strategies for Genetic Manipulation of Photosynthesis team presentations (Widhalm, Dudareva)

Date: September 17, 2020

#### **Presentation 1: Strategies for Genetic Manipulation of Photosynthesis (team presentations).**

Working in teams of 3, choose a manuscript on strategies for genetic manipulation of photosynthesis (discuss this manuscript with Dr. Dudareva or Dr. Widhalm before developing your presentation). Each team will make a 15-minute PowerPoint presentation with an additional 2-5 minutes for questions and discussion. The presentation should include:

- a brief introduction which states the goals and hypothesis tested,
- a description of the metabolic modifications performed,
- a brief description of obtained results, an explanation in the case of an unexpected outcome, and possible future experiments to achieve the initial goal.

This assignment is worth 50 points.

### Discussion paper 3 assigned (Seung *et al.*, 2020)

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### **Lecture 9, Week 5**

Lecture title: Carbohydrate metabolism; sucrose and starch synthesis (Dudareva)

Date: September 22, 2020

Assigned reading: Chapter 13: "Carbohydrate Metabolism"

Objectives/topics covered: This lecture will focus on carbohydrate metabolism with special reference to sucrose and starch synthesis and degradation. Focus will be on regulation of these processes in a C3 mesophyll leaf (please note that regulation may differ in other cell types and organs ... these differences will be highlighted in this and subsequent Lectures). Specific topics to be considered are:

- Metabolite transporters between chloroplast and cytosol
- Biosynthetic pathways leading to synthesis of starch and sucrose
- Key enzymes of sucrose and starch synthesis and degradation, and their regulation

### **Discussion paper 3 for today: Seung *et al.*, 2020 (25 points possible)**

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### **Lecture 10, Week 5**

Lecture title: Glycolysis (Dudareva)

Date: September 24, 2020

Assigned reading: Chapter 13: "Carbohydrate Metabolism"

Objectives/topics covered: This lecture will focus on the reactions of glycolysis; reactions that convert hexose phosphates to the 3-carbon compounds PEP and pyruvate via triose phosphates (glyceraldehyde 3-P and dihydroxyacetone phosphate) in the cytosol. Specific topics to be considered are:

- Intermediates and enzymes of glycolysis
  - Regulation of PFK (ATP-dependent phosphofructokinase)
  - Metabolic bypasses (adaptations to Pi-deficiency)
  - Alcohol and lactate fermentation under anaerobic stress
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### **Lecture 11, Week 6**

Lecture title: Citric acid cycle (Dudareva)

Date: September 29, 2020

Assigned reading: Chapter 14: "Respiration and Photorespiration"

Objectives/topics covered: This Lecture will focus on the carbon reactions of the citric acid cycle (TCA cycle; Krebs cycle). Specific topics to be covered include:

- An overview of the general mechanism of oxidative phosphorylation in mitochondria.
  - Role of glycolysis and the citric acid cycle in producing intermediates for biosynthesis.
  - Conversions of PEP, pyruvate, oxaloacetate and malate.
  - The pyruvate dehydrogenase complex and its regulation.
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## **Lecture 12, Week 6**

Lecture title: Hormones (Widhalm)

Date: October 1, 2020

Assigned reading: Chapter 17 "Biosynthesis of Hormones"

Objectives/topics covered: This lecture introduces the plant hormones (auxin, cytokinin, gibberellins, brassinosteroids, ethylene, abscisic acid, jasmonates, and salicylates) through their roles, during the plants life, from seed-to-seed. The biosynthesis, transport, perception, signal transduction and downstream effects of each are introduced, as well as a few ways that hormonal signaling pathways intersect.

**Discussion papers 4 assigned (Rekhter *et al.*, 2019; Torrens-Spence *et al.*, 2019)**

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## **Lecture 13, Week 7**

Lecture title: Hormones (continued) (Widhalm)

Date: October 6, 2020

Assigned reading: Chapter 17 "Biosynthesis of Hormones"

Objectives/topics covered: This lecture introduces the plant hormones (auxin, cytokinin, gibberellins, brassinosteroids, ethylene, abscisic acid, jasmonates, and salicylates) through their roles, during the plants life, from seed-to-seed. The biosynthesis, transport, perception, signal transduction and downstream effects of each are introduced, as well as a few ways that hormonal signaling pathways intersect.

**Discussion papers 4: Rekhter *et al.*, 2019; Torrens-Spence *et al.*, 2019 (25 points possible)**

**Presentation 2 assigned. Student teams should receive approval of their paper from the instructors via email by Friday October 12<sup>th</sup>.**

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## **Lecture 14, Week 7**

Lecture title: Structure and function of lipids; fatty acid biosynthesis (Widhalm)

Date: October 8, 2020

Assigned reading: Chapter 8 "Lipids"

Objectives/topics covered: This Lecture will focus on the structure and function of plant lipids, with special emphasis on fatty acid biosynthesis. Specific topics to be covered include:

- Definition of the term "lipids" and their diverse roles in plants
- Major classes of lipids; structures of fatty acids; nomenclature
- Fatty acid biosynthesis; overview; compartmentation
- Central role of acetyl-CoA and malonyl-CoA
- Acetyl-CoA carboxylase (ACCase)
- Fatty acid synthase (refers to all enzyme activities in fatty acid biosynthesis except ACCase)

**Discussion paper 5 assigned (Li *et al.*, 2018)**

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### **Lecture 15, Week 8**

Lecture title: Fatty acid biosynthesis (contd.); synthesis of membrane lipids (Widhalm)

Date: October 13, 2020

Assigned reading: Chapter 8 "Lipids"

Objectives/topics covered: This Lecture will continue discussion of fatty acid biosynthesis, and introduce the synthesis pathway for membrane lipids. Specific topics to be covered include:

- The terminal steps in fatty acid biosynthesis
- Desaturation and elongation of C16 and C18 fatty acids
- Unusual fatty acids; long-chain fatty acids
- The prokaryotic and eukaryotic pathways of glycerolipid synthesis; compartmentation
- Synthesis of membrane lipids; synthesis of phosphatidate; the CDP-diacylglycerol and diacylglycerol pathways of phospholipid synthesis

### **Discussion Paper 5 for today: Li *et al.*, 2018 (25 points possible)**

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### **Lecture 16, Week 8**

Lecture title: Genetic Engineering of Lipids team presentations (Widhalm, Dudareva)

Date: October 15, 2020

**Presentation 2: Genetic Engineering of Lipids team presentations.** Working in teams of 3, choose a manuscript on genetic/metabolic engineering of lipid metabolism (discuss this paper with Dr. Dudareva or Dr. Widhalm before developing your presentation). Each team will make a 15-minute PowerPoint presentation with an additional 2-5 minutes for questions and discussion. The presentation should include:

- a brief introduction which states the goals and hypothesis tested,
- a description of the metabolic modifications performed,
- a brief description of obtained results, an explanation in the case of an unexpected outcome, and possible future experiments to achieve the initial goal.

This assignment is worth 50 points.

### **Discussion paper 6 assigned (Li *et al.*, 2020)**

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### **Lecture 17, Week 9**

Lecture title: Nitrogen assimilation, uptake, and reduction (Guest lecture: Dr. Ying Li)

Date: October 20, 2020

Assigned reading: Chapter 16 "Nitrogen and Sulfur" (sections 16.1-16.10)

Objectives/topics covered: This lecture will focus on the nitrate uptake systems in plants, and the regulation of nitrate reduction to ammonia. Particular attention is given to the regulation of nitrate reductase.

### **Discussion paper 6: Li *et al.*, 2020 (25 points possible)**

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### **Lecture 18, Week 9**

Lecture title: Nitrogen assimilation into amino acids (Widhalm)

Date: October 22, 2020

Assigned reading: Chapter 7 "Amino Acids" (section 7.2) and Chapter 14 (section 14.9)

Objectives/topics covered: This lecture will focus on: i) the pathways of ammonia assimilation in plants. There is strong genetic and biochemical evidence that the main pathway of ammonia assimilation involves the glutamine synthetase-glutamate synthase cycle. Glutamate dehydrogenase primarily functions in glutamate catabolism in plants; ii) the interconversions of glycine and serine, with emphasis on the glycine decarboxylase complex, serine transhydroxymethylase, and the involvement of tetrahydrofolate in these reactions. This series of reactions interfaces with plant one-carbon (C1) metabolism involved in synthesis of many secondary plant products; iii) the role of aminotransferases in amino acid biosynthesis. The central role of pyridoxal phosphate as a cofactor will be discussed.

**Discussion papers 7 assigned (Qian *et al.*, 2019; Lynch *et al.*, 2020)**

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### **Lecture 19, Week 10**

Lecture title: Histidine and aromatic amino acids (Guest lecture: Dr. Joe Lynch)

Date: October 27, 2020

Assigned reading: Chapter 7: "Amino Acids" (sections 7.3 and 7.7)

Objectives/topics covered: This lecture will provide an overview of the pathways of synthesis of histidine, phenylalanine, tyrosine and tryptophan in plants.

**Discussion papers 7 for today: Qian *et al.*, 2019; Lynch *et al.*, 2020 (25 points possible)**

**Discussion paper 8 assigned (Ha *et al.*, 2019)**

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### **Lecture 20, Week 10**

Lecture title: Phenylpropanoids (Widhalm)

Assigned reading: Chapter 24 "Natural Products" (sections 24.14-24.19)

Date: October 29, 2020

Objectives/topics covered: This lecture will focus on the functions and biosynthetic pathways of phenylpropanoid-derived compounds, including flavonoids, isoflavonoids, anthocyanins, lignin, lignans, volatiles, coumarins, benzoic acids, and other compounds. Through the discussion paper, students will learn how regulation of upstream primary metabolism can affect downstream production of specialized compounds and how this regulation can be harnessed through metabolic engineering.

**Discussion Paper 8 for today: Ha *et al.*, 2019 (25 points possible)**

**Discussion Paper 9 assigned (Henry *et al.*, 2018)**

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### **Lecture 21, Week 11**

Lecture title: Terpenoids (Dudareva)

Date: November 3, 2020

Assigned reading: Chapter 24: "Natural Products" (sections 24.1-24.6)

Objectives/topics covered: This lecture will focus on the synthesis of terpenoids; the most structurally varied class of plant natural products. This lecture will also focus on the synthesis of carotenoids; the pathway of synthesis is a branch of the isoprenoid pathway also involved in terpenoid biosynthesis. Specific topics to be considered are:

- The mevalonate and non-mevalonate pathways of synthesis of isopentenylidiphosphate (IPP)
- Synthesis of geranylidiphosphate from IPP
- Production of phytoene (C40)
- Synthesis of carotenoids from phytoene
- Engineering of carotenoid biosynthesis (golden rice)

**Discussion paper 9 for today: Henry *et al.*, 2018 (25 points possible)**

**Discussion paper 10 assigned (Nett *et al.*, 2020)**

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### **Lecture 22, Week 11**

Lecture title: Other plant specialized metabolites (Widhalm)

Date: November 5, 2020

Assigned reading: Chapter 24 "Natural Products" (sections 24.7-24.13)

Objectives/topics covered: This lecture will provide an overview of the biosynthesis and functions of other aromatic amino acid-derived plant natural products, including cyanogenic glycosides, glucosinolates and alkaloids. Through the discussion paper, students will learn about some of the modern approaches being used to dissect specialized metabolite pathways in non-model plants.

**Discussion Paper 10 for today: Nett *et al.*, 2020 (25 points possible)**

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### **Lecture 23, Week 12**

Lecture title: Principles of metabolite analysis and metabolomics (guest lecture: Manoj Ghaste)

Date: November 10, 2020

Objectives/topics covered:

- Separation and quantification of metabolites
  - Ion exchange chromatography
  - Thin layer chromatography
  - Gas chromatography and GC-MS
  - Liquid chromatography and LC-MS
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### **Lectures 24, 25, 26 and 27, Weeks 12, 13, and 14**

Lecture title: Mini-symposium [student presentations] (Widhalm, Dudareva)

Dates: November 12, 17, 19, and 24, 2020

**Assignment (mini-symposium):** each student will be required to give a 15-minute presentation (12 minutes for talk and 3 minutes for questions) on a specialized metabolite chosen from a list provided by the instructors in late September. Students will be expected to cover aspects related to the compound's distribution in the plant kingdom, its ecological function and if applicable, examples of its practical usage for humans. Students should also incorporate elements learned in the course to describe the metabolism of the compound, including primary metabolic pathway(s) providing precursors for biosynthesis of the compound, genes/enzymes involved in its biosynthesis, subcellular architecture of the pathway and what steps remain to be elucidated. Students should also discuss how the compound is extracted from plant tissues and what efforts, if any, have been made to produce it via metabolic engineering, breeding or other approaches.

This assignment is worth 100 points

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### **Lectures 28 and 29, Week 15**

Dates: December 1<sup>st</sup> and 3<sup>rd</sup>

*No class is planned for this week, but these dates are reserved as make-up times if needed in the event of instructor illness or if more times are needed for student mini-symposium presentations. **There is no final exam.***

### **Brightspace**

All lecture materials, discussion papers, and communications will be available through the course Brightspace page available at <https://purdue.brightspace.com> with your Purdue login credentials. Be sure to regularly check the email associated with your Purdue Brightspace account to receive announcements related to the course.

### **Communication**

The main form of communication in this course will be through email and Brightspace announcements. Be sure to regularly check the email account you have registered with Brightspace and to check the course page on Brightspace at least once per week for announcements.

### **Attendance**

Due to COVID-19, attendance will not be required or factor into grades. Lectures will occur live through Zoom which will allow students who are isolated or quarantined due to COVID-19 to participate.

***Attendance Policy during COVID-19:***

Students should stay home and contact the Protect Purdue Health Center (496-INFO) if they feel ill, have any symptoms associated with COVID-19, or suspect they have been exposed to the virus. In the current context of COVID-19, in-person attendance will not be a factor in the final grades, but the student still needs to inform the instructor of any conflict that can be anticipated and will affect the submission of an assignment or the ability to take an exam. Only the instructor can excuse a student from a course requirement or responsibility. When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency conflict, when advance notification to an instructor is not possible, the student should contact the instructor as soon as possible by email, through Brightspace, or by phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases of bereavement, quarantine, or isolation, the student or the student's representative should contact the Office of the Dean of Students via email or phone at 765-494-1747. Our course Brightspace includes a link on Attendance and Grief Absence policies under the University Policies menu.

**Academic guidance in the event a student is quarantined/isolated**

If you become quarantined or isolated at any point in time during the semester, in addition to support from the Protect Purdue Health Center, you will also have access to an Academic Case Manager who can provide you academic support during this time. Your Academic Case Manager can be reached at [acmq@purdue.edu](mailto:acmq@purdue.edu) and will provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email or Brightspace. We will make arrangements based on your particular situation. The Office of the Dean of Students ([odos@purdue.edu](mailto:odos@purdue.edu)) is also available to support you should this situation occur.

**Protect Purdue plan**

The Protect Purdue Plan, which includes the Protect Purdue Pledge, is campus policy and as such all members of the Purdue community must comply with the required health and safety guidelines. Required behaviors in this class include: staying home and contacting the Protect Purdue Health Center (496-INFO) if you feel ill or know you have been exposed to the virus, wearing a mask in classrooms and campus buildings, at all times (e.g., no eating/drinking in the classroom), disinfecting desk/workspace prior to and after use, maintaining proper social distancing with peers and instructors (including when entering/exiting classrooms), refraining from moving furniture, avoiding shared use of personal items, maintaining robust hygiene (e.g., handwashing, disposal of tissues) prior to, during and after class, and following all safety directions from the instructor.

Students who are not engaging in these behaviors (e.g., wearing a mask) will be offered the opportunity to comply. If non-compliance continues, possible results include instructors asking the student to leave class and instructors dismissing the whole class. Students who do not comply with the required health behaviors are violating the University Code of Conduct and will be reported to the Dean of Students Office with sanctions ranging from educational requirements to dismissal from the university.

Any student who has substantial reason to believe that another person in a campus room (e.g., classroom) is threatening the safety of others by not complying (e.g., not wearing a mask) may leave the room without consequence. The student is encouraged to report the behavior to and discuss next steps with their instructor. Students also have the option of reporting the behavior to the Office of the Student Rights and Responsibilities. See also Purdue University Bill of Student Rights.

### **Technical issues with remote learning**

Please note that outside of addressing user error by the instructors, Drs. Dudareva and Widhalm will not be able to offer technical support to individuals experiencing computer or connection issues. Please contact the Purdue ITaP Customer Service Center at 765-494-4000 (<https://www.itap.purdue.edu/help/>) for assistance with individual issues or your departmental or college level support contact. Should you experience a technical issue and miss the class, including days with discussion papers or presentations, it will be up to you to contact the instructor for a make up assignment.

### **Course evaluation**

During the last two weeks of the semester, you will be provided an opportunity to evaluate this course and your instructor(s). On Monday of the 15<sup>th</sup> week of classes, you will receive an official email from evaluation administrators with a link to the online evaluation site. You will have two weeks to complete this evaluation. Your participation in this evaluation is an integral part of this course. Your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

### **Academic misconduct**

Academic misconduct of any kind will not be tolerated in any course offered by the Department of Biochemistry. Information on Purdue's policies with regard to academic misconduct can be found at [http://www.purdue.edu/studentregulations/student\\_conduct/regulations.html](http://www.purdue.edu/studentregulations/student_conduct/regulations.html)

Any incidence of academic misconduct will be reported to the Office of the Dean of Students. Academic misconduct may result in disciplinary sanctions including expulsion, suspension, probated suspension, disciplinary probation, and/or educational sanctions. In addition, such misconduct will result in punitive grading such as:

- receiving a lower or failing grade on the assignment, or

- assessing a lower or failing grade for the course

Punitive grading decisions will be made after consultation with the Office of the Dean of Students. Please note reported incidences of academic misconduct go on record for reference by other instructors. Further, a record of academic misconduct is likely to influence how current/future situations are handled.

To provide you with an unambiguous definition of academic misconduct, the following text has been excerpted from "Academic Integrity: A Guide for Students", written by Stephen Akers, Ph.D., Executive Associate Dean of Students (1995, Revised 1999, 2003), and published by the Office of the Dean of Students in cooperation with Purdue Student Government, Schleman Hall of Student Services, Room 207, 475 Stadium Mall Drive West Lafayette, IN 47907-2050.

"Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, *Student Regulations*] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

More specifically, the following are a few examples of academic dishonesty which have been discovered at Purdue University.

- substituting on an exam for another student
- substituting in a course for another student
- paying someone else to write a paper and submitting it as one's own work
- giving or receiving answers by use of signals during an exam
- copying with or without the other person's knowledge during an exam
- doing class assignments for someone else
- plagiarizing published material, class assignments, or lab reports
- turning in a paper that has been purchased from a commercial research firm or obtained from the internet
- padding items of a bibliography
- obtaining an unauthorized copy of a test in advance of its scheduled administration
- using unauthorized notes during an exam
- collaborating with other students on assignments when it is not allowed
- obtaining a test from the exam site, completing and submitting it later
- altering answers on a scored test and submitting it for a regrade
- accessing and altering grade records

- stealing class assignments from other students and submitting them as one's own
- fabricating data
- destroying or stealing the work of other students

Plagiarism is a special kind of academic dishonesty in which one person steals another person's ideas or words and falsely presents them as the plagiarist's own product. This is most likely to occur in the following ways:

- using the exact language of someone else without the use of quotation marks and without giving proper credit to the author
- presenting the sequence of ideas or arranging the material of someone else even though such is expressed in one's own words, without giving appropriate acknowledgment
- submitting a document written by someone else but representing it as one's own"

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing [integrity@purdue.edu](mailto:integrity@purdue.edu) or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Purdue's Honor Pledge was developed by students to advance a supportive environment that promotes academic integrity and excellence. It is intended that this pledge inspires Boilermakers of all generations to stay "on track" to themselves and their University. "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."

### **Notice of copyright protection of course materials**

Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials presented by an instructor are protected by copyright unless the instructor has stated otherwise. Students enrolled in, and authorized visitors to, Purdue University courses are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes reasonably arising from enrollment in the course or the University generally.

Notes taken in class are, however, generally considered to be "derivative works" of the instructor's presentations and materials, and they are thus subject to the instructor's copyright in such presentations and materials. No individual is permitted to sell or otherwise barter notes, either to other students or to any commercial concern, for a course without the express written permission of the course instructor. To obtain permission to sell or barter notes, the individual wishing to sell or barter the notes must

be registered in the course or must be an approved visitor to the class. Course instructors may choose to grant or not grant such permission at their own discretion, and may require a review of the notes prior to their being sold or bartered. If they do grant such permission, they may revoke it at any time, if they so choose.

### **Nondiscrimination policy statement**

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University views, evaluates, and treats all persons in any University related activity or circumstance in which they may be involved, solely as individuals on the basis of their own personal abilities, qualifications, and other relevant characteristics. Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, genetic information, marital status, parental status, sexual orientation, gender identity and expression, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in Purdue's Equal Opportunity, Equal Access and Affirmative Action policy which provides specific contractual rights and remedies. Additionally, the University promotes the full realization of equal employment opportunity for women, minorities, persons with disabilities and veterans through its affirmative action program.

Any question of interpretation regarding this Nondiscrimination Policy Statement shall be referred to the Vice President for Ethics and Compliance (<https://www.purdue.edu/ethics/index.php>) for final determination.

For additional information: [http://www.purdue.edu/purdue/ea\\_eou\\_statement.html](http://www.purdue.edu/purdue/ea_eou_statement.html)

### **Accessibility and accommodations**

Academic accommodations must be arranged through the Disability Resource Center <https://www.purdue.edu/drc/>. The instructors are 100% committed to make sure all necessary accommodations are met so that all students have the opportunity to learn. If there is any additional support that we may offer, please do not hesitate to contact the instructors.

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to



contact the Disability Resource Center at: [drc@purdue.edu](mailto:drc@purdue.edu) or by phone: 765-494-1247.

### **Safe Zone statement**

Dr. Widhalm is a member of a Safe Zone Ally community network, and he is available to listen and support you in a safe and confidential manner. As a Safe Zone Ally, he can help you connect with resources on campus to address problems you may face that interfere with your academic and social success on campus as it relates to issues surrounding sexual orientation and gender identity. His goal is to help you be successful and to maintain a safe and equitable campus.

### **Preferred name/pronouns**

We will gladly honor your request to address you by an alternate name or gender pronoun. Please advise us of this preference early in the semester so that we may make appropriate changes to our records.

### **Campus emergency and adverse weather procedures**

Emergency preparedness is your personal responsibility. Purdue University is actively preparing for natural disasters or human-caused incidents with the ultimate goal of maintaining a safe and secure campus.

- For any emergency call 911.
- There are nearly 300 Emergency Telephone Systems throughout campus that connect directly to the Purdue Police Department (PUPD). If you feel threatened or need help, push the button and you will be connected to the PUPD.
- If we hear a fire alarm, we will immediately evacuate the building by directly exiting outside through the door at the front right of the room.
- If we are notified of a Shelter in Place requirement for a tornado warning, we will shelter in the lowest level of this building away from windows and doors. Our preferred location is the basement. We will proceed out of the lecture room entrance (the door you come in) and take the stairs into the basement. Once in the basement, proceed to the end of the hallway to accommodate other people coming down the stairs.
- If we are notified of a Shelter in Place requirement for a hazardous materials release, we will shelter in our classroom shutting any open doors and windows.
- If we are notified of a Shelter in Place requirement for a civil disturbance, such as a shooting, we will shelter in a room that is securable preferably without windows. Our preferred location is in the lecture hall.

For additional information, please consult the Emergency Procedure Guidelines:

[http://www.purdue.edu/emergency\\_preparedness/](http://www.purdue.edu/emergency_preparedness/) . Sign up for emergency text alerts: <http://www.purdue.edu/securepurdue/>

When harsh weather is a possibility, Purdue administrators continuously monitor forecasts to ensure public safety. The university uses several systems to alert the campus community about weather-related changes to class schedules or work hours,

starting with the Purdue home page. For more information on weather preparedness:  
[http://www.purdue.edu/newsroom/health\\_safety/weather.html](http://www.purdue.edu/newsroom/health_safety/weather.html)

### **Sexual misconduct reporting**

Purdue University and your instructor are committed to providing all community members with a learning and work environment that is free from sexual harassment and assault. As instructors and/or faculty members, instructional staff have a mandatory reporting responsibility in this area. We will seek to keep such information private to the greatest extent possible. However, we are required by law to share information we obtain regarding sexual misconduct or information about a crime that may have occurred on Purdue's campus with the University. Students may speak to someone confidentially by contacting the Center for Advocacy, Response, and Education (CARE) at 765-495-CARE (2273). You have other options for getting help if you have experienced sexual assault, relationship violence, sexual harassment, or stalking. This information can be found at [https://www.purdue.edu/sexual\\_assault/](https://www.purdue.edu/sexual_assault/).

### **CAPS information**

Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.

### **Disclaimer**

This syllabus is subject to change. Relevant changes to the course will be posted on Brightspace and students will be notified by email if changes to the syllabus are needed.