



MODULE HANDBOOK
Second Academic Year (M2)



**Modules offered by the
Consorzio tra le Università di Torino, Milano,
Palermo, Foggia e Sassari**



Specialisation: Varietal Enology (Torino)

Module	ECTS points
Enography	5
Ampelography	5
Enological Product Quality Control	5
Enological Product Instrumental Analysis	5

Module name:	Enography
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vincenzo Gerbi, Prof. (University of Turin)
Lecturers:	Vincenzo Gerbi, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Varietal Enology – University Turin
Teaching format:	Regular lectures combined with sensory analysis and visits to cellars during the semester
Workload:	40 h lectures, 85 h personal work
Credit points:	5
Requirements under the examination regulations:	---
Recommended prerequisites:	have a good knowledge of viticulture and enology
Targeted learning outcomes:	Students have a good knowledge of the characteristics of different wines
Content:	For each wine describes the chemical characteristics of grapes and wines, and then describes the sensory characteristics
Exam achievements:	Oral presentation
Forms of media:	video projection, Internet
Literature:	<p>Calò A., Scienza A., Costacurta A. (2006). Vitigni d'Italia. Edagricole, Bologna.</p> <p>Specific papers on the characterization of wines from international and autochthonous varieties , such i.e.:</p> <p>Letaief H., Rolle L., Zeppa G., Orriols I., Gerbi V. (2007) - Phenolic characterization of grapevine cultivars from Galicia (Spain) Brancellao, Merenzao and Mencia (<i>Vitis vinifera</i> L.). <i>Ital. J. Food Sci.</i>, 1, 19, 101-109.</p> <p>Giordano M., Rolle L., Zeppa G., Gerbi V. (2009) - Chemical and volatile composition of three Italian sweet white passito wines. <i>J. Int. Sci. Vigne Vin.</i>, 43, 3, 159-170.</p>
Update:	February 2012

Module name:	Ampelography
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vincenzo Gerbi, Prof. (University of Turin)
Lecturers:	Vittorino Novello, Prof. (University of Turin); Vincenzo Gerbi, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Varietal Enology – University Turin
Teaching format:	Regular lectures combined with sensory analysis during the semester
Workload:	40 h lectures, 85 h personal work
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	have a good knowledge of viticulture
Targeted learning outcomes:	Students have a good knowledge of the characteristics of different grapevine varieties
Content:	White grapevine cv of cool and warm environments Black grapevine cv of cool and warm environments Aromatic grapevines varieties
Exam achievements:	Written report
Forms of media:	video projection, Internet
Literature:	Duplicated lecture notes, list of papers regarding the module topic
Update:	February 2012

Module name:	Enological Product Quality Control
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vincenzo Gerbi, Prof. (University of Turin)
Lecturers:	D. Lanati (University of Turin); Vincenzo Gerbi, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Varietal Enology – University Turin
Teaching format:	Regular Lectures and laboratory exercises during the semester
Workload:	20 h lectures, 20 h exercises, 65 h personal work
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	have a good knowledge of chemistry and microbiology of wines
Targeted learning outcomes:	Students are able to control the quality of wine, they are able to evaluate analytical data of wines
Content:	Description and interpretation of the fundamental analytical data of wines
Exam achievements:	written test and oral discussion
Forms of media:	video projection, Internet
Literature:	recommended by the teacher
Update:	February 2012

Module name:	Enological Product Instrumental Analysis
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vincenzo Gerbi, Prof. (University of Turin)
Lecturers:	D. Borsa (University of Turin); Vincenzo Gerbi, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Varietal Enology – University Turin Module of specialization Grapevine Ecophysiology – University Turin
Teaching format:	Regular lectures and laboratory exercises during the semester
Workload:	20 h lectures, 20 h exercises, 65 h personal work
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	have a good knowledge of chemistry of wines
Targeted learning outcomes:	Students are able to analyse wine and are familiar with the analytical techniques. They are able to evaluate instrumental data of wines.
Content:	Description and interpretation of the results of the instrumental analytical data of wines
Exam achievements:	written test and oral discussion
Forms of media:	video projection, Internet
Literature:	recommended by the teacher
Update:	February 2012

Specialisation: Vineyard Planning (Torino)

Module	ECTS points
Grapevine Propagation and Selection	5
Biotechnological Applications in Viticulture	5
Viticultural Planning	5
1 module from the Specialisation “Varietal Enology”	5

Module name:	Grapevine Propagation and Selection
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vittorino Novello, Prof. (University of Turin)
Lecturers:	Franco Mannini, Dr. (Research National Council)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vineyard Planning – University Turin
Teaching format:	Regular oral lectures with audio-visual support during the semester field and nursery practical training.
Workload:	30 hours of class lectures and 15 hours of field and nursery training 80 hours of personal work
Credit points:	5
Requirements under the examination regulations:	
Recommended prerequisites:	Basic knowledge of viticulture and vineyard management
Targeted learning outcomes:	Students have a deep knowledge on grapevine selection, up to date propagation techniques, nursery phytosanitary requirements and nursery regulations and marketing.
Content:	Grapevine propagation, filloxera, American rootstocks, mother plant vineyards management, nursery organization, main grape propagation techniques, clonal selection, certification, sanitary selection, main virus and phytoplasmas affecting grapevine, sanitation techniques, European and Italian regulations on production and commercialization of grapevine, statistical data on grape nursery production.
Exam achievements:	Oral examination
Forms of media:	Power point, black board, field visits, group discussion
Literature:	Duplicated lecture notes. AA. , 2006. Il vivaismo viticolo, Symposium proceedings, Ed. Istituto San Michele aA (TN). AA., 2008. Giallumi della vite – Guida al Riconoscimento, Ed. Regione Piemonte SFR, Torino. AA., 2004. Barbatelle per il vigneto Puglia, Ed. Basile Caramia, Locorotondo (BA). Krake L.R., Steele Scott N., Rezaian M.A., Taylor R.H., 1999. Graft-transmitted Diseases of Grapevines, CSIRO Publishing, Collingwood,

	<p>Vic, AUS.</p> <p>Morando A., 2001. Vigna nuova – Materiali e tecniche per l’impianto del vigneto. Ed. Vit. End. Calosso (Asti).</p> <p>Moretti G., 2005. Speciale Moltiplicazione della Vite. Vignevini, 11, 67-95.</p>
Update:	February 2012

Module name:	Biotechnological Applications in Viticulture
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vittorino Novello, Prof. (University of Turin)
Lecturers:	Ivana Gribaudo, Dott. (Consiglio Nazionale delle Ricerche)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vineyard Planning – University Turin
Teaching format:	10 weeks: regular oral lectures, laboratory practical training. Visit to a commercial micropropagation company
Workload:	30 hours lectures, 10 hours practical class, visit to a commercial micropropagation company (1 day), 77 hours personal work
Credit points:	5
Requirements under the examination regulations:	
Recommended prerequisites:	Basic knowledge of botany and plant biology. Contents of the basic module “Agricultural Genetics”
Targeted learning outcomes:	Students know how to use biotechnological tools for grapevine propagation, sanitation, germplasm preservation and breeding
Content:	Micropropagation: techniques, pros and cons, legal rules. Virus eradication: diagnosis, sanitation techniques, effects on grapevine field performances. Grapevine breeding through traditional and biotechnological methods: hybridizations and crosses, marker-assisted selection, genetic engineering (DNA transfer techniques, selection and plant regeneration, field trials, state of the art for grapevine). Embryo rescue of seedless grapes. Germplasm cryopreservation.
Exam achievements:	Oral test on the whole program
Forms of media:	audio-visual supports (PowerPoint)
Literature:	DE PAOLI G., ROSSI V., SCOZZOLI A. – 1994 – Micropropagazione delle piante ortoflorofrutticole. Edagricole. GRIBAUDO I., MANNINI F., CUOZZO D., GOBETTO M., LENZI R., CREDI R. - 2002 - Risanamento da malattie virali e virus-simili di cloni di vite (<i>Vitis vinifera</i> L.). Quad. Vitic. Enol., Univ. Torino, 25: 39-50. GRIBAUDO I., GRANDO M.S. – 2005 – Caratterizzazione varietale e

	<p>miglioramento genetico della vite. In: Manuale di viticoltura. Impianto, gestione e difesa del vigneto (a cura di M. Marengi). Edagricole, pp. 1-15.</p> <p>GRIBAUDO I., GRANDO M.S. - 2003 - Nuove tecniche di caratterizzazione varietale e miglioramento genetico della vite. Quad. Vitic. Enol. Univ. Torino 26: 209-244.</p> <p>JAMES C. – 2009 - Global Status of Commercialized Biotech/GM Crops: 2009. ISAAA Brief No. 41. ISAAA: Ithaca, NY.</p>
Update:	February 2012

Module name:	Viticultural Planning
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vittorino Novello, Prof. (University of Turin)
Lecturers:	Vittorino Novello, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vineyard Planning – University Turin
Teaching format:	Regular lectures during the semester and field visits
Workload:	25 hr lectures, 50 hr visits, 50 hr personal work
Credit points:	5
Requirements under the examination regulations:	Pre-registration
Recommended prerequisites:	Deep knowledge of viticulture and vineyard management
Targeted learning outcomes:	Students are able to project a vineyard
Content:	Factors involved in vineyard project choices Problems related to erosion prevention Hilly and mountain vineyards Legislative aspects of planting a vineyard Selection of planting materials
Exam achievements:	Practical case-study of vineyard project
Forms of media:	audio-visual supports
Literature:	Selected scientific publications and book chapters
Update:	February 2012

Specialisation: Grapevine Ecophysiology (Torino)

Module	ECTS points
Grapevine Micrometeorology	5
Influence of Vineyard Management on Biosynthesis of Secondary Metabolites	5
Biosynthesis of Secondary Metabolites	5
Enological Product Instrumental Analysis	5

Module name:	Grapevine Micrometeorology
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Andrea Schubert, Prof. (University of Turin);
Lecturers:	Federico Spanna, Dr. (Regione Piemonte – Phytosanitary Service Agrometeorological Office); Andrea Schubert, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Grapevine Ecophysiology – University Turin
Teaching format:	Regular lectures and laboratory activities during the semester and vineyard visits
Workload:	Lectures: 32 h; Lab: 6 h; visits: 2 h; 85 hours personal work
Credit points:	5
Requirements under the examination regulations:	None
Recommended prerequisites:	Knowledge on viticulture and basic elements of agro-ecology, phytopatology, and ecophysiology
Targeted learning outcomes:	Students have knowledge concerning the application of meteorological and climatological information in vineyard management. They are familiar with agro-meteorological modelling techniques applied to pest management and to agronomic techniques. They have also knowledge on the relationship between climatic variables, the processes of growth and productivity of the vine and exchange processes in the soil-plant-atmosphere system.
Content:	<p>Elements of atmosphere-science and weather forecasting. Techniques and instruments for meteorological and climatic survey.</p> <p>Ecophysiological, phytopathological, phenological and agronomic modeling. Micrometeorological modeling of the soil-plant atmosphere system. Climatic characterization in relation to orographic variables. Spatialization techniques applied to different spatial scales</p> <p>Main elements of evaluation of climatic potentiality and risk, and adaptation and mitigation strategies.</p>
Exam achievements:	Oral presentation
Forms of media:	Electronic presentations
Literature:	<p>S. Pal Arya - Introduction to Micrometeorology</p> <p>Radha Krishna Murty - Basic principles of Agricultural meteorology</p> <p>G. Campbell, J. Norman – Environmental Biophysics</p>

	M. Donatelli – Sistemi nella gestione integrata delle colture Recent papers published on international scientific journals
Update:	February 2012

Module name:	Influence of Vineyard Management on Biosynthesis of Secondary Metabolites
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Andrea Schubert, Prof. (University of Turin);
Lecturers:	Silvia Guidoni, Prof., Ph.D (University of Turin); Alessandra Ferrandino, Ph.D (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Grapevine Ecophysiology – University Turin
Teaching format:	Regular lectures and laboratory activity during the semester and vineyard visits
Workload:	Lectures: 26 h; Lab: 8 h; visits: 6 h; students' work: 85 h
Credit points:	5
Requirements under the examination regulations:	None
Recommended prerequisites:	Depth knowledge on viticulture
Targeted learning outcomes:	Students have theoretical knowledge concerning the influence of climatic and environmental variables and of cultivation choices on the grapevine development, on the ripening and on the secondary metabolite accumulation in grapes. They are able to consult independently and evaluate critically the scientific literature, in order to deduce the technical and practical aspects potentially applicable to the vineyard management. Being able to choose the most suitable cultivation technique in order to attain the expected objectives in the light of the latest scientific evidence.
Content:	General influences of climate and microclimate on grape ripening. Light, temperature and water: variability in the vineyard and influence on fruit and vine development, fruiting zone microclimate, grape ripening and secondary metabolite accumulation. Canopy manipulations and management practices: influence on vine microclimate, grape ripening and secondary metabolite synthesis. Critical evaluation of results of polyphenols and aromatic compound analysis (laboratory practices).
Exam achievements:	Oral presentation with critical review of a recent scientific paper
Forms of media:	Electronic presentations

Literature:	Recent papers published on international scientific journals
Update:	February 2012

Module name:	Biosynthesis of Secondary Metabolites
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Andrea Schubert, Prof. (University of Turin);
Lecturers:	Silvia Guidoni (University of Turin); Andrea Schubert, Prof. (University of Turin);
Language:	English / Italian
Classification within the curriculum:	Module of specialization Grapevine Ecophysiology – University Turin
Teaching format:	Regular lectures; laboratory practice; computer practice during the semester
Workload:	Lectures: 30 h; Lab: 6 h; computer 4 h
Credit points:	5
Requirements under the examination regulations:	None
Recommended prerequisites:	Plant biology; Biochemistry, Genetics
Targeted learning outcomes:	Students know the pathways involved in secondary metabolite biosynthesis in the grapevine, including the regulatory circuits based on signal transduction and control of gene expression at the molecular level. They understand the techniques which have been used in obtaining such information, a basic presentation of protocols of general use in plant molecular biology and functional genomics. They are able to carry out a q-PCR analysis and have gained a basic knowledge of bioinformatic tools of application in the study of grapevine biology.
Content:	<p>Techniques of molecular biology and functional genomics. Characteristics and roles of plant secondary metabolites.. Phenolics and isoprenoids in the grape berry..Biosynthesis of phenolic compounds and of isoprenoids in plants. Recent advances in the biosynthesis of flavonoids and terpenes in grape. Regulatory mechanisms of biosynthetic pathways. Molecular control of ripening in the grape berry. Effects of environmental factors on secondary metabolite biosynthesis.</p> <p>Lab practice: q-PCR analysis. Computer practice: main bioinformatic tools available for the study of grape biology.</p>
Exam achievements:	Oral examination
Forms of media:	Power Point slide shows
Literature:	Recent papers published on international scientific journals

Update:	February 2012
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Module name:	Enological Product Instrumental Analysis
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Vincenzo Gerbi, Prof. (University of Turin)
Lecturers:	D. Borsa (University of Turin); Vincenzo Gerbi, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Varietal Enology – University Turin Module of specialization Grapevine Ecophysiology – University Turin
Teaching format:	Regular lectures and laboratory exercises during the semester
Workload:	20 h lectures, 20 h exercises, 65 h personal work
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	have a good knowledge of chemistry of wines
Targeted learning outcomes:	Students are able to analyse wine and are familiar with the analytical techniques. They are able to evaluate instrumental data of wines.
Content:	Description and interpretation of the results of the instrumental analytical data of wines
Exam achievements:	written test and oral discussion
Forms of media:	video projection, Internet
Literature:	recommended by the teacher
Update:	February 2012

Specialisation: Vector Management in the Vineyard Agro Ecosystem (Torino)

Module	ECTS points
Ecology of Vector Insects	5
Biology of Vector Insects	5
Control of Vector Insects	5
Molecular Diagnosis Applied to Vector Insects	5

Module name:	Ecology of Vector Insects
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Alberto Alma, Prof. (DIVAPRA Entomology, University of Turin)
Lecturers:	Alberto Alma, Prof. (DIVAPRA Entomology, University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vector Management in the Vineyard Agro Ecosystem – University Turin
Teaching format:	Regular lectures, case studies, field collection of samples and laboratory work during the semester
Workload:	Attending lectures and laboratory activity and vineyard surveys 40 hours, plus independent and private study 85 hours (total 125 hours)
Credit points:	5
Requirements under the examination regulations:	
Recommended prerequisites:	Entomology
Targeted learning outcomes:	The course aims to provide students with the tools necessary to recognize the insect vectors, through field observations and laboratory preparations, and to assess the influence of the environment on the epidemiology of the main vine diseases caused by prokaryotes.
Content:	<ul style="list-style-type: none"> – Current state of knowledge on Auchenorrhyncha. Morphology and characters useful for recognition and classification. Fulgoromorpha and Cicadomorpha. – Role of the environment on the diffusion of Auchenorrhyncha. Vineyard agro-ecosystem and role of wild and cultivated plants as host plants of the vectors and reservoirs of plant pathogens.
Exam achievements:	Final oral examination
Forms of media:	Print, Power Point slides, internet
Literature:	<p>Holzinger W.E., Kammerlander I., Nickel H. (2003) – The Auchenorrhyncha of Central Europe. Vol 1: Fulgoromorpha, Cicadomorpha excl. Cicadellidae. Brill Publishing, Leiden, Boston</p> <p>Ossiannilsson F. The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark. Vol. 1 (1978); Vol. 2 (1981); Vol. 3 (1983). Scandinavian Science press LTD, Klampenborg, Denmark.</p> <p>Weintraub PG and Jones P (2010) – Phytoplasmas: genomes, plant host and vectors. CABI Publishing, Wallingford, UK.</p>
Update:	February 2012

Module name:	Biology of Vector Insects
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Alberto Alma, Prof. (DIVAPRA Entomology, University of Turin)
Lecturers:	Rosemarie Tedeschi, Dr. (DIVAPRA Entomology, University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vector Management in the Vineyard Agro Ecosystem – University Turin
Teaching format:	Regular lectures, case studies and laboratory work during the semester
Workload:	Lectures 40 hours plus independent and private study 85 hours (total 125 hours)
Credit points:	5
Requirements under the examination regulations:	
Recommended prerequisites:	Entomology
Targeted learning outcomes:	Students have knowledge of the bioethology of insect vectors and their role in the epidemiology of grapevine diseases caused by phytoplasmas, bacteria and viruses.
Content:	<ul style="list-style-type: none"> – Phytoplasmas: introduction to grapevine yellows and new perspective of research, identification of acknowledge and putative insect vectors, detection of phytoplasmas in putative insect vectors. – Bacteria: Pierce's disease, bioethology of the insect vectors of <i>Xylella fastidiosa</i>, conventional and innovative control strategies – Viruses: most important grapevine viruses, bioethology of insect and nematode vectors, conventional and innovative control strategies
Exam achievements:	Final oral examination
Forms of media:	Print, internet
Literature:	Giunchedi et al. (2007). Elementi di virologia vegetale. Piccin, Padova Tacconi R. (1980). Nematodi di interesse agrario. Edagricole, Bologna. Weintraub PG and Jones P (2010) – Phytoplasmas: genomes, plant host and vectors. CABI Publishing, Wallingford, UK.
Update:	February 2012

Module name:	Control of Vector Insects
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Alberto Alma, Prof. (DIVAPRA Entomology, University of Turin)
Lecturers:	Luciana Tavella, Dr. DIVAPRA Entomology, University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vector Management in the Vineyard Agro Ecosystem – University Turin
Teaching format:	Regular lectures, laboratory work and web-based learning during the semester
Workload:	Lectures and laboratory work 40 hours, plus independent and private study 85 hours (total 125 hours)
Credit points:	5
Requirements under the examination regulations:	
Recommended prerequisites:	Entomology
Targeted learning outcomes:	The course provides students with the tools necessary to evaluate the efficacy of the pest control techniques, to verify the side effects of the pest control techniques, and to implement an efficient and environmental friendly control strategy in vineyards.
Content:	<ul style="list-style-type: none"> – Chemical pest control: mode of action and application of the insecticides used in vineyards – Biological pest control: beneficial organisms (microorganisms and arthropods) usable to control grapevine pests. – Integrated pest management: principles and case studies.
Exam achievements:	Final oral examination
Forms of media:	Print, Power Point slides, internet
Literature:	Ragusa S., Tsolakis H. (2006) La difesa della vite dagli artropodi dannosi. Università degli Studi di Palermo. EU Pesticides database. http://ec.europa.eu/sanco_pesticides/public/index.cfm
Update:	February 2012

Module name:	Molecular Diagnosis Applied to Vector Insects
Academic Year:	2 nd academic year at University of Turin
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Alberto Alma, Prof. (DIVAPRA Entomology, University of Turin)
Lecturers:	Domenico Bosco, Dr. (DIVAPRA Entomology, University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Vector Management in the Vineyard Agro Ecosystem – University Turin
Teaching format:	Regular laboratory work, field collection of samples, lectures during the semester
Workload:	Lectures 20 hours, practicals (laboratory analyses and vineyard surveys) for 60 hours, plus independent and private study for 45 hours (total 125 hours)
Credit points:	5
Requirements under the examination regulations:	
Recommended prerequisites:	Entomology
Targeted learning outcomes:	Students can identify scope and role of molecular diagnosis applied to insect vectors of the vineyard agroecosystem in IPM and research programs. They have knowledge of methods and protocols for the molecular identification of plant pathogens and of vector species.
Content:	<ul style="list-style-type: none"> – Field sampling of vector insects: direct collection, sweeping net, yellow sticky traps, cage isolation of vector insects in the vineyard, storage and processing methods. – Laboratory analyses: DNA and RNA extraction, PCR, RT-PCR, real time PCR, RFLP, sequencing. – Molecular markers relevant to the study and identification of insect species, of insect-transmitted plant pathogens and of insecticide resistance traits.
Exam achievements:	Final oral examination
Forms of media:	Print, Power Point Presentation
Literature:	<p>M. A. Hoy, Insect Molecular Genetics (2003). Academic Press, Elsevier, Oxford, UK.</p> <p>Weintraub PG and Jones P (2010) – Phytoplasmas: genomes, plant host and vectors. CABI Publishing, Wallingford, UK.</p>
Update:	February 2012

Specialisation: Soil and Viticulture (Torino)

Module	ECTS points
Soil Fertility in Viticulture	6
Pedology	8
Land Evaluation and Viticultural Zoning	6

Module name:	Soil Fertility in Viticulture
Academic Year:	2 nd academic year at University of Turin
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Ermanno Zanini, Prof. (University of Turin)
Lecturers:	Valter Boero, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Soil and Viticulture – University Turin
Teaching format:	Regular lectures, case studies and web-based learning during the semester
Workload:	Lectures 48 hours plus independent and private study 102 hours (total 150 hours)
Credit points:	6
Requirements under the examination regulations:	----
Recommended prerequisites:	Inorganic and organic chemistry
Targeted learning outcomes:	Students have knowledge to understand the soil-plant relations which are indispensable for the control of the fertilisation in viticulture
Content:	<ul style="list-style-type: none"> – Soil sampling and testing – Cation exchange – Soil pH and liming – Essential plant nutrients – Secondary and micronutrients – N management and products – Soil N dynamics, uptake in viticulture and diagnostic tools – P and K management in viticulture – Environmental P – Site-specific management in viticulture – Manure management
Exam achievements:	Final oral examination
Forms of media:	Print, Internet
Literature:	<ul style="list-style-type: none"> – P. Violante - Chimica del Suolo e della nutrizione delle Piante. Edagricole (2002). – P. Sequi - Fondamenti di chimica del suolo, Pàtron (2005)
Update:	February 2012

Module name:	Pedology
Academic Year:	2 nd academic year at University of Turin
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Ermanno Zanini, Prof. (University of Turin)
Lecturers:	Ermanno Zanini, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Soil and Viticulture – University Turin
Teaching format:	Regular lectures, field work, case studies and web-based learning during the semester
Workload:	attending lectures and field work 64 hours plus independent and private study 136 hours (total 200 hours)
Credit points:	8
Requirements under the examination regulations:	-----
Recommended prerequisites:	Inorganic and organic chemistry, Soil fertility
Targeted learning outcomes:	Students have the theoretical and technical knowledge of the soil evolution and variability that are professional tools for the management of the soil in the field and their classification.
Content:	<ul style="list-style-type: none"> – key soil features (morphology); – how these features form (genesis); – nomenclature used to talk about soils (classification); – spatial distribution of soils over the earth's surface (mapping).
Exam achievements:	Final oral examination
Forms of media:	Print, internet
Literature:	<ul style="list-style-type: none"> – Sumner, M.E. (Editor), 2000. Handbook of Soil Science. CRC Press, Boca Raton, FL. – Schaetzl, Randall and Sharon Anderson, 2005. Soils, Genesis and Geomorphology. Cambridge University Press, Cambridge, UK. – Brady, N.C. and Weil, R.R., 1999. The Nature and Properties of Soils. Prentice Hall, Upper Saddle River, NJ, 881 pp. – Field Book for Describing and Sampling Soils v2.0 (PDF; 1.5 MB) – http://soils.usda.gov/technical/fieldbook/
Update:	February 2012

Module name:	Land Evaluation and Viticultural Zoning
Academic Year:	2 nd academic year at University of Turin
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Ermanno Zanini, Prof. (University of Turin)
Lecturers:	Ermanno Zanini, Prof. (University of Turin)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Soil and Viticulture – University Turin
Teaching format:	Regular lectures, laboratory work, guided personal study during the semester
Workload:	Lectures and lab work 48 hours plus independent and private study 102 hours (total 150 hours)
Credit points:	6
Requirements under the examination regulations:	-----
Recommended prerequisites:	Basic soil science, soil classification, basic topography
Targeted learning outcomes:	Students know the tools necessary to analysis the potential of the soils in connection with quality of wine products. They have the knowledge of the characteristics soil in the vineyard landscapes and the zoning in favour of the exploitation of the specific features of the territory for vineyard and wine production.
Content:	<ul style="list-style-type: none"> – Land evaluation and Land capability – Soil mapping and viticulture – Zoning (general criteria) – Zoning (cartographic methods) – Zoning (Quantitative methods and GIS applications)
Exam achievements:	oral presentation, report on lab/fieldwork
Forms of media:	Print, Internet
Literature:	Autori Vari, Metodi di valutazione dei suoli e delle terre, Cantagalli ed., 2006
Update:	February 2012

Specialisation: Territory and Precision Viticulture (Milano)

Module	ECTS points
Agro-Meteorology and Climatology for Viticulture	4
Soil Science Applied to Viticulture	4
Grapevine Eco-Phenology and Eco-Physiology of Zoning	2
Varietal Assortments	2
Advanced Technologies for Computer Management of Viticultural Processes	4
Statistical Methodology for Agricultural Research	4

Module name:	Agro-Meteorology and Climatology for Viticulture
Academic Year:	2 nd academic year at University of Milano
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Osvaldo Failla, Prof. (University of Milano)
Lecturers:	Luigi Mariani, Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Territory and Precision Viticulture – University Milano
Teaching format:	Regular lessons and practices in classroom during the semester
Workload:	24 h lessons, 12 h practices, 64 h personal study (Total 100 hours)
Credit points:	4
Requirements under the examination regulations:	None
Recommended prerequisites:	General Agronomy
Targeted learning outcomes:	The student can analyse a given territory for the cultivation of specific crops, on the basis of meteorology and climate.
Content:	<p>Part 1 - Meteorology and climatology. Atmospheric system: functions, structure, phenomena and characteristic scales, elements of complexity and indeterminacy. General circulation: mesoscale and synoptic weather patterns of mid-latitudes; Some notions about tropical meteorology (monsoons, Enso, tropical cyclones). Weather Forecast: types of forecasts (nowcasting, short and medium range forecast, long range forecast), reliability of forecasts. Weather forecasting exercises: analysis of weather maps, short and medium range forecast on a specific territory. Climatic system: characteristics of the system, structure and functions; elements of complexity (feed - back, role of cloud systems, role of greenhouse gases); climatic classification at different scales. Simulation of climate system with mathematical models (EBM, GCM).</p> <p>Part 2 - Agrometeorological Measurements. Meteorological instruments: technology, working principles, metrological aspects. Tutorial on use of the principal instruments.</p> <p>Part 3 – Micrometeorology. Boundary layer and canopy layer, radiation balance, surface energy balance and meteorological variables involved; turbulence (characteristics and associated phenomena); methods for estimating meteorological variables within the canopy layer; methods for estimating reference crop evapotranspiration; frost, fog, winds;</p>

	<p>urban micrometeorology (general information).</p> <p>Part 4 - Geostatistics, GIS and crop modelling. Geostatistics and geographic information systems applied to atmospheric and phenological variables: variability in space and time; links between scales. Exercise: reconstruction of fields of air temperature, global radiation, PAR, precipitation. Dynamic simulation models: applications to water balance and simulation of crop production. Agroclimatic analysis: from data retrieval to the analysis of suitability of a given territory for some specific crops.</p>
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Luigi Mariani, Agrometeorologia to be downloaded from: users.unimi.it/agroecol/mariani.php
Update:	February 2012

Module name:	Soil Science Applied to Viticulture
Academic Year:	2 nd academic year at University of Milano
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Oswaldo Failla, Prof. (University of Milano)
Lecturers:	Enrico Casati, Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Territory and Precision Viticulture – University Milano
Teaching format:	Regular lessons and practices in classroom and in field during the semester
Workload:	32 h lessons, 68 h personal study (Total 100 hours)
Credit points:	4
Requirements under the examination regulations:	
Recommended prerequisites:	
Targeted learning outcomes:	Students have a grounding in geopedology, both the theoretical and practical study cases, as geopedology is applied to viticultural contexts.
Content:	Soil definition. Soil components. Soil description. Pedogenetic processes. Main soil profiles. Factors influencing soil formation. Soils in laboratory. Soils under microscope. Soil classification and cartography. Study cases.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Giordano Andrea 1999 Pedologia; Editore: UTET;
Update:	February 2012

Module name:	Grapevine Eco-Phenology and Eco-Physiology of Zoning
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd and 4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Oswaldo Failla, Prof. (University of Milano)
Lecturers:	Oswaldo Failla, Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Territory and Precision Viticulture – University Milano
Teaching format:	Regular lessons and practical exercises during the semester
Workload:	8 h lessons, 16 h practices, 26 h personal study
Credit points:	2
Requirements under the examination regulations:	None
Recommended prerequisites:	General viticulture
Targeted learning outcomes:	Students know the meaning and the procedures of the viticultural zoning
Content:	Grapevine phenology and zoning techniques
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Vaudour E. 2005 I Terroir Definizione, caratterizzazione e protezione Edagricole Bologna Selected research and review paper from: American Journal of Enology and Viticulture Australian Journal of Grape and Wine Research International Journal of Vine and Wine Sciences Progrès Agricole et Viticole Vitis
Update:	February 2012

Module name:	Varietal Assortments
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd and 4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Osvaldo Failla, Prof. (University of Milano)
Lecturers:	Lucio Brancadoro, Dr. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Territory and Precision Viticulture – University Milano
Teaching format:	Regular lessons during the semester
Workload:	16 h lessons, 34 h personal study
Credit points:	2
Requirements under the examination regulations:	none
Recommended prerequisites:	General viticulture
Targeted learning outcomes:	Students know the approach for the practical evaluation of a grapevine varieties
Content:	Presentation of international and national grapes varieties as case study
Exam achievements:	Oral by presentation
Forms of media:	Power point and blackboard
Literature:	Selected research and review paper from: American Journal of Enology and Viticulture Australian Journal of Grape and Wine Research International Journal of Vine and Wine Sciences Progrès Agricole et Viticole Vitis
Update:	February 2012

Module name:	Advanced Technologies for Computer Management of Viticultural Processes
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Osvaldo Failla, Prof. (University of Milano)
Lecturers:	Fabrizio Mazzetto, Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Territory and Precision Viticulture – University Milano
Teaching format:	Regular lessons and practices in classroom during the semester
Workload:	24 h lessons, 32 h practices, 44 h personal study
Credit points:	4
Requirements under the examination regulations:	none
Recommended prerequisites:	Aptitude to computations and acceptable knowledge of basic computer science. Aptitude to simplify real world production systems throughout abstract models, in order to provide an ease qualitative and quantitative analysis of complex management problems.
Targeted learning outcomes:	Students have the capability for evaluating the technical performances of the different components of an information system to be used within an agricultural context. They have practical skills in the integrated use of GIS and GPS technologies for farm management purposes. Students have an information-oriented competence to design and manage an information system.
Content:	FARM INFORMATION SYSTEMS. Information Technologies for firm management and computer business. Role of information in production processes: definitions of “datum” and “information”, with related differences. Information Systems (IS) and related designing approaches: datum-oriented and information-oriented. IS components: electronic devices, computer and software, communication and data transfer systems. Hierarchic organization and enterprise decisional levels: strategic, tactical and processes management, knowledge management, operational levels. Structured, semi-structured and unstructured information profiles. IS classification based upon decisional levels and firm functional areas. Main features of IS designed for farm and agri-environmental enterprises. General role of machinery and mechanisation in farm information systems (FIS). BASIC INFORMATION TECHNOLOGIES. Processors, memories

	<p>and computer architectures. Application of memories: bit and byte; binary and hexadecimal numbering systems; representation of integer and real numbers and of alphanumeric data; representation of images and colour theory. System's software and computer operation systems. Programming languages and software tools. Management software packages and specific applications for Office Automation and Decision Support Systems. Telecommunications and networks: components and functions of a TLC systems; analogic and digital signals. Types of networks.</p> <p>ENTERPRISE DATA MANAGEMENT. Data organization by means traditional file approaches and throughout database technologies (DB); DB types and database management systems (DBMS); DB queries. Entity-relationship model for DB designing. Management needs for DBMS. Relevant DB applications for agri-environmental systems. Application examples.</p> <p>ADVANCED INFORMATION TECHNOLOGIES. Perspective of ITs in the contexts of agri-environmental enterprises between precision agriculture and information management. New emerging needs: traceability; production reporting and documentation; automations of field operational controls; site-specific farm management. Necessity of automating monitoring activities and their classification within the farm: environmental, crop and operational monitoring. Introduction to GPS: space, control and user segments; GPS receivers; positioning data computing methods (phase and pseudo-range measures; accuracy and precision; types of measuring errors); DGPS technologies; receivers' costs and selection criteria; agri-environmental applications. Outline on GIS tools: cartographic systems and geo-reference problems; layers and backgrounds; entities and related attributes; connections to DBs; digitalization of lands and farm structures; integration of GPS points and traces. Electronic technologies and remote sensing (RS): sensors for implements; variable rate technologies (VRT) devices; active and passive identification systems; yield mapping; an outline of RS and its possible applications to on-farm and off-farm contexts; role of ground sensing; spectral indices calculation and their application to crop monitoring. Operational monitoring: the role of farm machinery, mobile and stationary user points; tractors as information vectors; Computerized Field Notebooks (CFN): features and functionalities; basic construction architectures (tractor- and implement-oriented); algorithms to inference operational farm data, from the elementary activity to the farm historical memory. Principles of land operational monitoring: experiences achieved on a slurry spreading monitoring system based on a IS (equipped with CFNs) managed by the public administration.</p>
Exam achievements:	Practical work followed by its discussion
Forms of media:	Power point and blackboard
Literature:	<p>Pighin M., Garzona A. (2005), Sistemi informativi aziendali, struttura e applicazioni, Pearson Education Italia Ed., Milano</p> <p>Peri C. (2001), Qualità: concetti e metodi, Franco Angeli Ed., Milano</p> <p>Laudon K., Laudon J. (2005), Management dei sistemi informativi, Pearson Education Italia Ed., Milano</p> <p>Basso B., Sartori, Bertocco M. (2005), Agricoltura di Precisione: concetti teorici e applicazioni pratiche, L'Informatore Agrario Ed.,</p>

	Verona Latini F. (1986), Sistemi informativi e direzione aziendale, Franco Angeli Ed., Milano
Update:	February 2012

Module name:	Statistical Methodology for Agricultural Research
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Oswaldo Failla Prof. (University of Milano)
Lecturers:	Marco Acutis Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Territory and Precision Viticulture – University Milano
Teaching format:	Regular lessons and practices in classroom during the semester
Workload:	24 h lessons, 32 h practices, 44 h personal study
Credit points:	4
Requirements under the examination regulations:	None
Recommended prerequisites:	Basic knowledge of descriptive statistics. Basic level in usage of Excel spreadsheet.
Targeted learning outcomes:	Students can use personal computers for data management. They are able to use of Excel and a statistical package for analysis of data from experiment and surveys. Students can interpret software outputs and prepare plans for laboratory and field experiments.
Content:	Descriptive statistics. Characteristics of samples and populations. Main probability distribution. Usage of the normal distribution and of the standardized normal distribution. Estimation of population parameters from a sample. Bias, consistency and efficiency of an estimator. The structure of a statistical test: two-tail and one tail-test, the null hypothesis, the significance level, power of a test, type I, II and III errors. Analysis of qualitative data: Analysis of data from enumeration. χ^2 test 2 e Z. Comparison among observed X and condition of application. Relation between and theoretical proportion. Comparison among observed proportion. Contingency tables and related index for nominal or ordered data. Yates correction. G likelihood ratio test for small samples. Hint to log-linear models and more complex techniques for frequency data. Practical use of statistical software to do qualitative data analysis. t test and the analysis of variance Confidence bounds for a mean. Comparison of the mean of two samples; the Student's t test. The t test for paired data. More than two samples: the ANOVA. Requirements needed to apply ANOVA: normality and homogeneity of variances tests. Data transformation. Factorial ANOVA and the concept of interaction. 2 way and 3 way ANOVA. Hierarchical ANOVA. Model at fixed effect and model with random effects. Techniques for multiple comparison among means: contrast and post-hoc tests. Hints to

	<p>non-parametric ANOVA. Practical use of statistical software to do ANOVA. Correlation and regression analysis The correlation concept. Correlation coefficient and their statistical tests. Linear regression analysis. The squared minimum method. Requisites for the regression analysis and test for assumption. The regression coefficient and their standard error. Significance test for the regression coefficient and for intercept. Confidence bound of a regression line. The regression from the origin. The determination coefficient. Multiple regression analysis. The identification of the optimal model (backward, forward and stepwise regression). Hints of non parametric analysis of regression and correlation. Practical use of statistical software to do regression analysis. Experimental planning and field management of the experiments. Uncontrolled sources of error and the determination of the number of replication. Randomized blocks, Latin squares, split plot and strip plot experimental arrangement. Practical implementing in a field of experimental arrangement. Statistical analysis using specific software. Hints of geostatistics: semivariograms and spatial interpolation, with practical application. Introduction to multivariate analysis Basics of principal component analysis, discriminant analysis, multivariate analysis of variance and cluster analysis. First approach to the programs for multivariate analysis. Examples of interpretation of computer outputs and results reported in scientific papers</p>
Exam achievements:	Final test includes practical work at personal computer (50%), open and multiple response tests and oral discussion (50%).
Forms of media:	Power point and blackboard
Literature:	<p>Snedecor G., Cochran W., Statistical methods, VIII ed., Iowa state University press.</p> <p>Freund R.J., Wilson W.J., Statistical methods. Academic press. 1993</p> <p>Lindman H. Analysis of variance in complex experimental design (reference book). W.H. Freeman, S. Francisco, 1974.</p>
Update:	February 2012

Specialisation: Marketing and Organization of Viticultural Company (Milano)

Module	ECTS points
Farm Management and Agri-food System Organisation	8
Innovation Economics and Management in Food Industry	6
Marketing	6

Module name:	Farm Management and Agri-food System Organisation
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Roberto Pretolani, Prof. (University of Milano)
Lecturers:	Roberto Pretolani, Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Marketing and Organization of Viticulture Company – Università degli Studi di Milano
Teaching format:	Regular lectures during the semester
Workload:	64 h lessons 136 h personal study
Credit points:	8
Requirements under the examination regulations:	None
Recommended prerequisites:	Basic knowledge of agricultural production features; Knowledge of economics and agricultural policy notions provided at bachelor level
Targeted learning outcomes:	Students know about private and public subjects belonging to the agri-food system and their reciprocal interactions. They are able to analyse farm adaptation strategies when a change in market, agricultural policies and input endowment occur.
Content:	<p>Definition and measurement of the agri-food system</p> <p>Analysis of each part of the agri-food system</p> <p>Institutional context and facilities for farms</p> <p>Farm business management and administration</p> <p>Accounting as a management tool</p> <p>General accounting: firm information system, book entries, bookkeeping systems and methods, account plan – chart of accounts.</p> <p>The budget: budget drafting. Budget typologies and aims.</p> <p>Analytical accounting and production costs</p> <p>Farm business choices</p>
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	<p>Reference books:</p> <p>“R.Pieri, R.Pretolani, Il sistema agro-alimentare in Lombardia, Rapporto 2009, FrancoAngeli, 2009.”</p> <p>“B.Torquati, Economia e gestione dell'impresa agraria, Edagricole, 2003.</p>

	INEA.” Slides available on the Internet at: http://users.unimi.it/pretdepa/materiale.htm .
Update:	February 2012

Module name:	Innovation Economics and Management in Food Industry
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Roberto Pretolani, Prof. (University of Milano)
Lecturers:	Alessandro Banterle, Prof. (Professor, University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Marketing and Organization of Viticulture Company – Università degli Studi di Milano
Teaching format:	Regular lectures and practice in classroom during the semester
Workload:	48 h lessons 102 h personal study
Credit points:	6
Requirements under the examination regulations:	None
Recommended prerequisites:	
Targeted learning outcomes:	<p>Students have knowledge of main features of innovation in food industry from an economic viewpoint;</p> <p>the innovation within the general framework of food enterprise management and agro-food system;</p> <p>They know about the need to introduce innovations and the possible problems related to innovation</p>
Content:	<p>Main concepts and definitions of innovation.</p> <p>Economic and structural analysis of food industry.</p> <p>Firm competitive advantage: Porter model and Resources Based View.</p> <p>Sector competitiveness analysis.</p> <p>Market structures and competition among firms: monopolistic competition.</p> <p>Invention, innovation, scientific-technological innovation and relationship with the enterprise. Product, process and organizational innovation.</p> <p>Innovation in the food sector: role, peculiarities, constraints and opportunities. Innovation determinants in the food industry.</p> <p>Food enterprises strategies on the ground of innovation.</p> <p>Food consumption dynamics in relation to innovative processes.</p> <p>Technological innovation and its impact on products and production processes in food enterprises; legal implications.</p> <p>The path followed by an enterprise to achieve an innovation (product or process innovation)</p>

	Economic impact of an innovation on the enterprise. Economic evaluation and business plan.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	available from the website: http://users.unimi.it/banterle/
Update:	February 2012

Module name:	Marketing
Academic Year:	2 nd academic year at University of Milano
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Roberto Pretolani, Prof. (University of Milano)
Lecturers:	Lucia Baldi, Prof. (University of Milano)
Language:	English / Italian
Classification within the curriculum:	Module of specialization Marketing and Organization of Viticulture Company – Università degli Studi di Milano
Teaching format:	Regular lectures and practice in classroom during the semester
Workload:	48 h lessons 102 h personal study
Credit points:	6
Requirements under the examination regulations:	None
Recommended prerequisites:	knowledge of the basic concepts of economics
Targeted learning outcomes:	Students know the main tools of marketing such as: demand analysis, consumer behaviour, competitive strategies, market segmentation, product development, distribution channels, communication, analysis of cost and price and brand management Using the methodologies for conducting market analysis.
Content:	The course aims to introduce the marketing management focusing mainly on agriculture and food industry. Particular attention is given to quantitative methods to analyze consumer behaviour. The course is divided into 3 parts: 1) The principles of marketing 2) Quantitative methods for consumer analysis 3) Case Studies
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Textbooks: - Marketing – impresa e mercato, di R. Fiocca, ed. McGraw-Hill, 2005. - Statistics for Marketing and Consumer Research, di M. Mazzocchi, ed. SAGE, 2008. Other recommended books: - Marketing Agroalimentare, a cura di G. Antonelli, ed. F. Angeli, 2004. - Marketing, di W. Pride e O. C. Ferrel (italian edition by S. Podestà), ed. Egea, 2005.

Update:	February 2012
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Specialisation: Molecular Aspects of Enological Transformations (Milano)

Module	ECTS points
Protein Chemistry and Enzyme Applications	4
Molecular Techniques	4
Chemistry of Fermentation	4
Advanced Analytical Techniques in Enology	4
Coadjutants in Enology	4

Module name:	Protein Chemistry and Enzyme Applications
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Antonio Tirelli, Prof. (University of Milano)
Lecturers:	Francesco Bonomi, Prof. (University of Milano)
Language:	English
Classification within the curriculum:	Module of specialization Molecular Aspects of Enological Transformations – University of Milano
Teaching format:	Regular lectures and lab classes during the semester
Workload:	Lectures (20 hrs) + Lab (8 hrs) + 72 hours personal studies
Credit points:	4
Requirements under the examination regulations:	
Recommended prerequisites:	none
Targeted learning outcomes:	<p>Students have</p> <ul style="list-style-type: none"> - acquired familiarity with the structure-function relationship in proteins, with a focus on food proteins - got acquainted with the basics of the applications of enzymology to the food industry, with a focus on winemaking - have hands-on experience on the measurement of enzyme activity and of its significance for analytical and process development purposes
Content:	<p>The basics of protein structure. From protein sequence to high-order structure. Molecular determinants of folding. Controlled unfolding in food processes.</p> <p>Proteins and molecular recognition: the fining process as a case study.</p> <p>The fundamentals of enzyme catalysis. Inhibition and inactivation.</p> <p>Enzymes as an analytical tool. Enzymes as processing markers.</p> <p>Practical application of enzymes.</p>
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Gerhartz, Enzymes in Industry, VCH Verlag Wong, Food Enzymes, Chapman & Hall

	Godfrey & West, Industrial Enzymology, MacMillan
Update:	February 2012

Module name:	Molecular Techniques
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Antonio Tirelli, Prof. (University of Milano)
Lecturers:	Alessio Scarafoni Dr. (University of Milano)
Language:	English
Classification within the curriculum:	Module of specialization Molecular Aspects of Enological Transformations – University of Milano
Teaching format:	Regular lectures and lab classes during the semester
Workload:	82 hours 12 lectures (2 hours each) + 4 lab classes (3 hours each)
Credit points:	4
Requirements under the examination regulations:	
Recommended prerequisites:	Biochemistry and organic chemistry
Targeted learning outcomes:	<p>Students understand the molecular techniques applied for genetic and enzymatic analytical methods.</p> <p>In particular they :</p> <ul style="list-style-type: none"> - have acquired the general principles of analysis using biotechnological approaches of grape and wine. - have critically assessed and solved the interference-related problems arising from plant-derived matrices. - are familiar with the most common molecular analytical methodologies and to critically assess the obtained data.
Content:	<p>The basic of molecular biology and nucleic acids structure. Enzymes acting on nucleic acids. Extraction and isolation processes of macromolecules (DNA, RNA and proteins) from plants and raw and processed matrices for analytic and diagnostic purposes. Resolution of interference-related problems arising from plant-derived matrices. Quality assessment of the extracted DNA (spectofotometric, fluorimetric methods and electrophoresis).</p> <p>Methods and technologies employed in analyses of plant and food-extracted nucleic acids (General cloning, hybridation, sequencing, end point and quantitative real-time PCRs). Basics of transcriptomic and expression analysis. Basic of proteomics. Employment of immunochemical and immunoenzymatic techniques (Western blotting and ELISA).</p>
Exam achievements:	Oral examination

Forms of media:	Power point and blackboard
Literature:	Selected research and review paper from: American Journal of Enology and Viticulture Australian Journal of Grape and Wine Research Journal of Food Science Journal of Agricultural and Food Chemistry
Update:	February 2012

Module name:	Chemistry of Fermentation
Academic Year:	2 nd academic year at University of Milano
Semester:	3 rd semester of the Vinifera EuroMaster degree programme
Module coordinator:	Antonio Tirelli, Prof. (University of Milano)
Lecturers:	Francesco Molinari, Prof. (University of Milano)
Language:	English
Classification within the curriculum:	Module of specialization Molecular Aspects of Enological Transformations – University of Milano
Teaching format:	Regular lectures during the semester
Workload:	16 lectures (2 hours each) = 32 hours, personal studies: 64 hours (Total 100 hours)
Credit points:	4
Requirements under the examination regulations:	
Recommended prerequisites:	Biochemistry, microbiology and chemistry
Targeted learning outcomes:	<ul style="list-style-type: none"> – Students – have acquired an overall view of the microbial metabolisms involved in wine fermentations, including spoilage events – are familiar with the (bio)chemical basis of the of wine fermentations. – have knowledge concerning microbial biotransformations that lead to the formation of molecules in wine
Content:	<ul style="list-style-type: none"> – Enzymatic reactions involved in microbial metabolism in wine fermentations – Yeast and bacterial fermentations: biochemical and chemical features – Acetic acid bacteria and their impact in wine technology – Lab classes: fermentation of yeasts: product analysis and evaluation of the enzymatic activities involved
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Biotecnologie microbiche, (Donadio, Marino editori) Casa Editrice Ambrosiana 2008 Biocatalysis, Bommarius, A.; Riebel, B.R. Wiley-VCH. 2004
Update:	March 2010

Module name:	Advanced Analytical Techniques in Enology
Academic Year:	2 nd academic year at University of Milano
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Antonio Tirelli, Prof. (University of Milano)
Lecturers:	Roberto Foschino, Prof. (University of Milano); Ileana Vigentini, Ph.D. (University of Milano); Antonio Tirelli, Prof. (University of Milano);
Language:	English
Classification within the curriculum:	Module of specialization Molecular Aspects of Enological Transformations – University of Milano
Teaching format:	Regular lectures and laboratory practice during the semester
Workload:	132 hours: 16 lectures and 6 lab classes (4 hours each) = (22x 4 = 88 hours) + 62 hours independent studies = 150 hours (6 ECTS = 6 x 25 hours = 150 hours)
Credit points:	6
Requirements under the examination regulations:	
Recommended prerequisites:	Chemistry, analytical chemistry, applied microbiology
Targeted learning outcomes:	Students can apply analytical methods for chemical and biological components in wine and wine products.
Content:	Phylogenetic aspects of oenological microorganisms. Molecular methods for microbial identification and typing. Microbial biotechnology. GMO in winemaking. Chromatographic techniques, mass-spectrometry, electrophoretic separations, infrared analytical techniques applied to wine evaluation.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	M Vincenzini, P. Romano, G. A. Farris Microbiologia del vino Casa Editrice Ambrosiana, Milano, 2005 Zambonelli, Tini, Castellari: Guida all'uso del lieviti selezionati in enologia. Calderini Edagricole. K. Fugelsang: Wine microbiology Chapman & Hall Ed.
Update:	February 2012

Module name:	Coadjutants in Enology
Academic Year:	2 nd academic year at University of Milano
Semester:	4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Antonio Tirelli Prof. (University of Milano)
Lecturers:	Antonio Tirelli Prof. (University of Milano)
Language:	English
Classification within the curriculum:	Module of specialization Molecular Aspects of Enological Transformations – University of Milano
Teaching format:	Regular lectures during the semester
Workload:	8 lectures (2 hours each) = 16 hours, independent studies: 34 hours
Credit points:	4
Requirements under the examination regulations:	
Recommended prerequisites:	Biochemistry, Winemaking processes
Targeted learning outcomes:	Students understand the oenological practices involving the use of antimicrobials, yeast cell-wall fraction, polyphenols and fining agents in winemaking
Content:	Structure and activity of oenological tannins. Oenological use of pectinases and bentonite. Use, activity and interactions of lysozyme and sulfur dioxide. Use of hulls, lysates, mannoproteins in winemaking.
Exam achievements:	Written or oral examination
Forms of media:	Power point and blackboard
Literature:	Nicolas Vivas. Prodotti di Trattamento ed Ausiliari di Elaborazione dei Mosti e dei Vini. Ed. Eno-One (Reggio Emilia)
Update:	February 2012

Vineyard and / or Winery Stage

Module	ECTS points
Vineyard and / or Winery Stage	15

Module name:	Vineyard and / or Winery Stage
Academic Year:	2 nd academic year
Semester:	3 rd or 4 th semester of the Vinifera EuroMaster degree programme
Module coordinator:	Master thesis tutor
Lecturers:	-----
Language:	Italian/English
Classification within the curriculum:	All specializations
Teaching format:	internship
Workload:	275 h
Credit points:	15
Requirements under the examination regulations:	none
Recommended prerequisites:	none
Targeted learning outcomes:	Stage linked to the Master thesis
Content:	Master thesis research argument
Exam achievements:	none
Forms of media:	-----
Literature:	-----
Update:	February 2012

Module name:	Master Thesis at the Consortium among the Universities of Turin, Milan, Palermo, Foggia and Sassari
Academic Year:	2 nd academic year at Consortium among the University of Turin, Milan, Palermo, Foggia and Sassari
Module coordinator:	General Coordination Prof. Vittorino Novello, University of Turin
Supervisors:	Academic staff of Consortium among the University of Turin, Milan, Palermo, Foggia and Sassari, and associated partners
Language:	English
Classification within the curriculum:	Core module
Teaching format:	The Thesis consists of the elaboration of a written report about an independent scientific work of the student and a defence.
Workload:	20 weeks for the elaboration of the thesis; plus adequate time for personal preparation for the defence
Credit points:	20 ECTS
Requirements under the examination regulations:	Admission to the <u>defence</u> is granted under the condition that: <ul style="list-style-type: none"> – the student has completed all other compulsory modules of the second academic year successfully and obtained at least 120 ECTS (including the ECTS allocated to the Master Thesis)
Recommended prerequisites:	----
Targeted learning outcomes:	The student is <ul style="list-style-type: none"> – able to carry out scientific research independently in a given time implementing adequate scientific methods – able to present his/her results to a jury and answers questions related to the field of research.
Content:	Thesis document
Exam achievements:	Delivery of a written thesis report at the submission date, prepared under formal requirements of the University of Turin . Thesis defence in front of an examination jury of at least 7 academic members.
Forms of media:	Research methods depending on the topic of the thesis. Written report; presentation media for the defence
Literature:	Books and scientific papers related to the topic of the thesis
Update:	February 2012

Modules offered by Consorzio tra le Università di Udine, Padova e Verona (P5 students – class 2011)

Students of EmaVE-Vinifera course will follow the courses in the Laurea Magistrale in Viticoltura, Enologia e Mercati vitivinicoli” (Master in Viticulture, Enology and Wine Market, given according to the Italian regulations by the consortium among the three universities).

They will follow the second year courses.

They have to do in the second year (M2):

- One specialization (choose one out of three) 20 ECTS
- Optional courses 10 ECTS
- Language training (Italian for foreigners) 3 ECTS
- Master Thesis 28 ECTS
- Optional internship (included in thesis) (8 ECTS)

**Specialisation: Research and development in Enology
(UDINE) (20 ECTS)**

	ECTS points
Module group: Biotechnology for enological techniques	10
Biomolecular techniques for microorganism identification	3
Management of microbial fermentations	3
Post-harvest physiology of grapes and non-conventional operations in enology	4
Module group: Techniques of separation, stabilization and packaging in enology	10
Stabilization techniques in enology	4
Conditioning and packaging in enology	3
Separation processes in enology	3

Module name	Biomolecular techniques for microorganism identification
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Manzano, Marisa (University of Udine)
Lecturers:	Manzano, Marisa (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Enology Module group: Biotechnology for enological techniques (University of Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The course is aimed to give to students a knowledge on microbiology techniques based on molecular analysis applied to must and wine.
Content:	Non-conventional analytical methods used in microbiology in winery and in research. Reduction of analysis timing as compared to conventional ones. Laboratory practical work.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name:	Management of microbial fermentations
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Manzano, Marisa (University of Udine)
Lecturers:	Corich, Viviana (University of Padova)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Enology Module group: Biotechnology for enological techniques (University of Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	none
Targeted learning outcomes:	The course is aimed to give a deep knowledge about main parameters influencing alcoholic fermentation.
Content:	Effect of nitrogen nutrition, oxygen and temperature on fermentation kinetics as well as on the molecular response of oenological yeasts. Breeding techniques, with particular reference to recombinant DNA technology. Use of improved yeasts and their impact on vinification. Principles and case study of molecular techniques for quantification of yeasts using DNA analysis.
Exam achievements:	Oral exam
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Post-harvest physiology of grapes and non-conventional operations in enology
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Manzano, Marisa (University of Udine)
Lecturers:	Tornielli, Giovanni Battista (University of Verona)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Enology – Module group: Biotechnology for enological techniques (University of Udine)
Teaching format:	Oral lessons
Workload:	100 hours
Credit points:	4
Requirements under the examination regulations:	-----
Recommended prerequisites:	none
Targeted learning outcomes:	The course is aimed to give an adequate knowledge about physical, biological and technological aspects of grape overmaturation as well as about peculiar aspects of winemaking from semi-dried grapes.
Content:	Possible application of physical, chemical and biotechnological – including non-conventional - processes to elaborate and stabilize these wines. Post-harvest physiology. Overmaturation and late harvest. Effect of <i>Botrytis cinerea</i> . Production of wine from semi-dried grapes. Conditioning the redox potential. Irradiation treatments: UV, IR, microwaves, γ rays, β rays, electromagnetic fields, ultrasound. High pressure, thermic non-conventional treatments. Chemical and biotechnological non-conventional treatments.
Exam achievements:	Oral Exam
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Stabilization techniques in enology
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Celotti, Emilio (University of Udine)
Lecturers:	Celotti, Emilio (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Enology Module group: Techniques of separation, stabilisation and packaging in enology (University of Udine)
Teaching format:	Oral lessons
Workload:	100
Credit points:	4
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	To enable the student to manage adequately the different stabilization techniques available in enology now and in the future.
Content:	<p>The clarification by flotation combined with the hyperoxidation and cross-flow filtration of the musts. Winemaking in protection from oxygen, use of antioxidants and technical gases. Techniques to preserve the aroma of wine.</p> <p>New oenological practices recently approved for the stabilization of wines. Systems for the study and management of the colloidal stability of wines. Rapid techniques for the control of chemical and physical stability of wines. Management of yeast derivatives and polysaccharides in wine. Conservative and additional techniques for the wine stabilization.</p> <p>Tartaric precipitation and techniques for tartaric stabilization of wine. Use of ultrasound in the winemaking industry. Stabilization of red wine colour by the management of oxygen in maceration and aging. Filterability index of wines and sterile filtration.</p> <p>Practical laboratory experiments on topics and technical visits at specialized external companies.</p>
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	

Update:	February 2012
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Module name	Conditioning and packaging in enology
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Celotti, Emilio (University of Udine)
Lecturers:	Comuzzo, Piergiorgio (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Enology – Module group: Techniques of separation, stabilisation and packaging in enology (University of Udine)
Teaching format:	Oral lessons
Workload:	
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	To enable the student to manage conditioning and packaging in enology, choice of materials, technical solutions with an appropriate price/quality approach.
Content:	Materials for conditioning and packaging wine: vessels, bottles, closures, glues, capsule, label, their characteristics and their effect on storage of wine. Criteria to manage packaging machines and bottling lines. Criteria to manage the main parameters relevant for storage of bottled wine.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Separation processes in enology
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Celotti, Emilio (University of Udine)
Lecturers:	Teaching task in the process of attribution
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Enology Module group: Techniques of separation, stabilisation and packaging in enology (University of Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The course is aimed to give knowledge about theoretical aspects of separation processes, as well as plant and technology aspects.
Content:	Research and development activity in separation processes as applied to enology. Filtration, clarification, membrane processes, treatments with resins and polymers. Dealcolation. Other processes of separation.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

**Specialisation: Research and development in Viticulture
(UDINE) (20 ECTS)**

	Credit points
Module group: Grapevine physiology 2	10
Topics in applied physiology	4
Topics in genomics	3
Cell physiology	3
Module group: Agronomical techniques and territory	10
Vineyard mechanization and quality	4
Fertilizers and grapevine nutrition	3
Soil and irrigation management	3

Module name	Topics in applied physiology
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Peterlunger, Enrico (University of Udine)
Lecturers:	Peterlunger, Enrico (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Viticulture Module group: Grapevine physiology 2 (University Udine)
Teaching format:	Oral lessons, also in connection with internet
Workload:	100 hours
Credit points:	4
Requirements under the examination regulations:	-----
Recommended prerequisites:	none
Targeted learning outcomes:	Objective of this module is giving to students tools and criteria to evaluate research activity in plant physiology applied to grapevine, analysing experimental data, published papers, graduation theses to take them to know critically the research activity in its development.
Content:	Contents are analysis of research papers about plant gas exchanges, plant-water relationship, annual energetic cycle, maturation processes, compounds relevant for grape and wine quality. Particular attention will be given to application of results to normal cultivation practices.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	Mullins M.G., Bouquet A., Williams L.E., 1992. Biology of the grapevine. Cambridge University Press. Skinkis P.A., Bordelon B.P., Butz E.M., 2010. Effects of sunlight exposure on berry and wine monoterpenes and sensory characteristics of Traminette. American Journal of Enology and Viticulture 61(2): 147-156 Poni S., Casalini L., Bernizzoni F., Civardi S., Intriери C., 2006. Effects of early defoliation on shoot photosynthesis, yield components, and grape composition. American Journal of Enology and Viticulture 57(4): 397-407. Bucchetti B., Matthews M.A., Falginella L., Peterlunger E., Castellarin S.D., 2011. Effect of water deficit on Merlot grape tannins and

	<p>anthocyanins across four seasons. <i>Scientia Horticulturae</i> 128: 297-305.</p> <p>Sivilotti P., Bonetto C., Paladin M., Peterlunger E., 2005. Effect of soil moisture availability on <i>Vitis vinifera</i> cv. Merlot: from leaf water potential to grape composition. <i>American Journal of Enology and Viticulture</i>, 56(1): 9-18.</p>
Update:	February 2012

Module name	Topics in genomics
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Peterlunger, Enrico (University of Udine)
Lecturers:	Di Gaspero, Gabriele (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Viticulture Module group: Grapevine physiology 2 (University Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	none
Targeted learning outcomes:	The module is aimed to provide students with tools and criteria to evaluate research activity in plant genomics as applied to grapevine. A critical analysis will be performed of experimental data, published papers, graduation theses to take them to know critically the research activity in its development.
Content:	Contents are analysis of genome evolution in the grapevine lineage, gene families involved in metabolic pathways controlling phenotypic traits, nucleotide diversity and structural variation among grapevine cultivars.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Cell physiology
Academic Year:	2 nd academic year at University of Udine)
Semester:	January - June
Module group coordinator:	Peterlunger, Enrico (University of Udine)
Lecturers:	Braidot, Enrico (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Viticulture Module group: Grapevine physiology 2 (University Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	This course is aiming at giving to students a description about risks linked to the alterations (imbalances) of the oxidative metabolism.
Content:	The physiological responses of grape plants will be analyzed, in relation to main environmental stresses causing the production of the reactive oxygen species (ROS). The effects of protecting factors limiting damages induced by oxidative alterations will be discussed; their action will be distinguished on the basis of preventive or curative activities. Furthermore widespread laboratory techniques useful to characterize and to quantify the amount of oxidative stresses in grapevine tissues and cells will be shown. In particular the attention will be focused on the detection of anti-oxidant metabolites and “scavenger” enzymes.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Vineyard mechanization and quality
Academic Year:	2 nd academic year at University of Udine)
Semester:	January - June
Module group coordinator:	Pergher, Gianfranco (University of Udine)
Lecturers:	Pergher, Gianfranco (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Viticulture Module group: Agronomical techniques and territory (University of Udine)
Teaching format:	Oral lessons
Workload:	100 hours
Credit points:	4
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The aim is to prepare the student to choose and manage the viticultural machinery of a winery, considering productivity, expected income, environmental impact and territory conservation, both in his own vineyard and as a consultant.
Content:	Planning, planting and managing a vineyard, considering training system, soil preparation, mechanization level, trellis materials. Criteria to choose and to dimension operating machines, with analysis of timing, working efficiency, cost. Case studies. Impact on production and on environment, in particular for soil management, fertilization and pesticide application.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Fertilizers and grapevine nutrition
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Pergher, Gianfranco (University of Udine)
Lecturers:	Contin, Marco (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Viticulture Module group: Agronomical techniques and territory (University of Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The course gives deep knowledge on the chemical and biochemical aspects of grapevine mineral nutrition, availability and uptake of macro- and micro- nutrients, The course will afford the basis for the interpretation of soil and plant analyses in order to know the nutritional conditions of soil and plants and to define the optimal fertilizer strategy.
Content:	The use of mineral and organic fertilizers and amendments in viticulture. Knowledge of Italian and European legislation related to production, commercialization and utilization of fertilizers. Trends of advanced scientific research in grapevine mineral and organic nutrition.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Soil and irrigation management
Academic Year:	2 nd academic year at University of Udine
Semester:	January - June
Module group coordinator:	Pergher, Gianfranco (University of Udine)
Lecturers:	Delle Vedove, Gemini (University of Udine)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Viticulture Module group: Agronomical techniques and territory (University Udine)
Teaching format:	Oral lessons
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The course provides advanced knowledge on key physical properties of soil (porosity, structure, thermal state and soil hydrology) and their related processes (thermal and water regimes) involving the soil-plant-atmosphere continuum.
Content:	Assess the effects on soil-plant relationship of the following agronomic techniques: soil tillage, grassing and irrigation management. It aims to provide basic skills in monitoring (sensors) and the use of prediction tools (models) for optimal management of productive and qualitative response of the vineyard.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Specialisation: Research and development in Wine Economics (VERONA) (20 ECTS)

Module	Credit points
Module group: Marketing and Communication of Wine	10
Advanced tools of marketing and communication	5
New tools of marketing of wine and related products	5
Module group: Winery management tools	10
Budget analysis and planning	5
Investments and real estate valuation of the wine sector	5

Module name	Advanced tools of marketing and communication
Academic Year:	2 nd academic year at University of Verona
Semester:	January - June
Module group coordinator:	Begalli, Diego (University of Verona)
Lecturers:	Rossato, Chiara and Castellani, Paola (University of Verona)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Wine Economics Module group: Marketing and Communication of Wine (University of Verona)
Teaching format:	Oral lessons
Workload:	125 hours
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	Analyse the relationship between enterprise and the market. Introduction to new marketing approaches. To develop skills in communication and marketing in digital, multimedia and interactive environment.
Content:	Evolution of enterprise orientation. Relationship between marketing and enterprise strategies. Ethics, social responsibility of enterprise and marketing. Marketing survey. Consumer's behaviour. Market segmentation. Development and launching of new products. Management of products and brands. Service management. Price definition strategies. Retail distribution. Communication, advertising, sale promotion and public relations. Non-conventional marketing approaches and web-marketing.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	New tools of marketing of wine and related products
Academic Year:	2 nd academic year at University of Verona
Semester:	January - June
Module group coordinator:	Begalli, Diego (University of Verona)
Lecturers:	Begalli, Diego (University of Verona)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Wine Economics Module group: Marketing and Communication of Wine (University of Verona)
Teaching format:	Oral lessons
Workload:	125 hours
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The objective is to give to the student specific elements of wine marketing, to deepen the new approaches of analysis, examine the strategies and innovative marketing policies in Old and New World countries.
Content:	Methods to analyse wine demand, differentiation strategies and territory identity, strategies and commercial policies on national and international market, typical local systems and tools to valorise productions, territory marketing, case study.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name	Budget analysis and planning
Academic Year:	2 nd academic year at University of Verona
Semester:	January - June
Module group coordinator:	Begalli, Diego (University of Verona)
Lecturers:	Cantele, Silvia (University of Verona)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Wine Economics – Module group: Winery management tools (University Verona)
Teaching format:	Oral lessons
Workload:	125 hours
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The module is aimed to introduce the annual economic budget and annual planning for a winery.
Content:	“Objective function” of enterprise. Management: life phases, cycle, different aspects of management. Economic and financial structure of enterprise: income, capital, financial need and covering. Enterprise equilibrium. Annual budget. Tools for planning and checking.
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Module name:	Investments and real estate valuation of the wine sector
Sub-heading:	
Abbreviation:	
Academic Year:	2 nd academic year at University of Verona
Semester:	January - June
Module group coordinator:	Begalli, Diego (University of Verona)
Lecturers:	Begalli, Diego (University of Verona)
Language:	Italian/English
Classification within the curriculum:	Module of specialization Research and Development in Wine Economics – Module group: Winery management tools (University Verona)
Teaching format:	Oral lessons
Workload:	125 hours
Credit points:	5
Requirements under the examination regulations:	-----
Recommended prerequisites:	
Targeted learning outcomes:	The aim of the module is to examine the estimation of value as related to investments, real estate valuation and rights, at present more relevant for wineries.
Content:	Methods of assessment of property, income, financial, mixed and goodwill to evaluate a winery. Methods of assessment of land tenure improvement and investments in viticulture and enology. Real estate valuation, land annuity. Land rights. Succession and donation. Valuation for succession and donation taxes. .
Exam achievements:	Oral examination
Forms of media:	Power point and blackboard
Literature:	
Update:	February 2012

Optional Modules

Modules covering 10 ECTS have to be chosen from other programmes of the University of Udine (in case of the specialisations “Research and development in Enology” or “Research and development in Viticulture”) or of the University of Verona (in case of the specialisation Research and Development in “Wine Economics”)

Module name	Language Training – Italian as a foreign language at Udine-Padova-Verona
Academic Year:	2011-2012
Module coordinator:	Sbrizzai Elena (University of Udine)
Supervisors:	Sbrizzai Elena (University of Udine)
Language:	Italian
Classification within the curriculum:	Core module
Teaching format:	Oral lessons, written exercises, conversation
Workload:	75 hours
Credit points:	3
Requirements under the examination regulations:	No requirement
Recommended prerequisites:	Italian level A2
Targeted learning outcomes:	Can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. Can deal with most situations likely to arise whilst travelling in an area where the language is spoken. Can produce simple connected text on topics which are familiar or of personal interest. Can describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.
Content:	Elements of Italian grammar, structure of the sentence, dictionary. Conversation practice.
Exam achievements:	Getting positive result in written and oral tests
Forms of media:	Newspapers, internet, video, photography, .ppt presentations
Literature:	Various Authors „Rete! 1“, Italian course for foreigners
Update:	Feb 2012

Module name	Master Thesis at the Consortium among the universities of Udine, Padova, Verona
Academic Year:	2 nd academic year at Udine (Viticulture, Enology) or Verona (Wine economy)
Module coordinator:	General coordinator of EmaVE activities for UD-PD-VR prof. Enrico Peterlunger, and dr. Sabrina Di Santolo (Dean's office, Faculty of agriculture, University of Udine) for students' academic help
Supervisors:	Academic staff of Faculty of Agriculture - University of Udine, Faculty of Economics - University of Verona, Faculty of Agriculture – University of Padova, and academic staff members of the EMaVE Consortium and associated partners
Language:	English
Classification within the curriculum:	Core module
Teaching format:	The Thesis consists of the elaboration of a written report about an independent scientific work of the student and a defense.
Workload:	22 weeks for the elaboration of the thesis; plus adequate time (at least 2 weeks) for personal preparation for the defence
Credit points:	28
Requirements under the examination regulations:	Admission to the <u>thesis</u> is granted, if the student has <ul style="list-style-type: none"> – successfully completed the modules of the first academic year Admission to the <u>defence</u> is granted under the condition that: <ul style="list-style-type: none"> – the tutor's evaluation of the thesis is positive – the student has completed all other compulsory modules of the second academic year successfully and obtained at least 120 ECTS (including the ECTS allocated to the Master Thesis)
Recommended prerequisites:	---
Targeted learning outcomes:	The student is <ul style="list-style-type: none"> – able to carry out scientific research independently in a given time implementing adequate scientific methods – able to present his/her results to a jury and answers questions related to the field of research.
Content:	Thesis document
Exam achievements:	Delivery of a written thesis report at the submission date. Thesis defence in front of an examination jury of at least 3 academic members.
Forms of media:	Research methods depending on the topic of the thesis. Written report; presentation media for the defence

Literature:	Books and scientific papers related to the topic of the thesis
Update:	February 2012

Module name:	Vineyard and / or Winery Internship at Udine-Padova-Verona
Academic Year:	2 nd academic year
Semester:	during Vinifera EuroMaster degree programme, 2 nd academic year – internship can be done before or after the lessons which take place in January-June of each year
Module coordinator:	Master thesis tutor
Lecturers:	-----
Language:	Italian/English
Classification within the curriculum:	All specializations
Teaching format:	Internship
Workload:	200 h
Credit points:	8 (included in thesis ECTS)
Requirements under the examination regulations:	None
Recommended prerequisites:	None
Targeted learning outcomes:	Internship linked to the Master thesis
Content:	Internship in winery is intended to allow the student having a direct experience about grapevine cultivation, grape production, harvest, wine making, wine stabilization. The student participates to the different operations working manually but also being part of the decisional processes, verifying the criteria of decision in relation to the type of wine to be produced. The internship activity can be part of the thesis activity and the credits are included in thesis credits. Internship can be done in small wineries as well as great wineries, and more than one internship may be done, in the region Friuli Venezia Giulia, in other Italian regions, in Europe or overseas.
Exam achievements:	None
Forms of media:	-----
Literature:	-----
Update:	February 2012

**Modules offered by
Hochschule RheinMain
University of Applied Sciences
(Faculty of Geisenheim)
and
Geisenheim Research Center**



Hochschule **RheinMain**
University of Applied Sciences
Wiesbaden Rüsselsheim Geisenheim



Core Modules

Module	ECTS points
Advanced Enology	6
Advanced Viticulture	6
Product- and Project Management in Wine Business (Advanced Wine Business)	6
Research Project	12
Total:	30

Module Name	Advanced Enology (Technology and Microbiology in Enology)
Academic Year:	2 nd academic year in Geisenheim
Semester:	3 rd semester
Module coordinator:	Monika Christmann, Prof. Dr. (Hochschule RheinMain & Geisenheim Research Center)
Lecturer:	Monika Christmann, Prof. Dr. (Hochschule RheinMain & Geisenheim Research Center); Manfred Großmann, Prof. Dr. (Hochschule RheinMain & Geisenheim Research Center); Doris Rauhut, Prof. Dr. (Hochschule RheinMain & Geisenheim Research Center); Rainer Jung, Prof. Dr. (Geisenheim Research Center); von Wallbrunn, Christian Dr. (Geisenheim Research Center)
Language:	English
Classification within the curriculum:	Module of specialisation
Teaching format / class hours per week during the semester:	Lecture and seminar: 4 hours / per week during the semester
Workload:	60 hours face to face teaching and seminar; 120 hours independent studies and group work = 180 hours
Credit points:	6
Requirements under the examination regulations:	-----
Recommended prerequisites:	-----
Targeted learning outcomes:	Students know about the ongoing research activities in winemaking, enology and microbiology and their implementation in small, medium and large scale wine production
Content:	Current research topics in Enology; Wine making technology; Microbiology
Study / exam achievements:	Presentation and written examination
Forms of media:	Power point presentations, hand-outs
Literature:	References relevant publications will be given at begin of the course
Update:	February 2012

Module name	Advanced Viticulture
Academic Year:	2 nd academic year at Geisenheim
Semester:	3 rd semester
Module coordinator:	Manfred Stoll, Dr. (Geisenheim Research Center)
Lecturer:	Randolf Kauer, Prof. Dr. (Hochschule RheinMain); Dipl. Biologe Oliver Bitz, Dipl. Biol. (Geisenheim Research Center); Elvira Bleser, Dr. (Geisenheim Research Center); Joachim Schmid, Dr. (Geisenheim Research Center); Peter Böhm, Dr. (Geisenheim Research Center); Anette Reineke, Prof. Dr. (Hochschule RheinMain & Geisenheim Research Center); Bernd Gruber, Dipl. Oen. (Geisenheim Research Center)
Language:	English
Classification within the curriculum:	Module of Specialisation
Teaching format / class hours per week during the semester:	Lectures: 4 hours / per week during the semester
Workload:	60 hours face to face teaching; 120 hours independent studies = 180 hours
Credit points:	6
Requirements under the examination regulations:	-----
Recommended prerequisites:	-----
Targeted learning outcomes:	Students know about the actual research topics in viticulture, soil science and pest control in grape production
Content:	Actual research topics in viticulture, soil science and pest control in grape production
Study / exam achievements:	Written examination
Forms of media:	Power point, laboratory and field work
Literature:	References relevant publications will be given at begin of the course
Update:	February 2012

Module name	Product and Project Management in Wine Business Strategic Planning of Product- and Project Development (Advanced Wine Bussiness)
Academic Year:	2 nd academic year at Geisenheim
Semester:	3 rd semestere
Module coordinator:	Robert Göbel, Prof. Dr. (Hochschule RheinMain)
Lecturer:	Robert Göbel, Prof. Dr (Hochschule RheinMain) & guest lecturers
Language:	English
Classification within the curriculum:	Module of Specialisation
Teaching format / class hours per week during the semester:	Lectures: 2 hours / per week during the semester Seminar: 2 hours / per week during the semester
Workload:	30 hours face to face teaching; 30 hours seminary work; 120 hours independent studies and team work = 180 hours
Credit points:	6
Requirements under the examination regulations:	-----
Recommended prerequisites:	-----
Targeted learning outcomes:	<ul style="list-style-type: none"> – Students know methods of strategic management – They are able to analyse firm and environmental conditions – They are able to implement a production planning system – They are able to organize projects in the wine business – They learn to develop marketing concepts – They are able to work with management information systems
Content:	<p>Theoretical Basis:</p> <p>Methods of strategic management, analysis of firm and environment, production planning, product development, product design, methods of marketing management, management information systems, marketing and communication concepts, consumer behavior and target group analysis</p> <p>Project:</p> <p>Competition teams develop and design a wine product, based on a CI- and communication concept</p>
Study / exam achievements:	Accompanying presentations, to show stages of development; Final presentation of a product and a written communication concept,

	developed within two competition groups
Forms of media:	Power point; black and white board; product samples; printed concepts
Literature:	Literatur research is part of course; References relevant publications will be given at begin of the course
Update:	November 2011

Module name:	Research Project
Academic Year:	2 nd academic year at Geisenheim
Semester:	3 rd semester
Module coordinator:	Dr. Manfred Stoll (Geisenheim Research Center)
Lecturer:	Academic staff of Hochschule RheinMain & Geisenheim Research Center
Language:	English
Classification within the curriculum:	Module of Specialisation
Teaching format / class hours per week during the semester:	Face to face and presentations en bloc at the beginning and end of the semester. Research under supervision continuously
Workload:	8 hours face to face; 12 hours presentation of interim and final results, 300 hours research under supervision and independent study, 40 hours preparation of interim und final reports
Credit points:	12
Requirements under the examination regulations:	-----
Recommended prerequisites:	-----
Targeted learning outcomes:	Students know about research strategies and methods and are able to apply them to practical research
Content:	Introduction to the library and literature research, research strategies; research methods; processing research data; statistics (involvement in laboratory)
Study / exam achievements:	Presentation and written report
Forms of media:	Power point and laboratory equipment (depending on the project), field visits
Literature:	The literature research is part of the research project
Update:	February 2012

Module name:	Master Thesis at Hochschule RheinMain and Geisenheim Research Center
Academic Year:	2 nd academic year at Geisenheim
Module coordinator:	General Coordination by Dr. Manfred Stoll (Geisenheim Research Center and Dipl.-Ing. agr. Sonja Thielemann (Hochschule RheinMain)
Supervisors:	Academic staff of Hochschule RheinMain & Geisenheim Research Center and academic staff members of the EMaVE Consortium and associated partners
Language:	English
Classification within the curriculum:	Core module
Teaching format:	The Thesis consists of the elaboration of a written report about an independent scientific work of the student and a defence.
Workload:	24 weeks for the elaboration of the thesis; plus adequate time (at least 2 weeks) for personal preparation for the defence
Credit points:	30 ECTS
Requirements under the examination regulations:	<p>Admission to the <u>thesis</u> is granted if the student has</p> <ul style="list-style-type: none"> – successfully completed the modules of the first academic year – attended an internship of at least 8 weeks, proved by a respective certificate <p>Admission to the <u>defence</u> is granted under the condition that:</p> <ul style="list-style-type: none"> – the written report was evaluated at least with the grade “E - pass” – the student has completed all other compulsory modules of the second academic year successfully and obtained at least 120 ECTS (including the ECTS allocated to the Master Thesis)
Recommended prerequisites:	----
Targeted learning outcomes:	<p>The student is</p> <ul style="list-style-type: none"> – able to carry out scientific research independently in a given time implementing adequate scientific methods – able to present his/her results to a jury and answers questions related to the field of research.
Content:	Thesis document
Exam achievements:	<p>Delivery of a written thesis report at the submission date. The written report has to be prepared under consideration of the formal requirements of the Hochschule RheinMain .</p> <p>Thesis defence in front of an examination jury of at least 3 academic members.</p>
Forms of media:	<p>Research methods depending on the topic of the thesis.</p> <p>Written report; presentation media for the defence</p>

Literature:	Books and scientific papers related to the topic of the thesis
Update:	February 2012

Additional Language Module offer

The credit points are not counted for the completion of the Master degree programme.

Module	ECTS points
Deutsch als Fremdsprache	2

Module name:	Deutsch als Fremdsprache
Academic Year:	2 nd academic year in Geisenheim
Semester:	3 rd semester
Module coordinator:	Anne Nussbaum (Sprachenzentrum / Language Center)
Lecturer:	Free lance lecturers
Language:	German
Classification within the curriculum:	Additional Module
Teaching format / class hours per week during the semester:	Lectures (interactive teaching): 2 hours / per week during the semester
Workload:	30 hours interactive teaching; 30 hours independent studies
Credit points:	2
Requirements under the examination regulations:	-----
Recommended prerequisites:	-----
Targeted learning outcomes:	Depending on the entrance level: The level of the course will be defined at the beginning of the course depending on students' previous knowledge
Content:	Topics of daily live Special topics from Viticulture, Enology and Wine Business
Study / exam achievements:	Written examination and active participation
Forms of media:	Black board, Overhead; photo copies, exercise sheets
Literature:	-----
Update:	February 2012

**Modules offered by
Universidade Técnica de Lisboa
&
Universidade do Porto**



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**Instituto Superior de Agronomia
Universidade Técnica de Lisboa**

Core Modules

Module	ECTS points
Advanced Viticulture	6
Stabilisation and Wine Aging	6
Winery Training and Study Visit	3

Module name:	Advanced Viticulture
Academic Year:	2 nd academic year at Universidade Técnica de Lisboa
Semester:	3 rd semester
Module coordinator:	Carlos Lopes (ISA)
Lecturer:	Carlos Lopes (coordinator), Francisco Abreu, Manuela Chaves, Pedro Aguiar Pinto, Ricardo Ferreira, Sara Amâncio, Sofia Pereira, Eiras Dias (INRB) & Ricardo Braga (ESAE).
Language:	Portuguese/English
Classification within the curriculum:	Module of Specialization (compulsory module)
Teaching format / class hours per week during the semester:	7h/week during 10 weeks Lectures and Seminars: 70 h
Workload:	Total work load: 168 h
Credit points:	6
Requirements under the examination regulations:	-----
Recommended prerequisites:	Vine Physiology Vineyard Management
Targeted learning outcomes:	To complete the background in Viticulture by improving the knowledge in specialized areas like vineyard mechanization, yield forecast and precision viticulture. In addition, a perspective of the state of the art in current relevant topics such as sustainable viticulture, the impacts of climate change on viticulture and applications of biotechnology in the grape and wine industry, will be given through talks presented by several invited researchers.
Content:	<ol style="list-style-type: none"> 1. Sustainable Viticulture 2. Vineyard mechanization 3. Implications of climate change for viticulture and wine production 4. Crop development and yield forecast. 5. Precision Viticulture 6. Grapevine Biotechnology
Study / exam achievements:	Evaluation by a written report based on a literature review of a given topic (1/3) and by a final examination (2/3).
Forms of media:	Power point, black board, scientific and technological articles data base
Literature:	For each topic recent relevant publications will be provided at the beginning of the course
Update	February 2012

Module name:	Stabilisation and Wine Aging
Academic Year:	2 nd academic year at Universidade Técnica de Lisboa
Semester:	3 rd semester
Module coordinator:	Olga Laureano, Coord. Res. (Universidade Técnica de Lisboa)
Lecturer:	Olga Laureano, Corod. Res (Universidade Técnica de Lisboa). & guest Prof Helena Pereira and Fernando Gonçalves, PhD.
Language:	English
Classification within the curriculum:	Module of Specialisation (compulsary module)
Teaching format / class hours per week during the semester:	6h / week during 14 weeks Lectures: 28 h Laboratory directed work: 42 h Tutorial: 14 h
Workload:	168 h
Credit points:	6
Requirements under the examination regulations:	-----
Recommended prerequisites:	Wine analyses and wine making modules
Targeted learning outcomes:	<ul style="list-style-type: none"> – Students understand the different phenomena which take place during the storing and stabilization of wines. – They know how to develop judgement abilities on wine treatments, according to the type of wine intended. – They know how to promote team work and critical analysis skills.
Content:	<ol style="list-style-type: none"> 1. Wines, quality and quality control: quality characteristics (legal and commercial specifications); types of Portuguese wines; quality management; Hazard critical points of control.in wine industry (HACCP) 2. Physiochemical characterization of wines 3. Evolution and physiochemical modification of wines: colloidal phenomenon and main mechanisms involved; colouring matter composition and influence of the winemaking technology; evolution of the phenolic compounds during wine ageing (influence of pH, oxygen, dioxide of sulphur and temperature); characteristics and evolution of aroma compounds; wine aging in barrels. 4. Wines stabilization: metallic, protein and tartaric precipitations; stabilization processes; other treatments; stability tests. 5. Clarification of wines: fining agents, fining mechanisms; filtration – mechanisms of filtration; products used in filtration, types of filters. 6. Other oenological practices: international code of oenological practices. of OIV

	7. Membrane separation processes in oenology 8. Cork and corks for wine industry.
Study / exam achievements:	Assessment based on a written exam and on the discussion of a report concerning the characterization, evolution and treatments of a wine, attributed to the responsibility_of a group of three students, in the beginning of the classes' period.
Forms of media:	Power point, black board, scientific and technological articles data base
Literature:	<p><u>Main Bibliography</u></p> <p>AMERINE, M.A. E JOSLYN, M.A. (1970) - <i>Table Wines. The technology of their production.</i> U Calif Press, Berkeley</p> <p>Curvelo-Garcia, A.S. (1989) - <i>Controlo de Qualidade dos Vinhos.. I V V</i>, Lisboa.</p> <p>FLANZY,C (1998)-<i>Oenologie, fondements scientifiques et technologiques.</i> Tec & Doc, Londres, NY, Paris .</p> <p>O.I.V. (2011) - <i>Recueil des méthodes internationales d'analyse des vins et des moûts.</i> O.I.V., Paris.</p> <p>O I V (2011) - <i>Code International des Pratiques enologiques.</i> O.I.V.,Paris</p> <p>RIBEREAU-GAYON, P.; GLORIES, Y.; MAUJEAN, A.; DUBOURDIEU, D. (1998) - <i>Traité d'Oenologie. 2. Chimie du Vin, Stabilisation et Traitements</i>, Dunod, Paris.</p> <p><u>Other Bibliography</u></p> <p>BRAGA, A.; COSME, F.; RICARDO-DA-SILVA , J. M. and LAUREANO, O. (2007) - Gelatine, casein, and potassium caseinate as distinct wine fining agents: <i>J. Int. Sci. Vigne Vin</i>, 41 (4):203-214.</p> <p>COSME, F.; RICARDO-DA-SILVA, J.M.; LAUREANO, O. (2008) – Interactions between protein fining agents and proanthocyanidins in white wine. <i>Food Chemistry</i>, 106 (2): 536-544.</p> <p>DALLAS, C. E LAUREANO, O. (1994) - Effects of pH, sulfur dioxide, alcohol content, temperature and storage time on the colour composition on a young Portuguese red wine. <i>J.Sci.Food Agric.</i>, 65: 477-484.</p> <p>DALLAS, C.; RICARDO-DA-SILVA, J.M. E LAUREANO, O. (1994) - Degradation of oligomeric procyanidins and anthocyanidins in a Tinta Roriz red wine during maturation. <i>Vitis</i>, 34(1): 51-56.</p> <p>JORDÃO, A.M.; RICARDO-DA-SILVA, J.M.; LAUREANO, O. (2006) – Effect of Oak Constituents and Oxygen on the Evolution of Malvidin-3-Glucoside and (+)-Catechin in Model Wine. <i>Am. J. Enol. Vitic.</i> 57(3) : 377-381</p>
Update	February 2012

Module name:	Winery Training and Study Visit
Academic Year:	2 nd academic year at Universidade Técnica de Lisboa
Semester:	3 rd semester
Module coordinator:	Jorge M. Ricardo da Silva (Universidade Técnica de Lisboa)
Lecturer:	Jorge M. Ricardo-da-Silva, Prof. Ph.D (Universidade Técnica de Lisboa) Manuel Malfeito Ferreira, Prof. Ph.D (Universidade Técnica de Lisboa); Jorge Queiroz, Prof. Ph.D (Universidade de Porto)
Language:	Portuguese/English
Classification within the curriculum:	Module of Specialisation -
Teaching format / class hours per week during the semester:	August – September (compulsory module). The students should spend at least one month in a winery during harvest time.
Workload:	84 h
Credit points:	3,0 ECTS
Requirements under the examination regulations:	-----
Recommended prerequisites:	Vinification, Viticulture, Wine Microbiology modules
Targeted learning outcomes:	<ul style="list-style-type: none"> – Contact of the students with the practical of wine company, during harvest and vinification. – Participation of the students during grape maturation controls until the end of the fermentations/1st racking of the wines. – Study visits to vineyards and wineries of the main Portuguese wine regions.
Content:	<p>Grape maturation survey; Harvest decision; Definition of a concept related to the production of a certain wine style; Hygiene of the winery and equipment preparation; Corrections and pre-fermentative operations; Choice of the grapes, crushing, destemming; draining, pressing, Clarification of white and rose musts; Fermentative process; yeast application; maceration/remontage, Fermentation temperature control; Decision about malolactic fermentation; draining and pomace out from the tanks. Wine survey until the end of fermentations; racking. Yields, costs and by-products</p> <p>Integrated study visit of the vineyards and wineries of the main Portuguese wine regions.</p>
Study / exam achievements:	<p>Report of the training period in a winery with an oral presentation and discussion.</p> <p>Report of the study visit.</p>
Forms of media:	Power point
Literature:	Various

Update	February 2012
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Elective Modules – one module has to be chosen

Module	ECTS points
Grape and Wine Derived Products and By-Products	(3)
Steep Slope Viticulture	(3)
Fortified Wines	(3)
Total	3

Module name:	Grape and Wine Derived Products and By-Products
Academic Year:	2 nd academic year at Universidade Técnica de Lisboa
Semester:	3 rd semester
Module coordinator:	Jorge M. Ricardo-da-Silva, Prof. Ph.D (Universidade Técnica de Lisboa)
Lecturer:	Jorge M. Ricardo-da-Silva, Prof. Ph.D (Universidade Técnica de Lisboa), Isabel Sousa, Prof. Ph.D (Universidade Técnica de Lisboa) & guests [A. Pedro Belchior, Isabel Spranger, Ilda Caldeira, Sara Canas, Baoshan Sun (Ph.D all from INRB-EVN), Ana M ^a Teixeira (private company)]
Language:	Portuguese/English
Classification within the curriculum:	Module of Specialisation (elective module)
Teaching format / class hours per week during the semester:	3,5h/week during 10 weeks Lectures: 21 h Laboratory directed work: 14 h Tutorial: 7 h
Workload:	84 h
Credit points:	3,0 ECTS
Requirements under the examination regulations:	-----
Recommended prerequisites:	Vinification, Composition and Physico-Chemical and Sensory Control of wines
Targeted learning outcomes:	Knowledge and characterization on the grape and wine alternative products and by-products, in order to obtain a valorization, in parallel to the main products of the sector: Grapes and wines.
Content:	<p>Short historical description of the grape and wine alternative products and by-products. Actual interest. Grape alternative products: juices, production diagram and equipment. Raisins, production diagram and equipment. Polysaccharides gelification: processes and products. Jams, production diagram and equipment, particular case of “uvada”. Jellies, production diagram and equipment, particular case of hypocaloric jellies.</p> <p>Liquors, production diagram and equipment. Concentrated must: economic importance and production, equipment and rectification. Other grape alternative products.</p> <p>Wine derived products: brandies, types, distillation and alembics, aging technology, the barrels- chemical composition, botanical and geographical origin of the wood, cooperage. Vinegars: types, production technology, fermentation systems, fining. Other wine derived (alternative) products. By-products valorization: stems, marcs, seeds, lees, tartar, distillation residues. Biological, nutraceutical, and</p>

	pharmacological aspects of the vine products: nutraceutical products, main responsible constituents.
Study / exam achievements:	final written examination
Forms of media:	Power point, black board, scientific and technological articles data base
Literature:	<p>LARANJEIRA, C. (1998) – Introdução monográfica à indústria vinagreira. Aproveitamento de vinhaços de aguardentes vnicas em acetificação: um valor de opção para a indústria vinagreira. Tese de Mestrado em Ciência e Tecnologia de Alimentos, Instituto Superior de Agronomia, UTL.</p> <p>CALDEIRA, I. (1995) – Uvada – recuperação de um doce tradicional de uva e maçã. Tese de Mestrado em Viticultura e Enologia, Instituto Superior de Agronomia, UTL.</p> <p>CALDEIRA, I. (2004) – O aroma de aguardentes vnicas envelhecidas em madeira. Tese de Doutoramento em Engenharia Agro-Industrial, Instituto Superior de Agronomia, UTL.</p> <p>CANAS, S. (2003) – Estudo dos compostos extraíveis de madeira (Carvalho e Castanheiro) e dos processos de extracção na perspectiva do envelhecimento em Enologia. Tese de Doutoramento em Engenharia Agro-Industrial, Instituto Superior de Agronomia, UTL.</p> <p>CANTAGREL, R. (1993) – Elaboration et Connaissance des Spiritueux (1º Simpósio Científico Internacional do Congresso), Tec. & Doc. Lavoisier, Paris.</p> <p>CHATONNET, P. (1995) – Influence des procédés de tonnellerie et des conditions d'élevage sur la composition et la qualité des vins élevés en fûts de chêne. Thèse Doctorat, Université de Bordeaux II</p>
Update	February 2012

Module name:	Steep Slope Viticulture
Academic Year:	2 nd academic year at Universidade Técnica de Lisboa
Semester:	3 rd semester
Module coordinator:	Jorge Queiroz Prof. Ph.D (Universidade de Porto)
Lecturer:	Carlos Lopes Prof. Ph.D (Universidade Técnica de Lisboa)
Language:	English
Classification within the curriculum:	Module of Specialisation (elective module)
Teaching format / class hours per week during the semester:	3h/week during 14 weeks Lectures and practical: 35 h Tutorial: 7 h
Workload:	84 h
Credit points:	3
Requirements under the examination regulations:	-----
Recommended prerequisites:	Vineyard Management
Targeted learning outcomes:	<ul style="list-style-type: none"> – Students know the main regions of mountain grape growing of the world. – They understand the specificities of training systems and installation of the vine in Mountain Grape growing. – They understand the measures to take in order to reduce erosion in Mountain Grape growing and alternative forms of soil maintenance.
Content:	<p>I. Main regions of Mountain Viticulture in the winegrowing world.</p> <p>II. Hillside systematization for vine planting in Mountain Viticulture.</p> <p>III. Specific training systems in Mountain Viticulture.</p> <p>IV. Control of erosion and soil maintenance.</p>
Study / exam achievements:	Evaluation in a final written examination
Forms of media:	Power point, black board, scientific and technological articles data base
Literature:	<p>Main Bibliography:</p> <p>J. Queiroz; M. Cunha; A. Magalhães; D. Guimaraens; M. Sousa; L. Borges; R. Castro (2009). “Mountain viticulture and new training systems in narrow terraces - Douro region”. 16th International GiESCO Symposium, 2009, 487-492 – University of Califórnia, Davis, USA.</p> <p>Jorge Queiroz; Mário Cunha; António Fonseca, Mafalda Machado, Mário Sousa, Luísa Borges, Rogério Castro, António Magalhães and David Guimaraens (2010). VINE SPACING IN STEEP SLOPE VITICULTURE: NARROW TERRACES, DOURO REGION. VITICULTURE EN FORT PENTE ET DENSITÉ DE PLANTATION:</p>

	<p>BANQUETTES ÉTROITES, RÉGION DE DOURO. CERVIM, Troisième Congrès International Viticulture de Montagne et/ou En Forte Pente, Castiglione di Sicilia, Catania, Itália.</p> <p>and other selected internet sites and journal articles and conference proceedings.</p>
Update	February 2012

Module name:	Fortified Wines
Sub-heading, if applicable:	----
Abbreviation, if applicable:	----
Academic Year:	2 nd academic year at Universidade Técnica de Lisboa
Semester:	3 rd semester
Module coordinator:	Jorge M. Ricardo-da-Silva, Prof. Ph.D (Universidade Técnica de Lisboa)
Lecturer:	Jorge Queiroz Prof. Ph.D (Universidade de Porto), Jorge M. Ricardo-da-Silva, Prof. Ph.D (Universidade Técnica de Lisboa)
Language:	Portuguese and English
Classification within the curriculum:	Module of Specialisation (elective module)
Teaching format / class hours per week during the semester:	3,5h/week during 10 weeks Lectures and practical: 35 h Tutorial: 7 h
Workload:	84 h
Credit points:	3,0 ECTS
Requirements under the examination regulations:	-----
Recommended prerequisites:	Vinification, Vineyard Management
Targeted learning outcomes:	Knowledge of the distinct steps from grape maturation to the ageing of the wine, in fortified winemaking conditions. The different fortified wines of the world.
Content:	Grape maturation survey; Harvest decision in order to obtain a fortified wine. Corrections and pre-fermentative operations; Fermentative process; yeast application; maceration/remontage, Fermentation temperature control; Decision about brandy addition; draining and pomace out from the tanks Wine survey during storage, maturation and ageing. The fortified wines from Portugal with special emphasis in Port Wine. The fortified wines around the world. Study visit at two fortified wine companies.
Study / exam achievements:	Evaluation in a final written examination
Forms of media:	Power point, black board, scientific and technological articles data base

Literature:	Main bibliography: Selected internet sites, journal articles and conference proceedings.
Update	February 2012

Module name:	Master Thesis at the University of Lisboa
Academic Year:	2 nd academic year at Lisboa
Module coordinator:	General coordination by the Master Course Committee
Supervisors:	Academic staff of the University of Lisboa and academic staff members of the EMaVE Consortium and associated partners
Language:	English or Portuguese
Classification within the curriculum:	Core module
Teaching format:	The dissertation will be an individual manuscript and is subjected to public examination, which includes an oral presentation
Workload:	1176
Credit points:	42
Requirements under the examination regulations:	<p>The dissertation should be submitted after approval in all mandatory and elective courses required, up to 3 months after the last day of classes in the academic year in which the student is enrolled.</p> <p>The examination jury shall issue a previous judgment within 30 days in which is declared the acceptance of the dissertation as it is presented or if it needs revision. In the latter case indicating to the candidate the changes to be made.</p> <p>a) The candidate has 45 days to submit a new version of the dissertation with the amendments made; b) Alternatively make a statement to say that dispenses make those changes</p>
Recommended prerequisites:	To enrol in the dissertation the student must have completed at least 48 ECTS of the Master course programme
Targeted learning outcomes:	The dissertation must reflect the candidate ability to participate in responsibilities of conception, planning, research and development.
Content:	<p>The work to be carried out for the preparation of the dissertation may take one of the following ways:</p> <p>a) A stage of professional nature, with experiment. b) A stage in research activities. c) A project work.</p> <p>1. When the dissertation is the culmination of a stage of professional nature, it should include:</p> <p>a) A brief description of activities undertaken during the stage and should be well reflected the degree of student involvement in them; b) A literature review on the specific topic, based on research in key scientific and technical publications in the area of the last 5 years; c) A discussion of the scientific activity developed that supports the relevant topic.</p> <p>2. If the dissertation is the end result of a stage in research activities, in addition to the points mentioned in a) and b) above, it should also include</p>

	<p>a description of the materials and methods, the presentation and discussion of results obtained, the conclusions reached and a list of literature cited.</p> <p>3. If the dissertation takes the form of project work, it should reflect the critical analysis of information collected and the experiences from stages in companies, factories or farms. It should include an analysis of the market / area in which it occurs and a detailed description of objectives, required resources and the organizational structure of the unit's production scheme that proposes to build. It should also contain a brief economic study to demonstrate the feasibility of this unit.</p>
Exam achievements:	<p>The MSc dissertation is an individual practice-oriented research project within the specific scientific areas of the Master Course. It should consist of original work, deepening on the knowledge previously acquired by students throughout the course and must reflect their ability to participate in the design, planning, research and development.</p> <p><i>Detailed expected achievements and assessment criteria in annex</i></p>
Forms of media:	Presentation media for defence
Literature:	<p>Books</p> <p>Scientific papers mainly from the databases</p> <p>http://apps.webofknowledge.com/WOS_GeneralSearch_input.do?product=WOS&search_mode=GeneralSearch&SID=W2lelkC@oAEhCme84Ep&preferencesSaved=</p>
Update:	February 2012

MODULES offered by Universidad Politécnica de Madrid



Core Modules

Module	ECTS points
Microbiological and Physicochemical Stabilization of Wines from Dry Regions	6
Training Design and Practices for Viticulture in Dry Regions	5
Wine Technology in Wines from Dry Mediterranean Regions	4
Viticulture in Dry Mediterranean Regions/Spanish Grape cultivars	4
Marketing and Diffusion in Spanish Wine Sector	6
Vine pests and diseases in dry regions	3
Study Trip – Spanish Wines	2
Total	30

Module name:	Microbiological and Physicochemical Stabilization of Wines from Dry Regions
Academic Year:	2 nd academic year at Universidad Politécnica de Madrid
Semester:	3 rd semester
Module coordinator:	José Antonio Suárez Lepe, Prof. Ph.D (Universidad Politécnica de Madrid)
Lecturer:	José Antonio Suárez Lepe, Prof. Ph.D; Carmen González Chamorro , Prof. Ph.D; Pedro Tienda Priego, Prof. Ph.D; Jose Barcenilla Moraleda, Dr.; Antonio Morata Barrado Prof. Ph.D (Universidad Politécnica de Madrid)
Language:	Spanish
Classification within the curriculum:	Module of Specialisation at <i>Universidad Politécnica de Madrid</i>
Teaching format / class hours per week during the semester:	5 hours per week
Workload:	face-to-face teaching: 2 hours x 15 weeks = 30 hours laboratory: 3 hours x 15 weeks = 45 hours independent study: 5 hours. X 15 weeks = 75 hours Preparation for examination and examination = 60 hours Total 180 hours
Credit points:	6
Requirements under the examination regulations:	----
Recommended prerequisites:	Wine Microbiology Grape and Wine composition Wine chemical analysis
Targeted learning outcomes:	<p>Knowledge:</p> <ul style="list-style-type: none"> – Advanced knowledge in Microbiological strategies-biotechnologies to improve wine fermentation in dry regions – Advanced knowledge to manage typical disequilibria in musts and wines of dry Mediterranean regions: Acidity, alcoholic degree, color, metabolic profile... – Advanced microbiological and instrumental analysis to check the quality/evolution of fermentations and aging processes. <p>Skills:</p> <ul style="list-style-type: none"> – Advanced management of alcoholic and malolactic fermentations in dry regions – Advanced management of especial maceration/extraction process to increase quality – Advanced management of the alterations during stabilization and aging

	<p>Competences:</p> <ul style="list-style-type: none"> - Capacity to evaluate biotechnological process in wineries - Capacity to take technical decisions according to analytical -results in dry regions - Capacity to evaluate and to control Microbiological and physicochemical alterations in Mediterranean regions
<p>Content:</p>	<p>Microbiology:</p> <ul style="list-style-type: none"> - Yeast selection and fermentation biotechnologies to improve technical and sensorial parameters in dry regions. - Color stabilization, pyranoanthocyanin formation, malic acid production, increase of glycerine and polysaccharides. - Microbiological alterations in Mediterranean regions and strategies to manage these problems. - LAB alterations, TCAs, Dekkera/Brettanomyces and ethylphenols. - Advanced management of biological ageings. - Over lees aging in red and white wines, film aging. - New perspectives in fermentation. - New biotechnologies, use of no Saccharomyces. <p>Microbiological analysis:</p> <ul style="list-style-type: none"> - Analytical management of malolactic fermentation. - Techniques for yeast characterization (molecular and conventional). - Analytical determination of spoilage molecules from microbial activity. <p>Physicochemistry:</p> <ul style="list-style-type: none"> - Advanced physicochemical techniques to improve/control acidity/ph. - Techniques to reduce alcoholic degree. - Techniques to reduce sulphites addition in dry regions. - Management of wines to increase self life with good aromatic profile. <p>Instrumental analysis:</p> <ul style="list-style-type: none"> - Spectrophotometric determinations of phenols - Enzymatic analysis - Atomic Absorption Spectrophotometry - GC-FID (liquid injection and purge and trap injection) - GC-MS (liquid injection and SPME) - LC-DAD-RI - LC-ESI/MS
<p>Study / exam achievements:</p>	<p>Written exam Laboratory reports</p>
<p>Forms of media:</p>	<p>Multimedia presentations and demonstrations Conventional media Videos Laboratory presentations</p>

<p>Literature:</p>	<p>Suárez Lepe, J. A., Íñigo Leal, B. Microbiología Enológica. Fundamentos de vinificación. Ed. Mundiprensa. Madrid. 3ª ed. 2004.</p> <p>Suárez Lepe, J. A. Levaduras Vínicas. Funcionalidad y Uso en Bodega. Ed. Mundiprensa. Madrid. 1997.</p> <p>Ribéreau-Gayon, P., Glories, Y., Maujean, A., Dubordieu, D. Handbook of Enology. Vol. 2. The Chemistry of Wine Stabilization and Treatments. John Wiley and Sons, LTD. New York, 2001.</p> <p>Flanzy, C. Ed. Enología: Fundamentos Científicos y Tecnológicos. Ed AMV y Mundiprensa. Madrid, 2000.</p> <p>Boulton, R. B., Singleton, V. L., Bisson, L. F., Kunkee, R. E. Principles and Practices of Winemaking. Ed. Chapman and Hall, New York. 1996.</p> <p>SCI Journals</p> <ul style="list-style-type: none"> Am. J. Enol. Vitic. S. Afric. J. Enol. Vitic. Aust. J. Grape Wine Res. J. Int. Sci. Vin. Wine. J. Agric. Food Chem. Food Chem. Int. J. Food Microbiol. J. Appl. Microbiol.
<p>Update</p>	<p>February 2012</p>

Module name	Training Design and Practices for Viticulture in Dry Regions
Academic Year	2 nd academic year at the Universidad Politécnica de Madrid
Semester	3 rd semester
Module coordinator	Prof. Vicente Sotés Ruiz, Prof. Ph.D (Universidad Politécnica de Madrid)
Lecturer	Vicente Sotés Ruiz, Prof. Ph.D; José Ramón Lissarrague García-Gutiérrez, Prof. Ph.D; Pilar Baeza Trujillo, Prof. Ph.D; Patricia Sánchez de Miguel; Dra. (Universidad Politécnica de Madrid)
Language	Spanish
Classification within the curriculum	Module of Specialisation at Universidad Politécnica de Madrid
Teaching format/class hours per week during the semester	4 hours
Work load	Attending classes: 3 hours x 15 weeks = 45 hours Practices: 1 hour x 15 weeks = 15 hours Personal study: 3 hours x 15 weeks = 45 hours Preparation for examination and examination = 45 hours Total 150 hours
Credits points	5
Requirements under the examination regulations	----
Recommended prerequisites	Vine anatomy, morphology and biology Vine ecology Basis on soil science knowledge and fundamentals on Terroir Fundamentals on Vine pests and control media
Targeted learning outcomes	Knowledge: <ul style="list-style-type: none"> – To evaluate the environmental potential for vinegrowing in a given area – To establish an irrigation program based on objectives and resources. – To know irrigation management based on plant observations, soil water control, atmosphere demand and weather forecast. – To establish different canopy managements for different environments, cultivars and objectives. – To adapt and optimize the resources – radiation, water, soil fertility, etc.- to the objectives fixed by the winemaker or the company – To establish a soil management program adapted to vineyard conditions: soil, climate, variety, rootstock and winemaker requirements.

	<p>Skills:</p> <ul style="list-style-type: none"> - Creative persons and Self starters - Ability to find out new solutions adapted to upcoming challenges: new laws, machinery , or current demanded products - To improve the efficiency of the viticulture practices - Capable for continuing education programs and research within the industry <p>Competences:</p> <ul style="list-style-type: none"> - Viticulturist - Vineyard manager - Viticulture assistant - Viticulture consulter
Content	<p>Effects of dry, warm climate on must composition parameters:</p> <ul style="list-style-type: none"> - Berry size - Sugar download to berry under hot environments - Uncouple sacharimetric and phenolic maturity - Factors affecting acidity synthesis and breakdown in the berry - Hazards during berry maturity as due to hot climate: sugar blockage, shriveling, raisin, small berry size <p>Viticultural Practices:</p> <ul style="list-style-type: none"> - Basis on Irrigation applied to warm and Mediterranean regions - Irrigation Estrategies. How to couple sacharimetric and skin maturation. Water management when water is a scarce well. Irrigation management to affect particular yield components. Evaluation of the vineyard potential productivity. - Irrigation control: atmosphere, soil and plant. - Pruning and trellising - Canopy management - Soil management for Mediterranean vineyards
Study/exam achievements	<p>Written exam: theory and resolution of practical cases</p> <p>Field -practice Reports</p>
Forms of media	<p>Multimedia presentations</p> <p>Field practices</p> <p>Conferences from people of the wine and vinegrowing industry</p>
Literature	<p><u>Books</u></p> <p>Baeza P., Lissarrague P. and Sánchez P. 2007. Fundamento y aplicación del riego en la vid. Ed. Agrícola Española. Madrid. 264 pp.</p> <p>Coombe BG and Dry PR. 2006. Viticulture vol 2. Practices. Winetittles. Adelaide (Australia) 376 pp</p> <p>Coombe BG and Dry PR. 2004. Viticulture vol 1.Resources. Winetittles. Adelaide (Australia). 255 pp.</p> <p>Huglin P. and C. Schneider. 1998. Biology and écologie de la Vigne. Payot-Lausanne. Rustica. 370 pp.</p> <p>Ingels CA, R L Bugg, GT McGourty and L P Christensen. 1998. Cover Cropping in Vineyards: A Grower's Handbook. Winetittles. Adelaide</p>

	<p>(Australia). 162 pp. Gladstones J. 2002. Viticulture and Environment. Winetittles. Adelaide (Australia). 320 pp. Jackson D. Monographs in Cool Climate Viticulture - 2. Climate. 2001. Adelaide (Australia). 80 pp. Martínez de Toda F. 1991. Biología de la vid. Mundi-Prensa. Madrid. 346 pp. Mullins MG, Bouquet A. and Williams LE. 1992. Biology of the grapevine. Cambridge University Press. 252 pp. White RE. 2003. Soils for Fine Wines. Oxford University Press. New York (USA). 279 pp. Smart R. and Robinson M. 2006. Sunlight into Wine: A Handbook for Winegrape Canopy Management. Winetittles. Adelaide (Australia) 96 pp.</p> <p><u>Journals</u> American Journal of Enology and Viticulture Australian J. of Grape and Wine Research HortTechnology Int. J. Sci. de la Vigne et du Vin Irrigation Science Le Progrès Agricole et Viticole Rev. Suisse de Vitic. Arboric. Hortic. Spanish Journal of Agricultural Research Scientia Horticulturae South African Journal of Enology and Viticulture Viti Viticultura y Enología Profesional Vitis</p> <p><u>Proceedings</u> Acta Horticulture GESCO and GiESCO</p>
Update	February 2012

Module name:	Wine Technology in Wines from Dry Mediterranean Regions
Academic Year:	2 nd academic year at Universidad Politécnica de Madrid
Semester:	3 rd semester
Module coordinator:	Fernando Calderón Fernández, Prof. Ph.D (Universidad Politécnica de Madrid)
Lecturer:	Fernando Calderón Fernández Prof. Ph.D; Pedro Tienda Priego Prof. Ph.D; Antonio Morata Barrado Prof. Ph.D; José Antonio Suárez Lepe Prof. Ph.D (Universidad Politécnica de Madrid)
Language:	Spanish
Classification within the curriculum:	Module of Specialisation at Universidad Politécnica de Madrid
Teaching format / class hours per week during the semester:	3 hours per week
Workload:	face-to-face teaching: 3 hours x 15 weeks = 45 hours independent study: 3 hours.x 15 weeks = 45 hours Preparation for examination and examination = 30 hours Total 120 hours
Credit points:	4
Requirements under the examination regulations:	----
Recommended prerequisites:	General wine engineer of prefermentative processes Conventional red and white wine making
Targeted learning outcomes:	<p>Knowledge:</p> <ul style="list-style-type: none"> – Advanced knowledge in wine stabilization in dry regions. – Advanced knowledge in wine making for wines with high alcoholic degree and low acidity. – Advanced knowledge in special wines: Sherry wines, Porto and Madeira wines, Noble rot wines. <p>Skills:</p> <ul style="list-style-type: none"> – Advanced management winemaking in dry regions. – Advanced management of wine stabilization in dry regions. – Quality strategies. <p>Competences:</p> <ul style="list-style-type: none"> – Capacity to improve wine quality with unbalanced grapes from dry regions. – Capacity to increase shelf life of products y warm regions.
Content:	Refrigeration engineer in warm regions – refrigeration necessities during elaboration, stabilization and

	<p>conservation.</p> <ul style="list-style-type: none"> - climatization of wineries and aging cellars <p>Special strategies for winemaking in warm regions</p> <p>Wine estabilization</p> <p>Wine conservation</p> <ul style="list-style-type: none"> -Inert gases in wine making <p>Wine stabilization</p> <p>Bottling</p> <ul style="list-style-type: none"> -Bottling engineer -Other packaging systems <p>Special wines</p> <ul style="list-style-type: none"> -Sherry wines: wine technology and microbiology and biochemistry of aging. -Porto wines: wine technology and aging -Madeira wines: wine technology and ageing. -Liquor wines. -Spirits.
Study / exam achievements:	Written exam
Forms of media:	<p>Multimedia presentations and demonstrations</p> <p>Conventional media</p> <p>Videos</p>
Literature:	<p>Boulton R. B., Singleton, V. L., Bison L., Kunkee, R. E. Teoría y práctica de la elaboración del vino. Editorial ACRIBIA. Zaragoza. 2002.</p> <p>Flanzy, G.M. Enología. Fundamentos científicos y tecnológicos. Ed. AMV- Mundi-Prensa. Madrid. 2000.</p> <p>Hidalgo, J. Tratado de Enología. Tomo I y II. Ed. Mundi-Prensa. Madrid. 2003.</p> <p>Ribereau-Gayon, P., Glories Y., Maujean A., M Dubourdieu D. Tratado de Enología. 1. Microbiología del vino. Vinificaciones. Editorial Hemisferio Sur- Mundi-Prensa. (Buenos Aires – Madrid). 2002.</p> <p>Ribereau-Gayon, P., Glories Y., Maujean A., M Dubourdieu D. Tratado de Enología. 2. Química del vino. Estabilización y Tratamientos. Editorial Hemisferio Sur- Mundi-Prensa. (Buenos Aires – Madrid). 2002.</p> <p>Suárez, J. A.; IÑIGO, B. Microbiología enológica. Fundamentos de vinificación. 3ª ed. Ed. Mundi-Prensa. Madrid. 2004.</p> <p>Troost, G. Tecnología del vino. Ed. Omega. Madrid. 1980.</p> <p>Zamora, F. Elaboración y crianza del vino tinto. Aspectos científicos y prácticos. AMV Ediciones. Madrid. 2003.</p>
Update	February 2012

Module name	Viticulture in Dry Mediterranean Regions / Spanish Grape cultivars
Academic Year	2 nd academic year at the Universidad Politécnica de Madrid
Semester	3 rd semester
Module coordinator	Vicente Sotés Ruiz, Prof. Ph.D. (Universidad Politécnica de Madrid)
Lecturer	Prof. Vicente Sotés Ruiz Prof. Ph.D; José Ramón Lissarrague García-Gutiérrez Prof. Ph.D; Pilar Baeza Trujillo Prof. Ph.D; Patricia Sánchez de Miguel; Dra. (Universidad Politécnica de Madrid)
Language	Spanish
Classification within the curriculum	Module of Specialisation at Universidad Politécnica de Madrid
Teaching format/class hours per week during the semester	4 hours per week face to face teaching and field practices
Work load	Attending classes: 4 hours x 15 weeks = 60 hours Personal study: 4 hours (including preparation for the Examination) x 15 weeks = 60 hours Total = 120 hours
Credits points	4
Requirements under the examination regulations	----
Recommended prerequisites	Vine anatomy, morphology and biology Vine ecology Basis on soil science knowledge and fundamentals on Terroir Fundamentals on Vine pests and control media
Targeted learning outcomes	<p>Knowledge:</p> <ul style="list-style-type: none"> – To evaluate the environmental potential of a given area for vinegrowing – To find out the best rootstock and cultivar performance for any potential vinegrowing area – To determine the potential of new varieties in an area – To determine the soil factors affecting vine performance. To identify the possible problems and to find out the techniques to solve them – To know the factors affecting planting and new plants care in a dry, hot area. <p>Skills:</p> <ul style="list-style-type: none"> – Creative persons and Self starters – Ability to find out new solutions adapted to upcoming challenges: new laws, machinery , or current demanded products

	<ul style="list-style-type: none"> - Capable for continuing education programs and research within the industry <p>Competences:</p> <ul style="list-style-type: none"> - Viticulturist - Vineyard manager - Viticulture assistant - Viticulture consulter
Content	<p>Environmental characteristics of the Spanish vineyards</p> <ul style="list-style-type: none"> - Vinegrowing regions - Cultivars and rootstocks <p>Table grapes growing in Spain</p> <ul style="list-style-type: none"> - General scope - Cultivars and rootstocks - Particular field practices for table grapes growing. <p>Zoning and Terroir</p> <ul style="list-style-type: none"> - Basis and methodology applied to Spanish and Southamerica vine growing regions <p>Vineyard establishment</p> <ul style="list-style-type: none"> - Objectives of the vineyard - Desing - Plant material - Care and Training young vines
Study/exam achievements	<p>Written exam: theory and resolution of practical cases</p> <p>Field -practice Reports</p>
Forms of media	<p>Multimedia presentations</p> <p>Field practices Conferences from people of the wine and vinegrowing industry</p> <p>One-day trips and 5-days trips to Spanish and sourranging vinegrowing regions</p>
Literature	<p><u>Books</u></p> <p>Alburquerque MV, R.Yuste, JA Rubio and J Yuste. 2006. Desprición y caracterización agronómica de 28 variedades tintas de vid en Castilla y León. ITACyL. 195 pp.</p> <p>Bettiga L. 2003. Wine grapes varieties in California. ANR publications. 188 pp.</p> <p>Coombe BG and Dry PR. 2006. Viticulture vol 2. Practices. Winetittles. Adelaide (Australia) 376 pp</p> <p>Coombe BG and Dry PR. 2004. Viticulture vol 1.Resources. Winetittles. Adelaide (Australia). 255 pp.</p> <p>Centro de Investigación y Desarrollo Agrario de La Rioja. 1994. Aspectos vitícolas y enológicos de la variedad Graciano. La Rioja. 101 pp. Consejerí ad Agricultura y Alimentación de La Rioja.</p> <p>Huglin P. and C. Schneider. 1998. Biology and écologie de la Vigne. Payot-Lausanne. Rustica. 370 pp.</p> <p>Gladstones J. 2002. Viticulture and Environment. Winetittles. Adelaide</p>

	<p>(Australia). 320 pp.</p> <p>Jackson D. Monographs in Cool Climate Viticulture - 2. Climate. 2001. Adelaide (Australia). 80 pp.</p> <p>White RE. 2003. Soils for Fine Wines. Oxford University Press. New York (USA).279 pp.</p> <p>Robinson J. 2006. The Oxford Companion to wine.</p> <p>Robinson J. 1986. Vines , grapes and wines.</p> <p>Rubio JA, J Yuste, R Yuste MV Albuquerque, C Arranz and E Barajas. 2008. Clones certificados de las principales variedades tradicionales de vid en Castilla y León. ITACyL. 315 pp</p> <p>Johnson H and Robinson J. 2007. The world atlas of wine.</p> <p><u>Journals</u></p> <p>American Journal of Enology and Viticulture</p> <p>Australian J. of Grape and Wine Research</p> <p>Int. J. Sci. de la Vigne et du Vin</p> <p>Le Progrès Agricole et Viticole</p> <p>Rev. Suisse de Vitic. Arboric. Hortic.</p> <p>Spanish Journal of Agricultural Research</p> <p>Scientia Horticulturae</p> <p>South African Journal of Enology and Viticulture</p> <p>Viti</p> <p>Viticultura y Enología Profesional</p> <p>Vitis</p>
Update	February 2012

Module name:	Marketing and Diffusion in Spanish Wine Sector
Academic Year:	2 nd academic year at Universidad Politécnica de Madrid
Semester:	3 rd semester
Module coordinator:	Gabriel Yravedra Llopis, Prof. Ph.D (Universidad Politécnica de Madrid)
Lecturer:	Teresa Iruretagoyena Osuna Prof. Ph.D; Pedro Reinares Prof. Ph.D; Rafael del Rey Prof. Ph.D (Universidad Politécnica de Madrid)
Language:	Spanish
Classification within the curriculum:	Module of Specialisation at Universidad Politécnica de Madrid
Teaching format / class hours per week during the semester:	4 hours per week
Workload:	face-to-face teaching: 4 hours x 15 weeks = 60 hours independent study: 3 hours x 15 weeks = 45 hours Preparation for examination and examination = 75 hours Total 180 hours
Credit points:	6
Requirements under the examination regulations:	----
Recommended prerequisites:	European legislation in Wine Sector Basic Wine Economy
Targeted learning outcomes:	<p>Knowledge:</p> <ul style="list-style-type: none"> – Advanced knowledge in wine business management – Advanced knowledge in marketing strategies in wine sector. – Advanced knowledge in wine markets for Spanish products. Wine exportation. <p>Skills:</p> <ul style="list-style-type: none"> – Advanced management of marketing strategies in wine sector – Advanced management of Spanish wine business – Quality strategies <p>Competences:</p> <ul style="list-style-type: none"> – Capacity to improve wine sales using suitable strategies for Spanish wines – Capacity to manage Spanish wine bussines
Content:	<p>Wine business management:</p> <ul style="list-style-type: none"> – Economical and financial analysis of wine business – Evaluation of wine investments

	<p>Wine marketing:</p> <ul style="list-style-type: none"> – Commercial strategies of marketing applied to wine sector – Price and promotion strategies on wine sector – Spanish wine market regulation in the frame of EU – Government management of wine sector – Quality management in wine sector <p>International commercialization of Spanish wine:</p> <ul style="list-style-type: none"> – Introduction – Markets of France, Italy and Benelux – Markets of Germany, Great Britain and Nordic countries – Other European markets, USA, Oceania, Asia and Africa. – Marketing programme to increase Spanish wines sales.
Study / exam achievements:	Written exam
Forms of media:	<p>Multimedia presentations and demonstrations</p> <p>Conventional media</p> <p>Videos</p>
Literature:	<p>Alonso, R; Iruretagoyena, T. Economía de la empresa agroalimentaria. MAPA. Madrid. 2004.</p> <p>Caldentey, A. et al. El marketing agroalimentario”. Ed, Mundi-Prensa. Madrid. 1999.</p>
Update	February 2012

Module name:	Vine pests and diseases in dry regions
Academic Year:	2 nd Academic year at Universidad Politécnica de Madrid
Semester:	3 rd semester
Module coordinator:	Elisa Viñuela Sandoval, Prof. Ph.D (Universidad Politécnica de Madrid)
Lecturer:	Rosa Raposo, Dra. (Instituto Nacional de Investigaciones Agrarias) Angela Alonso (Universidad Politécnica de Madrid) Prof. Elisa Viñuela Sandoval (Universidad Politécnica de Madrid) Prof. Pedro del Estal Padillo (Universidad Politécnica de Madrid) Prof. Pilar Medina Vélez (Universidad Politécnica de Madrid)
Language:	Spanish
Classification within the curriculum:	Module of Specialisation at Universidad Politécnica de Madrid
Teaching format / class hours per week during the semester:	2 hour/week of face-to-face teaching and laboratory
Workload:	face-to-face teaching 1 hour x 15 weeks = 15 hours laboratory 1hour x 15 weeks = 15 hours independent study 1 hour x 15 weeks = 15 hours Preparation for examination and examination = 45 hours Total 90 hours
Credit points:	3
Requirements under the examination regulations:	----
Recommended prerequisites:	----
Targeted learning outcomes:	<p>Knowledge:</p> <ul style="list-style-type: none"> – Advanced knowledge in vineyard pests in dry regions – Learn diagnosis and identification of the most important grapevine diseases and pests – Know the life cycle of pathogens and biology of the major diseases – Learn specific management practices for the major diseases and pests – Understand the bases to define an integrated management strategy for the major grapevine diseases and pests <p>Skills:</p> <ul style="list-style-type: none"> – Identify the major grapevine pests and diseases in dry regions – Manage of pests and diseases in an integrated program for dry regions <p>Competences:</p>

	<ul style="list-style-type: none"> - Be able to take technical decisions in an integrated pest and disease management program
Content:	<p>Control:</p> <ul style="list-style-type: none"> - Pest management: - Insects as pest. Thresholds. Factors regulating populations. Sampling and monitoring. - Mechanical, physical and cultural control, chemical control, biological control, genetic manipulation of insect pests, pheromones and other insect attractants. - Disease management: - Cultural practices, disease resistant varieties, fungicides - Guidelines for an integrated and organic management of major grape diseases in Spain <p>Pests:</p> <ul style="list-style-type: none"> - Orthoptera: Acrididae. Isoptera: <i>Calotermes flavicollis</i> and <i>Reticulitermes</i> spp. - Homoptera: aphids; phyloxera grape; Cicadelloidea: <i>Empoasca</i> spp., <i>Scaphoideus titanus</i>; Flatidae: <i>Metcalfa pruinosa</i>; Coccoidea; - Thysanoptera: <i>Frankiniella occidentalis</i>, <i>Drepanothrips reuteri</i>. - Coleoptera: <i>Altica ampelophaga</i>, <i>Vesperus xatartii</i>, <i>Xylotrechus arvicola</i>, <i>Anobium punctatum</i>, <i>Sinoxylon sexdentatum</i>, <i>Byctiscus betulae</i>, <i>Otiorrhynchus</i> sp.; Scarabeoidea; Elateroidea - Lepidoptera: <i>Sparganothis pilleriana</i>, <i>Lobesia botrana</i>, <i>Eupoecilia ambiguella</i> <i>Chryptoblades gnidiella</i>; Noctuidae; Tineidae - Diptera: Cecidomyiidae; Tephritidae; Drosophilidae. - Hymenoptera: Vespidae. - Acarina. <p>Diseases: Major grape diseases in Spain:</p> <ul style="list-style-type: none"> - Powdery mildew - Downy mildew - Grey mould - Trunk diseases - Phomopsis cane and leaf spot - Fanleaf degeneration - Leafroll - Corky bark
Study / exam achievements:	<p>Two separate written exams for pests and diseases</p> <p>Reports of laboratory work</p>
Forms of media:	<p>Multimedia presentations and demonstrations</p> <p>Conventional media</p> <p>Videos</p>
Literature:	<p>GALET P. 1982. <i>Les maladies et les parasites de la vigne</i>. Tome II: <i>Les parasites animaux</i>.</p>

	<p>MAPA & MUNDI-PRENSA, Ed. 2004. <i>Los parásitos de la vid. Estrategias de protección razonada</i>. 5ª Ed.</p> <p>FLAHERTY, D.L. 1992. <i>Grape pest management</i>. University of California.</p> <p>PEARSON AND GOHEEN. 1988. <i>Compendium of grape diseases</i>. APS Press, St. Paul, Minnesota. 93 pp.</p> <p>DUBOS. 2002. <i>Maladies cryptogamiques de la vigne</i>. 2 ed. Éditions Féret, Bordeaux. 207pp</p> <p>WALTER, BOUDON-PADIEU, RIDÉ. 2000. <i>Maladies à virus, bactéries et phytoplasmes de la vigne</i>. Éditions Féret, Bordeaux. 191 pp</p>
Update	February 2012

Module name:	Study Trip – Spanish Wines
Academic Year:	2nd academic year at Universidad Politécnica de Madrid
Semester:	3rd semester
Module coordinator:	Prof. José Antonio Suárez Lepe Prof. Fernando Calderón Fernández
Lecturer:	Prof. José Antonio Suárez Lepe Prof. Fernando Calderón Fernández Prof. José Ramón Lissarrague Prof. Antonio Morata Barrado
Language:	Spanish
Classification within the curriculum:	Module of Specialisation at Universidad Politécnica de Madrid
Teaching format / class hours per week during the semester:	2 Study trips 1 st Sherry Region. Visiting Vineries and Vineyards of Montilla Moriles (Córdoba). Sherry region and Puerto de Santa María (Cádiz) y SanLúcar de Barrameda. The trip finishes visiting some winery at La Mancha. Normally 4 days studying the enology, viticulture, technology, architecture and traditions of this special place. 2 nd To other country. Variable depending on the decisions taken in plenary meetings. Italy (Benneto, Toscana), Portugal (Porto and Alentejo) or France (Cognac-Bordeaux) are typical options. 5days studying the enology, viticulture, technology, architecture and traditions of this regions.
Workload: (Per week)	8 hours per day
Credit points:	2
Requirements under the examination regulations:	----
Recommended prerequisites:	Previous modules of related subjects
Targeted learning outcomes:	1 st To know the main wines in Sherry regions, peculiarities of the oenology and viticulture. 2 nd To know the main wines, peculiarities of the oenology and viticulture.
Content:	At least two visits per day at different wineries visiting with technical staff the vineyards, the wineries to show the students the technology and the peculiarities of the winemaking in those regions
Study / exam achievements:	The knowledge acquired during the study trip is evaluated in the exams of the modules of related subjects.

Forms of media:	Visit of Wineries
Literature:	----
Update	February 2012

Module name:	Master Thesis at the Universidad Politécnica de Madrid
Academic Year:	2 nd academic year at Universidad Politécnica de Madrid
Module coordinator:	General Coordination by Prof. Dr. José Antonio Suárez Lepe, Prof. Dr. Pilar Baeza and Prof. Dr. Antonio Morata
Supervisors:	Academic staff of the Food Science and Technology Dept., Viticulture-Fitotecnia Dept. at the Universidad Politécnica de Madrid, the academic staff members of the EMaVE Consortium and associated partners
Language:	Spanish. Master Thesis document (written report) and defence in English.
Classification within the curriculum:	Core module
Teaching format:	The Thesis consists of the elaboration of a written report about an independent scientific work of the student and a defence.
Workload:	24 weeks for the elaboration of the thesis; plus adequate time (at least 2 weeks) for personal preparation for the defence
Credit points:	30 ECTS
Requirements under the examination regulations:	<p>Admission to the <u>thesis</u> is granted if the student has</p> <ul style="list-style-type: none"> – successfully completed the modules of the first academic year – attended an internship of at least 8 weeks, proved by a respective certificate <p>Admission to the <u>defence</u> is granted under the condition that:</p> <ul style="list-style-type: none"> – the written report was evaluated at least with the grade “E - pass” – the student has completed all other compulsory modules of the second academic year successfully and obtained at least 120 ECTS (including the ECTS allocated to the Master Thesis)
Recommended prerequisites:	----
Targeted learning outcomes:	<p>The student is</p> <ul style="list-style-type: none"> – able to carry out scientific research independently in a given time implementing adequate scientific methods – able to make the statistic treatment of the results. – able to present his/her results to a jury and answers questions related to the field of research.
Content:	Thesis document
Exam achievements:	<p>Delivery of a written thesis report at the submission date. The written report has to be prepared under consideration of the formal requirements of the Universidad Politécnica de Madrid .</p> <p>Thesis defence in front of an examination jury of at least 3 academic members, 2 from Universidad Politécnica de Madrid and belonging the third one to other University-Research center inside our consortium.</p>

Forms of media:	Research methods depending on the topic of the thesis. Written report; presentation media for the defence
Literature:	Books and scientific papers related to the topic of the thesis
Update:	February 2012