GENERAL HORTICULTURE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
ACADEMIC UNIT	AGRICULTURE		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	AGR 501	**SEMESTER OF STUDIES**	5th
COURSE TITLE	General Horticulture		
FACULTY MEMBER			

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	3	
Lab exercises	2	
Total	5	5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Specialized general knowledge
PREREQUISITE COURSES:	Typically, there are no prerequisite courses
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek. Teaching may be performed in English in case foreign students attend the course.
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (English)
COURSE WEBPAGE (URL)	

2. LEARNING OUTCOMES

Learning outcomes

• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area

• Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B

• Guidelines for writing Learning Outcomes

The course aims to familiarize students with entrepreneurial cultivation of vegetables in open field and under covered conditions. Information provided is focused on origin, evolution, taxonomy of commercial vegetables, propagation, use of supportive front line technology and vegetable expansion of their postharvest life.

By the end of this course the student will have developed the following skills:

Using frontline know-how on vegetable production in order to achieve high quality and market competitiveness.
Be able to consult farmers and agricultural firms for vegetable propagation techniques.

Be able to apply proper agricultural practices which can lead to successful certification, packaging and distribution to the market.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

- Information/data search using technology tools
- Decision making
- Autonomous (Independent) work
- Team work
- Project planning and management
- Respect for the environment
- Adaptation to environmental changes under optimum, suboptimum and extreme conditions.
- Production of new research ideas
- Promotion of free, creative and inductive thinking

3. SYLLABUS

Lectures

1. Evolution of vegetable market in Greece and their nutritional value.
2. Botanic taxonomy of vegetables; types of gardening.
3. Climate requirements of vegetables.
4. Soil requirements and soil amelioration
5. Propagation techniques of vegetables. Grafting.
6. Plant hardening and transplantation to the field.
7. Techniques of direct planting in soil and growth development.
8. Growth physiology and flower pollination / fertilization.
9. Rotation techniques.
10. Fertilization and irrigation of vegetables.
11. Pest, diseases and weed control.
12. Vegetable seed production.
13. Harvest, postharvest processes and fresh vegetable distribution on the market.

Laboratory exercises

1. Seed identification of vegetables.
2. Seed germination; abiotic requirements.
3. Propagation techniques
4. Hardening and seedling types.

5. Transplanting and direct sowing. 6. Postharvest process in fresh vegetables.

4. TEACHING AND LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Lectures, self-tests of students and problem-solving seminars., face to face.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES ***Use of ICT in teaching, laboratory education, communication with students***	Use of Information and Communication Technologies (ICTs) in teaching. Scenarios *in silico* and evaluation of general horticulture data will be integrated in the course. Exemplary solutions will be provided.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of nondirected study according to the principles of the ECTS*	***Activity*** / ***Semester workload*** Lectures (3conduct hours per week x 13 weeks) — 39 *Lab Practice (2 conduct hour per week x 6 weeks)* — 12 Writing short reports on laboratory exercises — 12 Total examinations — 2 Hours for private study of the student, preparation and attendance mid-term or/and final examinations. — 60 ***Total number of hours for the Course (25 hours of work-load per ECTS credit)*** — ***125 hours (total student work-load)***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*	Student performance evaluation will be explained to the students at the beginning of the course/beginning of the semester. 1. Mandatory final written examination for lectures / theoretical part of the course, comprises 60% of the final mark of the student. 2. Mandatory final written examination for the transferred laboratory skills of the course, comprises 40% of the final mark of the student. Minimum pass mark: 5 (full scale: 0-10) 1. The above mentioned process will be taking place in Greek and for foreign students (eg ERASMUS students) in English. Examination will be based on full length questions and / or multiple choice questions.

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	2. Oral examination could take place if permitted by the legal/regulatory framework under which the student is affiliated (or enrolled) to the department. If permitted, oral examination will take place simultaneously with written exams.

5. ATTACHED BIBLIOGRAPHY

Proposed literature (indicative and not restrictive):

1. Σάββας, Δ., 2016. Γενική Λαχανοκομία. Εκδόσεις Πεδίο
2. Χα, Ι.Α., Πετρόπουλος, Σ., 2014. Γενική Λαχανοκομία και Υπαίθρια Καλλιέργεια Κηπευτικών. Πανεπιστημιακές Εκδόσεις Θεσσαλίας, Βόλος.

Proposed research journals for further reading (indicative and not restrictive):

1. HortScience
2. Journal of Horticultural Science and Biotechnology
3. European Journal of Horticultural Science.

GENERALFLORCULTURE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
ACADEMIC UNIT	AGRICULTURE		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	AGRI 403	**SEMESTER OF STUDIES**	4rd
COURSE TITLE	General Floriculture		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**CREDITS**
	Lectures	3	
	Laboratory Exercises	2	
	Total	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	*specialised general knowledge*		
PREREQUISITE COURSES:	Typically, there are no prerequisite courses.		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek. Teaching may be performed in English in case foreign students attend the course.		

IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (English)
COURSE WEBPAGE (URL)	

2. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The aim of the course is to give the student the basic knowledge about:

• the botanical classification of ornamental plants.
• The genetic basis of diversity in ornamental plants.
• morphology and physiology of ornamental plants.
• Annual herbs, perennial herbs, geophytes, shrubs, trees, etc.
• the effect of environmental factors on their development, the substrate materials, the cultivation systems, sexual and asexual propagation, grafting and the use of phytohormones in their cultivation.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Teamwork	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

Generally, by the end of this course the student will, furthermore, have develop the following general abilities (from the list above):

Searching, analysis and synthesis of facts and information, as well as using the necessary technologies
Decision making
Independent work
Teamwork
Production of new research ideas
Promotion of free, creative and inductive thinking

3. SYLLABUS

- Botanical classification of ornamental plants.
- The genetic basis of diversity in ornamental plants. Natural selection. Human-driven selection.
- Categorization of flowering plants into annual herbs, perennial herbs, geophytes, shrubs, trees, etc.
- Morphology and development of ornamental plants. Flowering control
- Effect of environmental factors on their development and physiology.
- Organic and inorganic substrates

- Cropping systems for ornamental plants.
- Plant propagation and grafting.
- Use of phytoregulatory compounds – phytohormones.

Laboratory Practicals

• Greenhouse cultivation,

• substrates, preparation of mixtures

• planting and seed development in crates and pots, planting bulbs.

• Seedling development and cultivation

• Seedling transplants

• grafting and asexual propagation of plants.

4. TEACHING AND LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face lectures.
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Use of Information and Communication Technologies (ICTs) (e.g. Microsoft PowerPoint) in teaching. The contents of the course of each chapter are uploaded on the internet, that the students can freely download using a password which is provided to them at the beginning of the course.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures (3 contact hours per week x 13 weeks)	39
Laboratory Exercises (2 contact hours per week x 6 weeks)	12
Writing short reports on laboratory exercises	12
Total examinations	2
Hours for private study of the student, preparation and attendance mid-term or/and final examinations.	60
Total number of hours for the Course (25 hours of workload per ECTS credit)	***125 hours (total student workload)***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other.*	Final mandatory written examination, full length questions and / or multiple-choice questions, as well as questions based on the laboratory work. Minimum pass grade= 5, scale 0-10. All the above are taking place in Greek as well as in English for foreign students (e.g. ERASMUS students) if any.

Specifically, defined evaluation criteria are given, and if and where they are accessible to students.	

5. ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

Floriculture: Principles and Species. John M. Dole, Harold F. Wilkins. Pearson/Prentice Hall, 2005
Introduction to Floriculture. Caroline Harrington. Larsen and Keller Education 2019.#

- *Related academic journals:*

Floriculture International magazine, Journal of Floriculture and Landscaping

SPECIFIC VITICULTURE-OENOLOGY

4. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	AGRICULTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	AGR 708	**SEMESTER OF STUDIES**	7th
COURSE TITLE	ADVANCED VITICULTURE		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	3	
Laboratory exercises	2	
Total	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	specialised general knowledge, skills development
PREREQUISITE COURSES:	Typically, there are not prerequisite courses.
TEACHING AND ASSESSMENT LANGUAGE:	Greek. teaching may be however performed in English in case foreign students attend the course.
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

5. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

After successful completion of the course students will be able to:

- To organize viticultural nurseries and apply techniques to produce simple rootstocks and rootstocks of grafted vine plants.

- To deal with the chemical composition of grapes: Sugars. Organic acids. Phenolic compounds. Volatile compounds. Alcoholic degree. Nutritional value.
- To deal with qquality characteristics of table varieties, winemaking and raisin varieties and the harvesting technologies.
- To organize programs offering certified viticultural products and to direct groups of producers.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

by the end of this course the students will, furthermore, have develop the following general abilities (from the list above):

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Production of free, creative and inductive thinking
Respect for the natural environment

6. SYLLABUS

The grape as a raw material for vine products (chemical composition, ripening process, factors affecting ripening and quality-terroir, technological maturity, determination of harvest time).

Chemical composition of grape: Sugars. Organic acids. Phenolic compounds. Volatile compounds. Alcoholic degree. Nutritional value.

Quality characteristics of winemaking varieties and harvesting techniques.

Quality characteristics of rraisin varieties and harvesting techniques.

Raisin quality characteristics.

Quality characters of table varieties and harvesting techniques. Quality characters of table grapes.

Drying grapes (Stages of drying, Speed of drying, factors affecting the speed of drying, Alkaline solutions, determination of the appropriate harvest time.

Determination of harvest time, Harvesting process, Dryers, productive types of raisins, Storage).

Industrial processing of raisins (pre-washing, Sulfurization, Washing, Humidity regulation, Cleaning and sorting, Polishing, Destemming, Packaging).

Production of Natural Sultana Raisin

Corinthian Raisin Technology (Effect of the degree of ripeness on the quality of the raisin, Harvesting process, Dryers, Collection and Storage of the Raisin

Industrial Processing of Corinthian Raisins (Agglomerate removal, Smelting and sorting, Washing, De-stemming,

Varieties of winemaking. Legislative classification of Greek wines.

Methodology and harvesting techniques of wine-making varieties.

Winemaking technologies and winemaking products.

. The grape as raw material in relation to the quality of the wines

7. TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures in the class and in the laboratory (face to face)	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Use of Information and Communication Technologies (ICTs) (e.g. PowerPoint) in teaching. Direct communication with the students (face to face and by e-mail), Support of the learning process and uploading of the educational material to the electronic platform (e-class): https://eclass.upatras.gr	
TEACHING METHODS	***Activity***	***Semester workload***

The manner and methods of teaching are described in detail. *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	Lectures (3 conduct hours per week x 13 weeks)	39
	Laboratory practice, fieldwork (2 conduct hours per week x 6 weeks)	12
	Writing short reports on laboratory exercises	12
	Total examinations x 2 conduct hours each)	2
	Hours for private study of the student and preparation for mid-term or/and final examination / Final examination	60
	Total number of hours for the Course (25 hours of work-load per ECTS credit)	***125 hours (total student work-load)***
STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	1. Optionally, two mid-term examinations with the final examination grade to be the mean mark. It is mandatory to obtain pass grade (≥5) in each examination. 2. Written examination after the end of the semester. Minimum passing grade: 5. **Evaluation of theoretical part (50%)** Written examination. It is mandatory to obtain pass grade (≥5). **Evaluation of the laboratory work (50%)** Written examination. It is mandatory to obtain pass grade (≥5).	

8. RECOMMENDED LITERATURE

- Ι. Βαγιάνος, ΠΡΑΚΤΙΚΗ ΑΜΠΕΛΟΥΡΓΙΑ-ΟΙΝΟΛΟΓΙΑ, Εκδόσεις Ψύχαλος, 1986.
- Ν. Α. , Νικολάου, ΑΜΠΕΛΟΥΡΓΙΑ, Εκδόσεις Σύγχρονη Παιδεία, 2008.
- Σταυρακάκης,Μ.Ν.2010 . Αμπελογραφία
- Τσακίρης, Α., ΑΜΠΕΛΟΥΡΓΙΑ ΓΙΑ ΚΡΑΣΙΑ ΠΟΙΟΤΗΤΑΣ, Εκδόσεις Ψύχαλος, 2016.

APPLIED PLANT PHYSIOLOGY AND NUTRITION

9. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	AGRICULTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	AGR_605	**SEMESTER OF STUDIES**	6th

COURSE TITLE	APPLIED PLANT PHYSIOLOGY AND NUTRITION	
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	2	
Laboratory exercises	2	
Total	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background	
PREREQUISITE COURSES:	Typically, there are not prerequisite courses.	
TEACHING AND ASSESSMENT LANGUAGE:	Greek. Teaching may be however performed in English in case foreign students attend the course.	
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes	
COURSE WEBPAGE (URL)		

10. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

At the end of this course the students will attain:

basic knowledge about Phytohormones and to understand the role of plant Hormones in the normal function, growth, and productivity of plants.

basic knowledge about of plant nutrition and understand the basics of plant nutrition and the optimization and control of crop nutrition.

Also to acquire basic knowledge about biotic and abiotic stresses in plants, their effect on plant productivity and the quality of the products produced.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

Generally, by the end of this course the students will, furthermore, have develop the following general abilities (from the list above):

be able to identify and deal with problems of hormonal disorders and to control and optimize production quantitatively and qualitatively using plant hormones.

 be able to identify and deal with crop nutrition problems and intervene to optimize production quantitatively and qualitatively.

 be able to identify and deal with stress problems in crop development

 To be able to utilize this knowledge in other knowledge subjects of agriculture

 Autonomous and Teamwork in an interdisciplinary environment

 Promotion of free, creative, and inductive thinking

 Exercising substantive criticism and solutions to plant nutrition problems

11. SYLLABUS

Plant hormones:
Regulation of plant growth and development, endogenous hereditary and exogenous factors.
Classes of Plant Hormones. Chemical Structure, Biosynthesis, Degradation, Physiological Role:
Growth promoting plant hormones: Auxins, Gibberellins, Cytokinins.
Growth retarders and inhibitors: Abscisic Acid, Ethylene.
Chemical growth regulators.
The use of plant Hormones in plant-applications
Phytoestrogens
Plant Nutrition:
Macro and Micronutrients
Factors Affecting Plant Nutrition
Determination of nutritional status of plants
Photoperiodism
Plant stress:
Abiotic stress factors
Extreme temperatures stress, nutritional stress.
Water stress, Salinity, etc..
Effects of stress on crops, stress control practice.
Biotic stress factors, Allelopathy

The **Laboratory exercises** include experiments and exercises in the laboratory and in the field:

1. Practical application of phytohormones to vegetables
2. Practical application of plant hormones in arboriculture
3. Effect of hormones on seed germination and rooting of cuttings
4. Malnutrition toxicities
5. Photoperiodism-applications
6. Coping with stressful situations

12. TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures in the class and in the laboratory (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Use of Information and Communication Technologies (ICTs) (e.g. PowerPoint) in teaching. Direct communication with the students (face to face and by e-mail),

Use of ICT in teaching, laboratory education, communication with students	Support of the learning process and uploading of the educational material to the electronic platform (e-class): https://eclass.upatras.gr

TEACHING METHODS

The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	***Semester workload***
Lectures (2conduct hours per week x 13 weeks)	26
Laboratory practice, fieldwork (2 conduct hours per week x 6 weeks)	12
Writing short reports on laboratory exercises	12
Total examinations x 2 conduct hours each)	2
Hours for private study of the student and preparation for mid-term or/and final examination / Final examination	73
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***125 hours (total student work-load)***

STUDENT PERFORMANCE EVALUATION

Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.

The evaluation criteria are presented and analyzed to the students at the beginning of the semester.

- Final written theory exam (60%).
- Final examination of laboratory exercises (40%).

In case of advances, they participate by 30% in the final score, respectively.

13. RECOMMENDED LITERATURE

Books:

1. Καράταγλης Στέλιος. 1999. Φυσιολογία Φυτών. Art of text. Σελ. 305
2. Τσέκος Ιωάννης. 2003. Φυσιολογία Φυτών. Εκδόσεις Αφοι Κυριακίδη. Σελ 1940
3. Μετζάκης Δημήτρης. 2005. Καλλιέργειες in vitro. Εκδόσεις Ιων. Σελ. 195
4. N. K. Fageria (2008). The Use of Nutrients in Crop Plants. CRC Press, 430 p. ISBN: 13-978-4200-751-06.
5. Θεριός Ν. Ι. 1996 "Ανόργανη Θρέψη και Λιπάσματα" Εκδόσεις Γ. Δεδούσης
6. Taiz L, Zeiger E. 2006. Plant Physiology 4th ed. Sinauer Sunderland, MA, σελ 705
7. Σαλάχας Γ 1997. Σημειώσεις Θεωρίας Εφαρμοσμένης Φυσιολογίας Φυτών. Μεσολόγγι. Σελ. 60.

Magazines:

Journal of Plant Nutrition

GENERAL VITICULTURE

14. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	AGRICULTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	AGR_601	**SEMESTER OF STUDIES**	1th
COURSE TITLE	VITICULTURE		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures	2	
Laboratory exercises	2	
Total	4	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background
PREREQUISITE COURSES:	Typically, there are not prerequisite courses.
TEACHING AND ASSESSMENT LANGUAGE:	Greek. teaching may be however performed in English in case foreign students attend the course.
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBPAGE (URL)	

15. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course is the basic introductory course in the science of viticulture and aims to provide students with the necessary knowledge in matters of business viticulture, for the production of high-quality viticultural products.
Upon successful completion of the course, the student will be able to:
• Understand the morphology, anatomy and function of the trunk and the annual biological cycle of vegetation. Understand the process of producing propagating material - root cuttings for the planning and installation of a productive vineyard.
• Understand the importance of vineyard bioclimatology and cultivation techniques.
• To identify and evaluate all biotic and abiotic factors in the vineyard and their role in the ripening and quality characteristics of the vitis products.

• To have the basic communication skills with fellow students, lecturers, and potential external stakeholders in matters of viticulture.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

by the end of this course the students will, furthermore, have develop the following general abilities (from the list above):

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Production of free, creative and inductive thinking
Respect for the natural environment

16. SYLLABUS

Historical review of vitis.

• Spread of vitis cultivation in Greece and in general throughout the world.

• Vitis products and their nutritional value.

• Effect of phylloxera on crop development.

• Botanical classification of the genus Vitis.

• Morphology and anatomy of vitis organs.

• Specific elements of vitis physiology. Vegetative cycle (teaching, budding, growth, wood maturation, storage, hibernation). Reproductive phase (stages of flower development, flowering, pollination, fertilization, fruit set and vein development).

micro-climate, soil and their effects on vegetation and production.

• Viticultural characteristics and cultivation properties.

• Varieties of winemaking. Table varieties. Special cultivation techniques to improve the quality of table varieties. Raisin varieties. Raisin technology.

• Vineyard installation.

• Irrigation and vitis growth.

• Inorganic nutrition, fertilization, and nutrient deficiency/excess problems.

17. TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures in the class and in the laboratory (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Use of Information and Communication Technologies (ICTs) (e.g. PowerPoint) in teaching. Direct communication with the students (face to face and by e-mail), Support of the learning process and uploading of the educational material to the electronic platform (e-class): https://eclass.upatras.gr
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures (2 conduct hours per week x 13 weeks)	26
Laboratory practice, fieldwork (2 conduct hours per week x 6 weeks)	12
Writing short reports on laboratory exercises	12
Total examinations x 2 conduct hours each)	2
Hours for private study of the student and preparation for mid-term or/and final examination / Final examination	73
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***125 hours (total student work-load)***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*	3. Optionally, two mid-term examinations with the final examination grade to be the mean mark. It is mandatory to obtain pass grade (≥5) in each examination. 4. Written examination after the end of the semester. Minimum passing grade: 5. **Evaluation of theoretical part (60%)** Written examination. It is mandatory to obtain pass grade (≥5). **Evaluation of the laboratory work (40%)** Written examination. It is mandatory to obtain pass grade (≥5).

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	

18. RECOMMENDED LITERATURE

- Ι. Βαγιάνος, ΠΡΑΚΤΙΚΗ ΑΜΠΕΛΟΥΡΓΙΑ-ΟΙΝΟΛΟΓΙΑ, Εκδόσεις Ψύχαλος, 1986.
- Ν. Α. , Νικολάου, ΑΜΠΕΛΟΥΡΓΙΑ, Εκδόσεις Σύγχρονη Παιδεία, 2008.
- Σταυρακάκης,Μ.Ν.2010 . Αμπελογραφία
- Τσακίρης, Α., ΑΜΠΕΛΟΥΡΓΙΑ ΓΙΑ ΚΡΑΣΙΑ ΠΟΙΟΤΗΤΑΣ, Εκδόσεις Ψύχαλος, 2016.

PLANT MORPHOLOGY AND ANATOMY

19. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
DEPARTMENT	AGRICULTURE		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	AGR_202	**SEMESTER OF STUDIES**	2th
COURSE TITLE	PLANT MORPHOLOGY AND ANATOMY		
INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*		**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
Lectures		3	
Laboratory exercises		2	
Total		5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background		
PREREQUISITE COURSES:	Typically, there are not prerequisite courses.		
TEACHING AND ASSESSMENT LANGUAGE:	Greek..		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBPAGE (URL)			

20. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

At the end of this course the student will attain knowledge on Plant Morphology and Anatomy, including a brief outline of the principal cell types, tissue systems, and structures (an introduction to the anatomical and histological structure of vegetative and reproductive plant organs). The student will be able to apply basic knowledge: What is plant tissue, plant morphology and anatomy? All about primary and secondary growth of stems and roots. How different cells and tissue systems are arranged.

At the end of the course the student will be able to apply basic knowledge of morphology and anatomy to other subjects in plant physiology, plant nutrition and have further developed the following skills/competences: 1. Ability to demonstrate knowledge and understanding of essential concepts and principles related to plant growth parameters. 2. Ability to apply such knowledge to the estimation and solution of nutritive problems and as many other plant growing problems. 4. Ability to get more specific knowledge for professional development.

General Abilities

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

Generally, by the end of this course the students will, furthermore, have develop the following general abilities (from the list above):

Autonomous and Teamwork in an interdisciplinary environment

Promoting free, creative and inductive thinking

Basic and specialized knowledge of the natural world. Generation of new research ideas

Respect for the natural environment

21. SYLLABUS

Plant cell:

1. Plant cell structure and ultrastructure.
2. Plant cell subcellular organelles.
3. Plant Cell categories: Parenchyma, collenchyma, sclerenchyma

Plant tissues:

1. Plan tissues. Meristem and permanent tissues.

2. Epidermal tissue system (cuticle, epidermis, epidermal hairs, root hairs, trichomes and stomata).
3. Complex tissues: xylem
4. Complex tissues: floem.
5. Secretory cells and tissues.

Organizing the plant body:
1. The shoot: primary and secondary structure and development.
2. The root: primary and secondary structure and development.
3. The leaf: primary and secondary structure and development.
4. The flower: the morphology and structure of the flower.
5. Reproduction of plants, (flowerw, fruits, seeds).

The **Laboratory exercises** include experiments and exercises in the laboratory:

1. Plant organs: roots, shoots, leaves, flowers, fruits.
2. The plant cell: core, plastids, dead cell encapsulated.
3. Epidermal tissues (cuticle, epidermis, epidermal hairs, root hairs, trichomes and stomata).
4. Tissues: Peripheral, Parenchymal, Supportive, Conductive Tissue.
5. Primary and secondary growth of: shoot, leaf, root.
6. Reproduction of plants, (flowers, fruits, seeds).

22. TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc.*	Lectures in the class and in the laboratory (face to face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, laboratory education, communication with students*	Use of Information and Communication Technologies (ICTs) (e.g. powerpoint) in teaching. Direct communication with the students (face to face and by e-mail), Support of the learning process and uploading of the educational material to the electronic platform (e-class): https://eclass.upatras.gr
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	***Semester workload***
Lectures (3conduct hours per week x 13 weeks)	39
Laboratory practice, fieldwork (2 conduct hours per week x 6 weeks)	12
Writing short reports on laboratory exercises	12
total examinations (2 conduct hours each)	2
Hours for private study of the student and preparation for mid-term or/and final examination / Final examination	60
Total number of hours for the Course (25 hours of work-load per ECTS credit)	***125 hours (total student work-load)***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	The evaluation criteria are presented and analyzed to the students at the beginning of the semester. • Final written theory exam (60%). • Final examination of laboratory exercises (40%). In case of advances, they participate by 30% in the final score, respectively.

23. RECOMMENDED LITERATURE

Καράταγλης Στ., Κωνσταντίνου Μ. (2005) Βοτανική, Μορφολογία – Ανατομία. Εκδόσεις Χάρις

Τσέκος Ι., Ηλίας Η. (2007) Μορφολογία και Ανατομία Φυτών. Εκδοτικός Οίκος Αδελφών Κυριακίδη Α.Ε.

Ψαράς Γ. (2002) Άτλας Ανατομίας Φυτών. Εκδόσεις Σταμούλη

Dickison W.C. (2000) Integrative Plant Anatomy. Academic Press