

Hydroponics Spring 2023 Syllabus

PSC 2900 2 credits

Instructor: Noah J. Langenfeld (noah.langenfeld@usu.edu)

Prerequisites: None. A high school level understanding of chemistry and biology recommended.

Schedule: AG Science 102, TR 9:00 – 9:50 a.m., 4 two-hour labs to replace lectures on 4 days, TBD

Course Description: Principles and practices of design, maintenance, and applications of hydroponic systems for sustainable food production. Basic solution chemistry and plant physiology principles and their impact of hydroponic optimization. Lecture and lab components.

Suggested textbook: Hydroponic Food Production: A Definitive Guidebook for the Advanced Home Gardener and the Commercial Hydroponic Grower, Seventh Edition – Howard M. Resh

Course Outcomes:

1. Apply knowledge of solution chemistry to designing and maintaining nutrient solutions.
2. Understand environmental conditions affecting plant growth and how they can be controlled to optimize hydroponic food production.
3. Identify and implement best hydroponic design and management practices for chosen applications.

Topics:

1. Measurement units
2. System designs
3. Nutrition and physiology
4. Solution preparation and monitoring
5. Aeration and substrates
6. Gases
7. Lighting
8. Automated control and design

Grading:

Assignment	Points	Number	Total points	Grade %
Quizzes	5	10	50	10
Lab reports	50	4	200	40
Homework	20	5	100	20
Special project – oral	75	1	75	15
Special project – written	75	1	75	15
Total			500	100

Quizzes will be given at the beginning of class, closed book, and should take less than 5 minutes. These are meant as simple comprehension checks and will be cumulative.

Lab reports will be due one week after the lab has ended. They will be a *maximum* of one page, single-spaced.

Homework will be due one week after being handed out and will cover calculations or research. All work must be shown to receive full credit. Do *not* leave any questions blank; take an educated guess.

The special project – oral will be a 5-minute flash talk with a *maximum* of 3 slides.

The special project – written will be a short (*two-page max.*) paper, single-spaced and including references (APA).

The grading scale is as follows:

Grade	Points	Percentage
A	≥ 465	≥ 93%
A-	450 – 464	90 – 92.9%
B+	435 – 449	87 – 89.9%
B	415 – 434	83 – 86.9%
B-	400 – 414	80 – 82.9%
C+	385 – 399	77 – 79.9%
C	365 – 384	73 – 76.9%
C-	350 – 364	70 – 72.9%
D+	335 – 349	67 – 69.9%
D	315 – 334	63 – 66.9%
D-	300 – 314	60 – 62.9%
F	< 300	< 60%

The instructor reserves the right to decrease the percentage cut-offs for all students. The cut-offs will *not* be raised.

Lab Safety: All laboratory exercises require the use of proper personal protective equipment. Lab goggles and closed toed shoes will be required. We will provide lab goggles for all students. Please make sure you wear closed toed shoes on the day of a laboratory activity. Lab coats are encouraged, but optional. Those not abiding by these rules will not be allowed to participate and will receive an automatic 0 for the lab activity.

Office hours: *By appointment only.* If you have questions about any material or require assistance with projects or labs, please do not hesitate to ask. I ask that you email me beforehand so we can work out a suitable time. Meetings can be in person, or virtual, whichever you prefer.