



**AYDIN ADNAN MENDERES UNIVERSITY**  
**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**  
**FIELD CROPS**  
**FIELD CROPS**  
**FIELD CROPS MASTER**  
**COURSE INFORMATION FORM**

Course Title	Plant Nutrition and Fertilization in Soilless Culture								
Course Code	ZTO523	Course Level		Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	206 (Hours)	Theory	2	Practice	2	Laboratory	0
Objectives of the Course	The aim of the course is to give detailed information about plant nutrition and fertilization in hydroponic food production								
Course Content	Terminology. The history of hydroponic food production. Principles of plant nutrition. Plant nutrients solutions. Media used in hydroponic food production. Preparation and using of plant nutrients solutions.								
Work Placement									
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Experiment, Demonstration, Discussion, Project Based Study, Problem Solving								
Name of Lecturer(s)	Prof. Mehmet Ali DEMİRAL								

#### Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

#### Recommended or Required Reading

1	The Physiology of Plants under Stress. Maynard G. Hale, David M. Orcutt. 1987. John Wiley & Sons Inc. ISBN. 0-471-88997-0.
2	Bitki Besleme. Burhan Kacar, Vahap Katkat. 1998. Vipaş Yayınları. ISBN: 975-564-068-1.
3	Bitki Fizyolojisi. Burhan Kacar, Vahap Katkat, Şule Öztürk. 2002. Nobel Yayıncılık. ISBN. 978-975-591-833-4.

Week	Weekly Detailed Course Contents	
1	Theoretical	Terminology and history.
	Preparation Work	Power point presentation.
2	Theoretical	Principles of plant nutrition.
	Preparation Work	Power point presentation.
3	Theoretical	Plant nutrients.
	Preparation Work	Power point presentation.
4	Theoretical	Comparison of soil and soilless culture in plant nutrition.
	Preparation Work	Power point presentation.
5	Theoretical	Uptake of plant nutrients by roots.
	Preparation Work	Laboratory work.
6	Theoretical	Movement of water and minerals across membranes.
	Preparation Work	Laboratory work.
7	Theoretical	Upward movement of water and plant nutrients in plants.
	Preparation Work	Laboratory work.
8	Intermediate Exam	Midterm Exam
9	Theoretical	Types and properties of chemicals used in preparation of nutrient solutions.
	Preparation Work	Laboratory work.
10	Theoretical	Methods of nutrient solution preparation
	Preparation Work	Laboratory work.
11	Theoretical	Chemical calculations used in nutrient solution preparation
	Preparation Work	Experimental Study at greenhouse
12	Theoretical	Application of nutrient solutions in different hydroponic food production method.
	Preparation Work	Power point presentation.
13	Theoretical	Application of nutrient solutions in different hydroponic food production method.
	Preparation Work	Experimental Study at greenhouse
14	Theoretical	Application of nutrient solutions in different hydroponic food production method.



14	Preparation Work	Power point presentation.
15	Theoretical	Application of nutrient solutions in different hydroponic food production method.
	Preparation Work	Power point presentation.
16	Theoretical	Final Examination

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	0	2	28
Lecture - Practice	14	0	2	28
Assignment	2	0	30	60
Term Project	1	0	35	35
Laboratory	10	0	2	20
Midterm Examination	1	0	10	10
Final Examination	1	0	25	25
Total Workload (Hours)				206
[Total Workload (Hours) / 25*] = ECTS				8

\*25 hour workload is accepted as 1 ECTS

### Learning Outcomes

1	To be able to recognize the hydroponic food production concept
2	To be able to recognize the hydroponic food production methods
3	To be able to recognize the fertilization management in hydroponic food production
4	To be able to recognize the fertilization management in hydroponic food production
5	To be able to develop the ability to bring practical solutions to problems arising fertigation in hydroponic production

### Programme Outcomes (Field Crops Master)

1	To be able to improve and deepen the level of expertise in field crops on the basis of the departments licenses qualifications.
2	To be able to recognize the subjects related to field crops, to be able to solve these and make interpretation.
3	To be able to have the skills of acting independently, to have power to decide and to create.
4	To be able to work in teams between departments
5	To be able to give briefing about latest information of Field Crops in written, oral and visual ways.
6	To be able to take responsibility for developing the new approaches and to formulate a solution facing unforeseen complex situations of applications,
7	To be able to defend the original opinions in both Turkish and in foreign languages by using these languages and communicating effectively.
8	To be able to contribute to science by producing knowledge for the aim of improving quality, efficiency and sustainability
9	To be able to apply breeding methods in order to improve new varieties for Field Crops.
10	To be able to maintain and select the appropriate statistical methods within the framework of the study, evaluation of scientific ethics; to convert the results into a report/dissertation and to offer them by producing scientific publications.

### Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	2	2	2	2	2
P2	2	3	2	2	2
P3	2	3	2	2	2
P4	2	3	3	3	3
P5	2	3	3	3	3
P6	2	3	3	3	3
P7	2	2	3	3	3
P8	2	2	3	3	3
P9	2	2	2	3	3
P10	2	2	2	3	3

