

Plant Physiology—BSC 431

Textbook: Introduction to Plant Physiology, 3rd ed., by William G. Hopkins and Norman P.A. Hüner

Three credit hours. Prerequisite: Organic chemistry. Description: The basic physiological processes of green plants.

Student outcome. Upon successful completion of this course you will have a basic understanding of photosynthesis, carbon fixation, and other energy transfer mechanisms; of plant development including hormone interactions, sensing and reacting to light, and measuring time (biological clock); and of stress reactions of plants to water, salt, and parasites and with plant secondary metabolism that is sometimes associated with stress.

Reading assignments

Topic (# essay questions in data bank/# multiple choice questions)

- 1 Cells, Tissues, and Organs: The Architecture of Plants (3/7)
- 2 Bioenergetics and ATP Synthesis (2/4)
- 3 The Dual Role of Sunlight: Energy and Information (2/4)
- 4 Energy Conservation in Photosynthesis: Harvesting Sunlight (3/6)
- 5 Energy Conservation in Photosynthesis: CO₂ Assimilation (5/9)
- Examination I (3 essay questions; 30 points)
- 6 Allocation, Translocation, and Partitioning of Photoassimilates (2/5)
- 7 Cellular Respiration: Unlocking the Energy Stored in Photoassimilates (2/5)
- 8 Nitrogen Assimilation (2/4)
- 9 Carbon Assimilation and Productivity (2/3)
- 10 Plant Cells and Water (2/4)
- 11 Whole Plant Water Relations (3/5)
- 12 Plants and Inorganic Nutrients (2/4)
- Examination II (3 essay questions; 30 points)
- 13 Roots, Soils, and Nutrient Uptake (2/5)
- 14 Patterns in Plant Development (3/6)
- 15 The Plant Hormones: Biochemistry and Metabolism (4/8)
- 16 The Plant Hormones: Control of Development (3/6)
- 17 Photomorphogenesis: Responding to Light (3/5)
- Examination III (3 essay questions; 30 points)
- 18 Plant Movements—Orientation in Space (3/6)
- 19 Measuring Time: The Control of Development by Photoperiod and Endogenous Clocks (3/6)
- 20 Temperature: Plant Development and Distribution (2/4)
- 21 Plant Environmental Stress Physiology (4/8)
- 22 Secondary Plant Metabolites (3/6)
- Examination IV (3 essay questions; 30 points)

You will be studying 22 of the 23 chapters in Introduction to Plant Physiology by William G. Hopkins and Norman P.A. Hüner, 3rd edition. You will have 22 assignments, each covering

one chapter of book. You are expected to read each chapter carefully and then take a quiz comprising multiple-choice questions that accompanies the chapter. One hundred twenty total questions graded at up to one point each will be asked for total of up to 120 points.

Four examinations (120 points total) will be given. The examinations will comprise essay questions from a set of questions posted on this website. You may not copy or paraphrase from any source.

Occasionally students do poorly on quizzes for reasons beyond their control. All the quizzes in this course are set up so that you can take them twice. You may voluntarily take up to six quizzes twice, receiving the higher of the two grades you score. The computer will allow you to take all 23 quizzes twice, but only six will be accepted. Please do not exceed the total of six, since that means that I have to reset your scores in the excess.

The following grading scale will be applied.

- A: 90% (216–240)
- B: 80% (192–215)
- C: 70% (168–191)
- D: 60% (144–167)

Plant Physiology—BSC 531

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Three credit hours. Prerequisite: Organic chemistry. Description: The basic physiological processes of green plants.

Student outcome. Upon successful completion of this course you will have a basic understanding of photosynthesis, carbon fixation, and other energy transfer mechanisms; of plant development including hormone interactions, sensing and reacting to light, and measuring time (biological clock); and of stress reactions of plants to water, salt, and parasites and with plant secondary metabolism that is sometimes associated with stress.

Reading assignments

Topic (# essay questions in data bank/# multiple choice questions)

- 1 Cells, Tissues, and Organs: The Architecture of Plants (3/7)
- 2 Bioenergetics and ATP Synthesis (2/4)
- 3 The Dual Role of Sunlight: Energy and Information (2/4)
- 4 Energy Conservation in Photosynthesis: Harvesting Sunlight (3/6)
- 5 Energy Conservation in Photosynthesis: CO₂ Assimilation (5/9)
- Examination I (3 essay questions; 30 points)
- 6 Allocation, Translocation, and Partitioning of Photoassimilates (2/5)
- 7 Cellular Respiration: Unlocking the Energy Stored in Photoassimilates (2/5)
- 8 Nitrogen Assimilation (2/4)
- 9 Carbon Assimilation and Productivity (2/3)
- 10 Plant Cells and Water (2/4)
- 11 Whole Plant Water Relations (3/5)
- 12 Plants and Inorganic Nutrients (2/4)
- Examination II (3 essay questions; 30 points)
- 13 Roots, Soils, and Nutrient Uptake (2/5)
- 14 Patterns in Plant Development (3/6)
- 15 The Plant Hormones: Biochemistry and Metabolism (4/8)
- 16 The Plant Hormones: Control of Development (3/6)
- 17 Photomorphogenesis: Responding to Light (3/5)
- Examination III (3 essay questions; 30 points)
- 18 Plant Movements—Orientation in Space (3/6)
- 19 Measuring Time: The Control of Development by Photoperiod and Endogenous Clocks (3/6)
- 20 Temperature: Plant Development and Distribution (2/4)
- 21 Plant Environmental Stress Physiology (4/8)
- 22 Secondary Plant Metabolites (3/6)
- Examination IV (3 essay questions; 30 points)

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one chapter of book. You are expected to read each chapter carefully and then take a quiz comprising multiple-choice questions that accompanies the chapter. One hundred twenty total questions graded at up to one point each will be asked for total of up to 120 points.

Four examinations (120 points total) will be given. The examinations will comprise essay questions from a set of questions posted on this website. You may not copy or paraphrase from any source.

You are required to report on a subject of your choosing from among the articles published in the last 10 years in the Annual Review of Plant Biology (formerly Annual Review of Plant Physiology and Plant Molecular Biology) or the Annual Review of Phytopathology. The report should be no less than 3,000 words and will be graded for up to 20 points.

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