Joint MSc program

Technology of Wine and Wine-Based Beverages

COURSEBOOK

VITICULTURE

VITICULTURE

I. GENERAL

COURSE TITLE	**VITICULTURE**		
UNIVERSITY	AGRICULTURAL UNIVERSITY		
DEPARTMENT	VITICULTURE AND FRUIT GROWING		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.1	**SEMESTER OF STUDY**	1
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

The course is designed and approved by the OIV to provide students with in-depth comprehension of and the ability to apply and synthesize knowledge in the following areas of viticulture:

- Organisation of the viticultural structure
- Basic marketing components with application in viticulture
- Analysis and behaviour in the production of components for propagation and realisation of vine planting material
- Development and management of vineyards
- European and national factors affecting the viticulture industry
- Elements in developing a marketing plan and planning grape harvests
- Strategy for social incentives in wine farms

General Skills

- Communication
- Creativity and problem-solving
- Attention to detail
- Interpersonal skills
- Leadership
- Adaptability
- Teamwork
- Critical thinking approach

III. COURSE CONTENTS

- Managing the work process in the vineyards
- Determining the scale of wine farms by analysing the motives and behaviour of those wishing to work in the sector
- Determining the profitability of growing vineyards of different scales
- Evaluating changes for strategic planning in the development and management of viticulture
- Determining the influence of internal and external factors on the production cycle
- Identifying the behaviour of websites and social media in the promotion of viticulture
- Developing a marketing plan for viticulture business
- Identifying suitable terroirs for vineyards establishment
- Acquiring teamwork skills

IV. RESOURCES

Stephen Skelton (2019). Viticulture – 2nd Edition: An introduction to commercial grape growing for wine production. S. P. Skelton Ltd. ISBN-13 978-0993123559

J. Winkler, James A. Cook, William Mark Kliewer, Lloyd A. Lider (1974). General Viticulture Revised & enlarged Edition. University of California. ISBN-13 978-0520025912

AMPELOGRAPHY

I. GENERAL

COURSE TITLE	**AMPELOGRAPHY**		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.2	**SEMESTER OF STUDY**	1
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

- This module aims to give a comprehensive introduction to ampelography of grape varieties for winemaking.

On successful completion the student will be able to:

- **understand** the main organography (structure) of grapevine and specific vocabulary for the description of grapevine varieties;
- **describe** and **differentiate** grapevine varieties used in the winemaking process;
- **design** and **perform** experiments applying the evaluation of grapes for winemaking.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Introduction to ampelography: aim, grapes classification, distribution groups, most famous world viticulture and wine regions
- Grapevine description: variety name, general information, botanical description, agrobiological characteristic, technological (oenological) characteristic
- Ampelography scheme and lists for grapevine description by OIV
- Genus Vitis grapevine characteristic marks: American species, East Asian species and Eurasian species
- Ampelographic description of most famous grapevine varieties for white wines
- Ampelographic description of most famous grapevine varieties for red wines
- Ampelographic description of some high resistance grapevine varieties
- Ampelographic description of some grapevine varieties for table grapes
- Rootstocks: requirements, classification, description of some varieties

IV. RESOURCES

- *Galet, P., A Practical Ampelography: Grapevine Identification, 1979*
- *Galet, P., Cepages et vignobles de France. Tome II. L'ampelographie francaise. 2nd edition, dehan, Montpelier, 1990*
- *Galet, P., Dictionnaire encyclopédique des cépages et de leurs synonymes, 2015*
- *Galet, P., Grape Varieties, 2002*
- *IPGRI, UPOV, OIV. 1997. Descriptors for Grapevine (Vitis spp.). International Plant Genetic Resources Institute, Rome, Italy, 1997*
- *OIV. Description of world vine varieties. International Office of the Vine and Wine, 2009*
- *OIV. Distribution of the world's grapevine varieties, 2017*
- *OIV. International list of vine varieties and their synonyms, 2013*

- *OIV. OIV Descriptor list for grape varieties and Vitis species, 2 edition. International Office of the Vine and Wine, 2001*
- *Robinson, J., J. Harding, J.Voluillamoz. Wine Grapes. A complete guide to 1,368 vine varieties, including their origins and flavours, 2012*
- *Roychev, V. Ampelogrphy, 2012 [in Bulgarian]*
- *Viala, P., V. Vermorel. Ampelographie, Tomme III, 1902*
- *http://www.eu-vitis.de/index.php*

GRAPEVINE MANAGEMENT

I. GENERAL

COURSE TITLE	GRAPEVINE MANAGEMENT		
UNIVERSITY	AGRICULTURAL UNIVERSITY		
DEPARTMENT	VITICULTURE AND FRUIT GROWING		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.7	**SEMESTER OF STUDY**	1rst
COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**		**ECTS Credits**
Lectures	15		3.0
Practical training	30		
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes

The course is designed and approved by the OIV to provide students with in-depth comprehension of and the ability to apply and synthesize knowledge in the following areas of grapevine management application:

- Application of some technological solutions in the cultivation of conventional and biological vineyards
- Integration of polymer net solutions for impacting adverse climatic conditions
- Wide application of *canopy management* in viticulture
- Influence of the meteorological factor on the support structure and the mechanical properties of the vine shoots
- Strategic planning in phenophase selection to manage reproductive potential in grapevines

General Skills

- Communication
- Creativity and problem-solving
- Attention to detail
- Interpersonal skills
- Leadership
- Adaptability
- Teamwork
- Critical thinking approach

III. COURSE CONTENTS

- Influence of the training system on grape quality
- Application of shoot removal as a factor in reducing yield
- Management of growth components and their fragmentation
- Tools for achieving the goals of *canopy management*
- Research and interpolation in the formation of norms for the pricing of *canopy management* operations
- Preliminary research and analysis of human resources in the grape-growing regions

IV. RESOURCES

Daniel Schuster, Laura Bernini, Andrea Paoletti (2018). Practical Field Guide to Grape Growing and Vine Physiology. Wine Appreciation Guild. ISBN-13 978-1935879312

AGROECOLOGY AND CLIMATE CHANGE

I. GENERAL

COURSE TITLE	AGROECOLOGY AND CLIMATE CHANGE		
UNIVERSITY	AGRICULTURAL UNIVERSITY		
DEPARTMENT	VITICULTURE AND FRUIT GROWING		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.9	**SEMESTER OF STUDY**	2

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Lectures	30	6.0
Seminar training	15	

LANGUAGE OF INSTRUCTION/EXAMS:	English

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

The course is designed and approved by the OIV to provide students with in-depth comprehension of and the ability to apply and synthesize knowledge in the following areas of wine marketing application:

- Influence of soil conditions in risk analysis of a production
- Positioning of geographical components and their influence on grape production
- Application of organic and synthetic mulching agents on microbiological activity in the soil
- Study of the water and wind components in the cultivation of grape production
- A study in the dynamics of the soil complex in relation to the supply of nutrient metabolites
- Monitoring of terroirs falling into nitrate zones

General Skills

- Communication
- Creativity and problem-solving
- Attention to detail
- Interpersonal skills
- Leadership
- Adaptability
- Teamwork
- Critical thinking

III. COURSE CONTENTS

- Management of leaf surface as a means of shading and its influence on grapes chemical composition
- Analysis of the components in the formation of the assessment in reproductive organs quality
- Quality control when applying GLOBALG.A.P. certificates
- Economic risk analysis in the production of dessert and wine grapes
- Production of secondary products from vineyards and their integration into the circular economy of the EU

IV. RESOURCES

Robert E. White (2015).
Understanding Vineyard Soils 2nd Edition. Oxford University press.
ISBN-13 978-0199342068
Henry Jeffreys (2023). Vines in a Cold Climate: The People Behind the English Wine Revolution. Allen&Unwin, ISBN-13 978-1838956653

OENOLOGY

FUNDAMENTALS OF WINEMAKING

I. GENERAL

COURSE TITLE	FUNDAMENTALS OF WINEMAKING		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.3	**SEMESTER OF STUDY**	1
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

- This module aims to give a comprehensive introduction to grape and wine composition and main stages of grape processing.

On successful completion the student will be able to:

- **understand** the main group of components in grape, grape must and wine, and their changes during the winemaking process;
- **describe and differentiate** grape composition and its changes after veraison to full ripening, composition of grape structural components, grape must and the resulting wine, main processes in winemaking;
- **design** and **perform** experiments applying the achievement of grape and wine quality.

General Skills

- Individual and autonomous work
- Teamwork
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Introduction and main characteristic of wine: wine definitions and classifications, winemaking stages
- Grape properties: physical, physico-mechanical, mechanical
- Grape and wine chemistry: groups of representatives, contents in grape structures elements, changes during grape ripening and the winemaking process, grape ripening types, modelling and predicting of grape ripening
- Grape processing: harvesting and transport, quality evaluation, cooling and heating, destemming and crushing, pressing
- Crushed grapes maintenance: cooling and heating, cold soak (maceration), draining and pressing
- Grape juice (must) maintenance: fractions characteristics, settling
- Alcohol fermentation: stoichiometric balance of main product, fermentation speed, methods of conduct, control and management, technological lost

IV. RESOURCES

- *Boulton, R., Singleton V., Bisson L., Kunkee R. Principles and Practices of Winemaking (First Edition), 1996*
- *Chobanova, D., Enology, Part I, Wine composition, 2012 [in Bulgarian]*
- *Flanzy, C. Oenologie: fondements scientifiques et technologiques, 2000*
- *Jackson, R. Wine Science: Principles and Applications (Fifth Edition), 2020*
- *Kemp B., Marangon M., Curioni A., Waters E., Marchal R. Managing Wine Quality, Volume II: Oenology and Wine Quality (Second Edition), 2022*
- *Morata, A., Red wine technology, 2019*
- *Morata, A., White wine technology, 2022*

- *Moreno-Arribas, V., C. Polo. Wine Chemistry and Biochemistry, 2009*
- *Rankine, B. Making good wine, 1995*
- *Ribereau-Gayon, P., Glories Y., Maujean A., Dubourdieu D. Handbook of Enology, Volume 1: The Microbiology of Wine and Vinifications (Second Edition). 2006*
- *Ribereau-Gayon, P., Glories Y., Maujean A., Dubourdieu D. Handbook of Enology, Volume 2: The Chemistry of Wine Stabilization and Treatments (Second Edition). 2006*

WINEMAKING

I. GENERAL

COURSE TITLE	WINEMAKING		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.10	**SEMESTER OF STUDY**	2
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

The module aims to form theoretical knowledge for the main processes in winemaking and practical skills for production of wine and wine materials. On successful completion the student will be able to:

- **understand** basic processes in winemaking;
- **describe** basic technological processes and methods for vinification and **understand** their application in winemaking;
- **study** related disciplines, such as wine analysis, wine microbiology, treatment and stabilisation of wine, evolution of wine, technology of distillates and high-alcohol beverages, oenological engineering, sensory analysis;
- **design** and **perform** experiments applying the theoretical and practical knowledge described above.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Sulphitation and correction of grape mash, must and wine
- White, red and rose dry wine production: wine characteristics, grape and technology requirements, essence and importance of the extraction processes, traditional and modified production methods
- Medium-sweet and sweet wine production: wine characteristics, grape and technology requirements, traditional and modified production methods
- Technological processes – control and management, importance of wine and grape analysis in winemaking

IV. RESOURCES

- ИВАНОВ, Т. (2011). Обща технология на виното (том 1). Дионис, София, ISBN: 9789542921035
- МАНДЖУКОВ, Б. (2010). Основи на винопроизводството – теория и практика. Дионис, София, ISBN: 9789548496940
- ЧОБАНОВА, Д. (2012). Енология (Част 1. Състав на виното). Академично издателство на УХТ, Пловдив, ISBN: 9789542402060
- ЧОБАНОВА, Д. (2016). Енология (Част 2. Обработка и стабилизиране на виното). Академично издателство на УХТ, Пловдив, ISBN: 9789542402923
- MORENO-ARRIBAS, V., C. POLO ET AL. (2009). Wine Chemistry and Biochemistry. Springer Science + Business Media, ISBN: 9780387741161
- RECEUIL DES METHODES INTERNATIONALES D'ANALYSE DES VINS ET DES MOUTS – VOLUME 1 (2017). OIV, Paris, ISBN: 9791091799683

- RECEUIL DES METHODES INTERNATIONALES D'ANALYSE DES VINS ET DES MOUTS – VOLUME 2 (2017). OIV, PARIS, ISBN: 9791091799690
- RIBEREAU-GAYON, P., D. DUBOURDIEU, B. DONECHE, A. LONVAUD (2006). HANDBOOK OF ENOLOGY (VOL. 1. THE MICROBIOLOGY OF WINE AND VINIFICATIONS). JOHN WILEY & SONS LTD, CHICHESTER, ENGLAND, ISBN: 9780470010341
- RIBEREAU-GAYON, P., Y. GLORIES, A. MAUJEAN, D. DUBOURDIEU (2006). HANDBOOK OF ENOLOGY (VOL. 2. THE CHEMISTRY OF WINE. STABILIZATION AND TREATMENTS). JOHN WILEY & SONS LTD, CHICHESTER, ENGLAND, ISBN: 9780470010372
- MORENO, J., R. PEINADO (2012). ENOLOGICAL CHEMISTRY. ELSEVIER INC., ISBN: 9780123884381
- *Joshi. V. K.,(2022) Concise Encyclopedia of Science and Technology of Wine*
- *Jacobson Jean L., (2006) Introduction to Wine Laboratory Practices and Procedures, 2006 Springer Science+Business Media, Inc.*
- *M. Victoria Moreno-Arribas, M. Carmen Polo (2009). Wine Chemistry and Biochemistry*
- *Waterhouse Andrew L., Gavin L. Sacks, Jeffery David W.,(2016). Understanding Wine Chemistry*
- *NEEL BURTON (2019.) THE CONCISE GUIDE TO WINE AND BLIND TASTING, © Acheron Press 2019*
- *Jackson Ronald S. (2020). Wine Science: Principles And Applications A catalogue record for this book is available from the British Library ISBN: 978-0-12-816118-0*
- *Keith Grainger, Hazel Tattersall (2005). WINE PRODUCTION: VINE TO BOTTLE, ISBN-13: 978-14051-1365-6 (pbk.: acid-free paper), ISBN-10: 1-4051-1365-0 (pbk.: acid-free paper)*

TREATMENT AND STABILISATION OF WINE

I. GENERAL

COURSE TITLE	TREATMENT AND STABILISATION OF WINE		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.17	**SEMESTER OF STUDY**	3
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

- This module aims to give a comprehensive introduction to wine treatment and stabilization. On successful completion the student will be able to:
- **understand** the main processes included in wine hazes;
- **describe** and **differentiate** wine hazes;
- **design** and **perform** experiments applying the achievement of wine clarity and stability.

General Skills

- Individual and autonomous work
- Teamwork
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Introduction
- Wine clarification
- Wine stabilisation against biochemical haze
- Wine stabilisation against colloidal hazes
- Wine stabilisation against metal hazes
- Wine deacidification
- Wine acidification
- Wine stabilisation against crystal hazes
- Wine stabilisation against biological hazes
- Wine bottling

IV. RESOURCES

- *Boulton R., Singleton V., Bisson L., Kunkee R. Principles and Practices of Winemaking (First Edition), 1996*
- *Chobanova D. Enology Part 2. Treatment and Stabilization of Wines (First Edition), 2016. [in Bulgarian]*
- *Flanzy C. Oenologi: fondements scientifiques et technologiques, 2000*
- *Jackson R. Wine Science: Principles and Applications (Fifth Edition), 2020*
- *Kemp B., Marangon M., Curioni A., Waters E., Marchal R. Managing Wine Quality, Volume II: Oenology and Wine Quality (Second Edition), 2022*
- *Morata A., Red wine technology, 2019*
- *Morata, A., White wine technology, 2022*
- *Ribereau-Gayon P., Glories Y., Maujean A., Dubourdieu D. Handbook of Enology, Volume 2: The Chemistry of Wine Stabilization and Treatments (Second Edition). 2006*

EVOLUTION OF WINE

I. GENERAL

COURSE TITLE	EVOLUTION OF WINE		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.14	**SEMESTER OF STUDY**	2
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	3.0
Practical training		15	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

- This module aims to give a comprehensive introduction to wine evolution during aging in vats, barrels or alternative types of aging in wood contact and in bottle.

On successful completion the student will be able to:

- **understand** the main processes included in wine aging;
- **Describe** and **differentiate** wine changes in time of wood contact and in bottle aging;
- **Design** and **perform** experiments applying the achievement of wine quality in aging process.

General Skills

- Individual and autonomous work
- Teamwork
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Introduction
- Main processes in wine storage/aging: oxidation-reduction (redox), condensations, polymerisations and esterifications
- Wine vat storage (aging)
- Requirements of technology and wine for barrel aging
- Wood types for barrel
- Extraction processes during barrel aging
- Other processes and wine evolution during barrel aging
- Alternative types of aging in contact with wood
- Requirements of technology and wine for bottle aging
- Processes and wine evolution during bottle aging

IV. RESOURCES

- *Boulton R., Singleton V., Bisson L., Kunkee R. Principles and Practices of Winemaking (First Edition), 1996*
- *Flanzy C. Oenologie: fondements scientifiques et technologiques, 2000*
- *Jackson R. Wine Science: Principles and Applications (Fifth Edition), 2020*
- *Kemp B., Marangon M., Curioni A., Waters E., Marchal R. Managing Wine Quality, Volume II: Oenology and Wine Quality (Second Edition), 2022*
- *Morata A., Red wine technology, 2019*
- *Morata, A., White wine technology, 2022*
- *Ribereau-Gayon P., Glories Y., Maujean A., Dubourdieu D. Handbook of Enology, Volume 2: The Chemistry of Wine Stabilization and Treatments (Second Edition). 2006*

TECHNOLOGY OF SPARKLING AND SPECIAL WINES

I. GENERAL

COURSE TITLE	TECHNOLOGY OF SPARKLING AND SPECIAL WINES		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.18	**SEMESTER OF STUDY**	3
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to give theoretical fundamental (physical, physico-chemical, chemical and biochemical processes) and methods of production of sparkling, liqueur, nobly sweet and aromatic wines. On successful completion the student will be able to:

- **understand** basic processes in technology of sparkling and special wines;
- **describe** basic processes and wine technology methods that form the specific properties of wines and **understand** their relation to the composition and quality of wine;
- **study** related disciplines, such as wine analysis, sensory analysis, oenological engineering;
- **design** and **perform** experiments applying the above theoretical knowledge and practical skills.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Production of liqueur and dessert wines: characteristics, classification, requirements; methods of increasing the sugar content of grapes; technological stages and specifics; maturation and aging of wines
- Technology and specifics of some famous liqueur and dessert wines: Porto and Madeira wines, Jerez wine, Malaga and Marsala wines, Tokai wines, Sauternes wines
- Production of sparkling wines: characteristics, classification, requirements; production methods; physical chemistry of sparkling wines; technological stages and specifics.
- Production of aromatic wines: classification, characteristics, requirements; technological stages and specifics

IV. RESOURCES

- *ИВАНОВ, Т. (2011). Обща технология на виното (том 1). Дионис, София, ISBN: 9789542921035*
- *ИВАНОВ, Т. (2011). Технология на специалните вина (том 2). Дионис, София, ISBN: 9789542921028*
- *МЕРЖАНИАН, А. (1986). Физикохимия игристых вин. Пищевая промышленность, Москва*
- *МАНДЖУКОВ, Б. (2010). Основи на винопроизводството – теория и практика. Дионис, София, ISBN: 9789548496940*
- *ЧОБАНОВА, Д. (2012). Енология (Част 1. Състав на виното). Академично издателство на УХТ, Пловдив, ISBN: 9789542402060*
- *ЧОБАНОВА, Д. (2016). Енология (Част 2. Обработка и стабилизиране на виното). Академично издателство на УХТ, Пловдив, ISBN: 9789542402923*

- *MORENO-ARRIBAS, V., C. POLO et al. (2009). Wine Chemistry and Biochemistry. Springer Science + Business Media, ISBN: 9780387741161RECEUIL des methodes internationales d'analyse des vins et des mouts – volume 1 (2017). OIV, Paris, ISBN: 9791091799683*
- *RECEUIL des methodes internationales d'analyse des vins et des mouts – volume 2 (2017). OIV, Paris, ISBN: 9791091799690*
- *RIBEREAU-GAYON, P., D. DUBOURDIEU, B. DONECHE, A. LONVAUD (2006). Handbook of Enology (vol. 1. The Microbiology of Wine and Vinifications). John Wiley & Sons Ltd, Chichester, England, ISBN: 9780470010341*
- *RIBEREAU-GAYON, P., Y. GLORIES, A. MAUJEAN, D. DUBOURDIEU (2006). Handbook of Enology (vol. 2. The Chemistry of Wine. Stabilization and Treatments). John Wiley & Sons Ltd, Chichester, England, ISBN: 9780470010372*
- *MORENO, J., R. PEINADO (2012). Enological Chemistry. Elsevier Inc., ISBN: 9780123884381*
- *Joshi. V. K.,(2022) Concise Encyclopedia of Science and Technology of Wine*
- *Jacobson Jean L., (2006) Introduction to Wine Laboratory Practices and Procedures, 2006 Springer Science+Business Media, Inc.*
- *Moreno-Arribas M. Victoria, M. Carmen Polo (2009). Wine Chemistry and Biochemistry*
- *Waterhouse Andrew L., Gavin L. Sacks, David W Jeffery.,(2016). Understanding Wine Chemistry*
- *NEEL BURTON (2019.) THE CONCISE GUIDE TO WINE AND BLIND TASTING, © Acheron Press 2019 Published by Acheron Press*

TECHNOLOGY OF DISTILLATES AND HIGH-ALCOHOL BEVERAGES

I. GENERAL

COURSE TITLE	TECHNOLOGY OF DISTILLATES AND HIGH-ALCOHOL BEVERAGES		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.11	**SEMESTER OF STUDY**	2
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to give a comprehensive introduction to processes used in wine-based spirits production and the main characteristics of different wine-based spirits. On successful completion the student will be able to:

- **understand** the basic principles and processes in the technology of different wine-based spirit drinks;
- **describe** the basic concepts and methods for wine and fermented brandies dealcoholisation and **understand** their relation to wine-based spirit quality;
- **study** related disciplines, such as sensory analysis, oenological engineering and technological case study;
- **design** and **perform** experiments applying the above theoretical knowledge.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Raw materials for wine-based spirit drinks production – wines, brandies: main characteristics and preparation for distillation
- The main processes in spirits production:

- distillation – principles, facilities and techniques for batch and continuous distillation
- rectification – principles and technical facilities
- preliminary purification (pre-stripping) and reflux techniques

- Design and technical facilities of discontinuous and continuous systems for wine distillation
- Wine spirits aging – methods and oak wood composition influence
- Spirits blending, treatments and bottling
- Different wine spirit drinks specifics and regions of production:

- Bulgarian Rakia – types and regions of production
- Balkan wine spirit regions of drinks – Vinars, Raka, Tsipouro, Tsikoudia, Zivania
- wine spirits and grape brand spirits of France – Cognac, Armagnac, Fine, Eau-de-vie De Vin, Marc
- wine spirits and grape brand spirits of Italy – Brandy Italiano, Grappa
- wine spirits and grape brand spirits of Spain and Portugal – Brandy, Orujo, Aguardiente, Aguardente de Vinho, Aguardente Bagaseira
- wine spirits and grape brand spirits of Central Europe - Weinbrand
- other wine spirits – Pisco, Chacha

IV. RESOURCES

- *Fermented Foods and Beverages of the World, 2010, CRC Press, New York;*
- *Batch distillation. Design and operation. I.M.Mujtada, 2004, IC Press, UK*
- *Jacques K., Lyons T. P., Kelsall D. R., 1999. The alcohol textbook. Nottingham University Press, UK;*
- *John Stone., 2001. Making Gin & Vodka. A Professional Guide for Amateur Distillers, Saguenay International 2 Cyrus Court Ottawa, Canada.*
- *Kosaric N., Vardar-Sukan F., Pieper H. J., 2001. The Biotechnology of Ethanol: Classical and Future Applications, Wiley, Germany*
- *The evolution of volatile compounds during the distillation of Cognac spirit.(2017) P. Allad at all, Agric.Food Chem., 65, 7736-7748*

WINE MICROBIOLOGY

I. GENERAL

COURSE TITLE	WINE MICROBIOLOGY		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.12	**SEMESTER OF STUDY**	2
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This course aims to give a comprehensive introduction to wine microbiology. On successful completion the student will be able to:

- **know** basic microorganisms, which can be found in winemaking – yeasts, bacteria and moulds;
- **understand** how to manage and control microbiological processes in winemaking in order to produce a high-quality product;
- **study** related disciplines, such as winemaking, and hygiene and beverage safety;
- **design** and **perform** experiments applying the above theoretical knowledge.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Microorganisms in winemaking: main characteristics of yeasts, bacteria and moulds
- Factors affecting microorganisms' growth in winemaking: chemical, physical and biological
- Alcoholic fermentation: main and secondary metabolites produced during fermentation, effect of metabolites on wine quality
- Malolactic fermentation: factors affecting malolactic fermentation, effect of malolactic fermentation on wine quality
- Microbial problems in winemaking: stuck and sluggish fermentation, wine spoilage

IV. RESOURCES

- *Ribéreau-Gayon P., D. Dubourdieu, B. Donèche, A. Lonvaud, Handbook of Enology, vol. 1. The Microbiology of Wine and Vinification, Wiley, Chichester, ISBN-13: 978-0-470-01034-1, 2006*
- *Fugelsang K., Wine Microbiology, Practical Applications and Procedures. Charles Edwards, Second edition, ISBN 0-387-33341-X, Springer, 2007.*
- *Reynold, AG. Managing wine quality Volume 1: Viticulture and wine quality Woodhead Publishing Limited, ISBN 978-1-84569-928-4, 2010*
- *Reynold, AG. Managing wine quality Volume 2: Oenology and wine quality Woodhead Publishing Limited, ISBN 978-1-84569-998-7, 2010*
- *Carrascosa, AV., R. Munoz, R. Gonzales, Molecular wine microbiology, Elsevier, ISBN: 978-0-12-375021-1, 2011*

OENOLOGICAL ENGINEERING

I. GENERAL

COURSE TITLE	OENOLOGICAL ENGINEERING		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.20	**SEMESTER OF STUDY**	3
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to give a comprehensive understanding in the sphere of winemaking equipment and the technical support of the processes. On successful completion the student will be able to:

- **possess** deep theoretical knowledge of the basic components and operation of winemaking equipment;
- **possess** basic practical knowledge of the design, mechanism and operation of winemaking equipment and devices;
- **perform** the basic calculations for the selection of technological equipment for a given wine production.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Equipment and technical devices for receiving, determining quality and processing of the grape
- Equipment for grape mush draining and pressing
- Equipment for wine and crushed grape fermentation
- Equipment for wine clearing
- Equipment for cooling and heating of the must and wine
- Bottling equipment

IV. RESOURCES

- *Ronald S. Jackson, PhD Wine Science Principles and Applications, Academic press, An imprint of Elsevier, 2020*
- *Keith Grainger, Hazel Tattersall, Wine Production and Quality, SECOND EDITION. ISBN: 978-1-118-93455-5 March 2016 Wiley-Blackwell*
- *Keith Grainger, Hazel Tattersall, Wine Production: Vine to Bottle ISBN: 978-0-470-99560-0 November 2007 Wiley-Blackwell*
- *Andrew G. Reynolds, Managing Wine Quality, Volume 2: Oenology and Wine Quality, 2nd Edition - December 3, 2021*
- *V. K. Joshi, Concise Encyclopedia of Science and Technology of Wine ISBN 9781138092754, Published July 28, 2021 by CRC*

SENSORY ANALYSIS

I. GENERAL

COURSE TITLE	SENSORY ANALYSIS		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.19	**SEMESTER OF STUDY**	3rd
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		30	6.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to provide structured and comprehensible information on the sensory analysis of wine. On successful completion, the student will be able to:

- **understand** the concepts and techniques of tasting, assessing and evaluating wines for their styles and qualities, and the challenges in assessing and recognising quality in wines;
- **describe** different wines interpreting the information perceived by the senses of sight, smell, touch, taste and hearing using special wine terminology and **understand** their relation to wine quality;
- **design** and **perform** experiments applying the above theoretical knowledge.

Studying related disciplines, such as viticulture, ampelography, winemaking, wine microbiology, evolution of wine, and treatment and stabilisation of wine, is beneficial through getting specific knowledge. They could be useful for the adequate description of wine quality or the evaluation of wine and for getting accurate feedback about present wine faults and flaws in accordance to the different technological factors/regimes directly affecting the wine sensory profile.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Sensory analysis and its relationship with the quality of wine
- Senses and sense organs: eyesight, hearing, touch, taste, smell; perceptions and sensations
- Organization of wine tasting process: sequence of tasting process, suitable conditions, appropriate equipment, tasting order, temperature of wines
- Wine sensory evaluation: appearance/visual, aroma/smell, taste/flavour, texture, mouthfeel sensation; tasting conclusions: quality assessment, readiness for drinking or potential for ageing
- Wine score sheets and wine terminology
- Factors with impact on the wine sensory profile, wine faults and flaws
- Statistical analysis used in sensory data analysis
- Sensory training exercises and practical wine tasting

IV. RESOURCES

- *Grainger, K., Wine quality: tasting and selection. Food Industry Briefing Series, Wiley-Blackwell, 2009, ISBN: 978-1-405-11366-3*
- *Grainger, K., Tattersall X., Wine Production and Quality, SECOND EDITION, Wiley-Blackwell, 2016, ISBN 9781118934555*

- *Jackson, R. S,Wine Science Principles and Applications, Fifth edition, Elsevier Ltd., 2020, ISBN: 978-0-12-816118-0*
- *Jackson, R. S., Wine tasting – a professional handbook, Third edition, Elsevier Ltd., 2017,* ISBN: 978-0-12-801813-2
- *Joshi, V. K., Concise Encyclopedia of Science and Technology of Wine, Taylor & Francis Group, LLC 2022, ISBN: 978-1-138-09275-4*
- *Lehrer, A., Wine and conversation, Second edition, Oxford University Press, 2009, ISBN 978-0-19-530793-1*
- *Reynolds, A. G., Managing Wine Quality. Volume I: Viticulture and Wine Quality, Second Edition, Elsevier Ltd., 2022, ISBN: 978-0-08-102067-8*
- *Reynolds, A. G., Managing Wine Quality. Volume II: Oenology and Wine Quality, Second Edition, Elsevier Ltd., 2022, ISBN: 978-0-08-102065-4*
- *Stevenson, T., THE SOTHEBY'S WINE ENCYCLOPEDIA. Fourth edition, Dorling Kindersley Limited, London, 2005, ISBN: 0-7566-1324-8*

WINE ANALYSIS

I. GENERAL

COURSE TITLE	WINE ANALYSIS		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.8	**SEMESTER OF STUDY**	1
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		15	3.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to give a comprehensive understanding in the sphere of wine analysis and the laboratory equipment. On successful completion the student will be able to:

- **possess** deep knowledge of different methods of wine analysis;
- **possess** deep practicals on the basic analysis of wine components;
- **possess** deep knowledge of laboratory equipment;

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Methods for sugar content determination;
- Methods for alcohol content and total dry matter determination;
- Methods for acids content determination;
- Methods for phenolic compounds determination;
- Methods for nitrogen compounds determination;
- Methods for esters and acetals determination;
- Methods for mineral compounds determination;
- Methods for aromatic content determination;
- Methods for sulphur dioxide determination.

IV. RESOURCES

- *C. Flanzy, "Oenologie: Fondements Scientifiques et Technologiques, Tec and Doc-Lavoisier," Tech and Doc/Lavoisier, Paris, 1998.*
- *Ribéreau-Gayon, P., Dubourdieu, D., Donèche, B., & Lonvaud, A. (2006). Handbook of enology: The microbiology of wine and vinifications (2nd ed.). John Wiley & Sons.*
- *Ribéreau-Gayon, P., Glories, Y., Maujean, A., & Dubourdieu, D. (2006). Handbook of enology: The chemistry of wine stabilization and treatments (2nd ed.)*

ECONOMICS, MANAGEMENT, LAW, MARKETING AND COMMUNICATION

WINE REGULATIONS

I. GENERAL

COURSE TITLE	WINE REGULATIONS		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	FOOD PRESERVATION AND REFRIGERATION TECHNOLOGY		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.4	**SEMESTER OF STUDY**	1
COURSEWORK BREAKDOWN		**TEACHING WEEKLY HOURS**	**ECTS Credits**
Lectures		30	6.0
Seminar training		15	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to give a comprehensive introduction to wine legislation. On successful completion the student will be able to:

- **understand** basic principles and processes in rulemaking;
- **describe** basic concepts for the wine supply chain, standards and market regulations applicable in the wine sector and **understand** the role of relevant authorities and institutions;
- **study** related disciplines, such as quality management in the wine supply chain, hygiene and beverage safety, wine consumer behaviour and wine marketing;
- **design** documentation and **perform** knowledge-based decisions in implementing standards and legislative requirements.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment

III. COURSE CONTENTS

- The wine supply chain:
  - Characterisation, regulation and control in the wine supply chain
  - International institutions and agreements
  - Authorities and institutions relevant to the Bulgarian wine market
  - A basic regulation item – Appellations vs Trademarks
- Basic knowledge of regulation:
  - Concept of legal system, legal norms and regulations
  - Official authorities – European and national competent authorities
  - Rulemaking process
  - Standardisation – definition and effect
  - Standards applicable in the Wine sector
- The regulation of winemaking in a globalised market:
  - Market regulations in the wine sector
  - Specific wine regulation items
- European and national legislation on wine and wine beverages
- Common Agricultural Policy (CAP) and development of the wine industry

IV. RESOURCES

- *Wine Law and Policy. From National Terroirs to a Global Market (2021). Editors: Julien Chaisse, Fernando Dias Simões, and Danny Friedmann. ISBN: 978-90-04-43831-6*
- *Matt Harvey, Vickie Way. (2014). Global Wine Regulation. ISBN 0455230579, 9780455230573*
- *Бориславов Рс., Виното. История, култура, технология, дегустация, изби и вина. Книгоиздателска къща „Труд“, 2009 г.*
- *Моллов, П. (2013). Качество на храните. Регулиране, контрол, управление. Изд. “Тем Дизайн”, София.*
- *Моллов, П. (2018). Качество и безопасност на храните – законодателство и контрол. Изд. “Тем Дизайн”, София.*

WINE CONSUMER BEHAVIOUR AND WINE MARKETING

I. GENERAL

COURSE TITLE	WINE CONSUMER BEHAVIOUR AND WINE MARKETING		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.5	**SEMESTER OF STUDY**	1
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		15	3.0
Seminar training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

The course is designed and approved by the OIV to provide students with in-depth comprehension of and the ability to apply and synthesize knowledge in the following areas of wine marketing application:

- The structure of the wine industry
- Core marketing concepts with application to the wine industry
- Extended marketing mix with specific focus on wine
- Wine market segmentation, consumer characteristics, motives and behaviours
- Wine brand development and management
- Tasting room management
- Strategic planning in the wine industry
- External and internal factors affecting the wine industry
- Components and development of a marketing plan
- Advertising, promotional strategies and social media in the wine industry

General Skills

- Communication
- Creativity and problem-solving
- Attention to detail
- Interpersonal skills
- Leadership
- Adaptability
- Teamwork
- Critical thinking approach

III. COURSE CONTENTS

- Understand the structure of the wine industry
- Define the core concepts of wine marketing
- Understand the elements of the extended marketing mix and apply it to the wine business framework
- Identify wine consumer segments; analyse consumer motives and behaviours, industry cost profitability norms by segment
- Examine and evaluate winery management practices
- Evaluate strategic planning options and different strategies for the wine brand development and management
- Analyse internal/external forces affecting the wine industry
- Conduct the SWOT analysis for wine businesses
- Evaluate various advertising and promotional strategies, website presence and social media in the wine industry

- Understand the components of and develop a marketing plan for a wine business
- Sensory examination and evaluation of the following properties of wine: variety, region, suitability for aging or drinking, oak content and possible faults.
- Communicate effectively and properly, work productively in a team

IV. RESOURCES

Wagner, P., Olsen, J., & Thach L. (2006). Wine Marketing and Sales: Success Strategies for a Saturated Market. (2nd edition). The Wine Appreciation Guild, San Francisco, CA ISBN: 978-1-934259-25-2

Wine tourism

I. GENERAL

COURSE TITLE	WINE TOURISM			
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES			
DEPARTMENT	TOURISM AND CULINARY MANAGEMENT			
LEVEL OF STUDY	POSTGRADUATE			
COURSE UNIT CODE	60.21	**SEMESTER OF STUDY**	1	
COURSEWORK BREAKDOWN		**TEACHING HOURS**		**ECTS Credits**
Lectures		15		3.0
Seminar training		30		
LANGUAGE OF INSTRUCTION/EXAMS:	English			

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to provide theoretical and practical skills in offering the product of wine tourism, part of cultural tourism. On successful completion the student will be able to:

- **understand** the philosophy of wine tourism as a phenomenon;
- **describe** the Old and the New World Wine tourism destinations;
- **study** related courses from the Economics, Management, Law, Marketing and Communication module;
- **design** and **perform** diversification of the wine tourism product.

General Skills

- Conducting critical analyses on tourism data
- Individual or team work based on the individual student profile
- Working in a multidisciplinary environment
- Promotion of creative and out-of-the-box thinking

III. COURSE CONTENTS

- The phenomenon of tourism and the visitor experience
- Wine and people; winescapes as an integral part of the cultural tourism
- The system of wine tourism; wine tourism demand, supply and prices; emerging issues in wine tourism
- The wine tourism product and wine routes; wine tourism resources; wine museums and wineries
- Wine tourism and UNESCO World Heritage Sites
- Old World Wine tourism destinations
- New World Wine tourism destinations
- Accessibility of wine tourism products by tourists with special needs

IV. RESOURCES

- *Стамов, С., К. Никовска. Винен туризъм. Кота, 2008.*
- *Carlsen, J., Charters, S. Global wine tourism: research, management and marketing. CAB International, 2006.*
- *Hall, C.M., L. Sharples, B. Cambourne, N. Macionis. Wine tourism around the world. Routledge, 2002.*
- *Khan, M.A. Strategic winery tourism and management. CRC Press, 2016.*
- *Pezzi, M.G., A. Faggian, N. Reid. Agritourism, wine tourism, and craft beer tourism. Routledge, 2021.*
- *Peters, G.L. American winescapes. Routledge, 2018.*
- *Onofri, L. Sustainability in high-excellence Italian food and wine. Routledge, 2022.*
- *Pforr, C., I. Phau. Food, Wine and China - Food, Wine and China - a Tourism Perspective. Routledge, 2018.*
- *Cavicchi ,A., C. Santini. Food and wine events in Europe. Routledge, 2014.*

- *Hall, C.M. (ed.). Wine, food, and tourism marketing. Routledge, 2010.*
- *Joshi, K. Concise encyclopedia of science and technology of wine. CRC Press, 2021.*
- *Joshi, K., R. Ray. Winemaking basics and applied aspects. CRC Press, 2021.*

QUALITY, FOOD SAFETY AND THE ENVIRONMENT

HYGIENE AND BEVERAGE SAFETY

I. GENERAL

COURSE TITLE	HYGIENE AND BEVERAGE SAFETY		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	TECHNOLOGY OF WINE AND BEER		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.21	**SEMESTER OF STUDY**	3
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		15	3.0
Practical training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This course aims to give a comprehensive introduction to hygiene and beverage safety. On successful completion the student will be able to:

- **describe** basic principles of wine preservation in order to achieve product safety;
- **understand** how important is hygiene as a tool for improving beverage safety;
- **study** related disciplines, such as wine microbiology and quality management in wine supply chain;
- **design** and **perform** microbiological control in winemaking.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Microbiological control in winemaking as part of food safety systems: fundamentals, main points of microbiological control in winemaking, effect of microorganism product on human health
- Methods for ensuring biological stability of wine: sterilising filtration, pasteurisation and use of preservatives
- Hygiene as a tool for increasing biological stability of wine: detergents and sanitisers used in winemaking, schedule for cleaning and sanitising in winemaking

IV. RESOURCES

- *Fugelsang K., Wine Microbiology, Practical Applications and Procedures. Charles Edwards, Second edition, ISBN 0-387-33341-X, Springer, 2007.*
- *Reynold, AG. Managing wine quality Volume 1: Viticulture and wine quality Woodhead Publishing Limited, ISBN 978-1-84569-928-4, 2010*
- *Reynold, AG. Managing wine quality Volume 2: Oenology and wine quality Woodhead Publishing Limited, ISBN 978-1-84569-998-7, 2010*
- *Carrascosa, AV., R. Munoz, R. Gonzales, Molecular wine microbiology, Elsevier, ISBN: 978-0-12-375021-1, 2011*

QUALITY MANAGEMENT IN THE WINE SUPPLY CHAIN

I. GENERAL

COURSE TITLE	QUALITY MANAGEMENT IN THE WINE SUPPLY CHAIN		
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES		
DEPARTMENT	FOOD PRESERVATION AND REFRIGERATION TECHNOLOGY		
LEVEL OF STUDY	POSTGRADUATE		
COURSE UNIT CODE	60.13	**SEMESTER OF STUDY**	2
COURSEWORK BREAKDOWN		**TEACHING HOURS**	**ECTS Credits**
Lectures		15	3.0
Seminar training		30	
LANGUAGE OF INSTRUCTION/EXAMS:	English		

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

This module aims to give a comprehensive introduction to wine legislation. On successful completion the student will be able to:

- **understand** basic principles and processes in quality management;
- **describe** basic concepts for quality, supply and demand chain and **understand** the main principles of quality management and the role of interested parties;
- **study** related disciplines, such as wine regulations, wine consumer behaviour and wine marketing, sustainable wine systems;
- **design** product quality and **perform** knowledge-based decisions in planning, controlling and optimising processes.

General Skills

- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Introduction to quality management:
  - Quality in the agri-food chain
  - Quality – concept and definition
- Wine quality:
  - Quality perception
  - Quality attributes
  - Factors influencing wine quality
- Quality management
  - Management – decision-making concept
  - Techno-managerial approach
  - Quality management activities
  - Quality behaviour
- Quality design
  - Quality design process
  - Product design variables
  - Process design variables
  - Tools
- Quality control
  - Quality control activities
  - Tools and methods
- Quality improvement

- Activities
- Tools and methods
- Quality assurance
  - Guidelines and standards
- Total quality management

IV. RESOURCES

- *Моллов, П. (2013). Качество на храните. Регулиране, контрол, управление. Изд. "Тем Дизайн", София.*
- *Моллов, П. (2018). Качество и безопасност на храните – законодателство и контрол. Изд. "Тем Дизайн", София.*
- *Моллов, П. и Велчев З., (2020). Качество и безопасност на храните – управление на качеството на храните.. Изд. "Тем Дизайн", София.*
- *Pieternel A. Luning and Willem J. Marcelis (2009) Food quality management. Technological and managerial principles and practices. ISBN: 978-90-8686-116-3*
- *Pieternel A. Luning and Willem J. Marcelis (2020) Food quality management. Technological and managerial principles and practices. eISBN: 978-90-8686-899-5 | ISBN: 978-90-8686-348-8*
- *Managing Wine Quality. Volume II: Oenology and Wine Quality. A volume in Woodhead Publishing Series in Food Science, Technology and Nutrition. Second Edition • 2021*
- *Managing Wine Quality. Volume I: Viticulture and Wine Quality. A volume in Woodhead Publishing Series in Food Science, Technology and Nutrition. Second Edition • 2010;* ISBN 978-1-84569-475-3
- *Rihn, Alicia L., Kimberly L. Jensen, and David W. Hughes. 2022. "Consumer Perceptions of Wine Quality Assurance Programs: An Opportunity for Emerging Wine Markets" Sustainability 14, no. 4: 2340. https://doi.org/10.3390/su14042340*
- *OIV 2022. STATE OF THE WORLD VINE AND WINE SECTOR 2021*

SUSTAINABLE WINE SYSTEMS

I. GENERAL

COURSE TITLE	SUSTAINABLE WINE SYSTEMS			
UNIVERSITY	UNIVERSITY OF FOOD TECHNOLOGIES			
DEPARTMENT	TECHNOLOGY OF WINE AND BEER			
LEVEL OF STUDY	POSTGRADUATE			
COURSE UNIT CODE	60.22	**SEMESTER OF STUDY**	3rd	
COURSEWORK BREAKDOWN		**TEACHING WEEKLY HOURS**		**ECTS Credits**
Lectures		15		3.0
Seminar training		30		
LANGUAGE OF INSTRUCTION/EXAMS:	English			

II. LEARNING OUTCOMES

Learning Outcomes *(according to the Bologna process)*

The discipline provides basic knowledge of:

- The **principles of sustainability** in the food industry and winemaking in particular
- **Waste products** from wine production and the possibilities for their utilisation
- The development of **integrated sustainable systems** in the wine industry
- **Design** and **performance** of experiments applying the above theoretical knowledge.

General Skills

- Individual and autonomous work
- Team work
- Working in a multidisciplinary environment
- Promotion of free, creative and inductive thinking

III. COURSE CONTENTS

- Basic principles of sustainability
- Application of the principles of sustainability in the food and wine industry
- Sustainable viticulture systems
- Principles of the development of integrated viticulture systems
- Waste products from wine production and methods for their utilisation

IV. RESOURCES

- *Preston-Wilsey, L. (2015). TOWARD A SUSTAINABLE WINE INDUSTRY. Green Enology in Practice, Apple Academic Press, Inc.*
- *Goode, J., Harrop, S. (2011). AUTHENTIC WINE. Toward Natural and Sustainable Winemaking, University of California Press.*

WINE AND HEALTH

I. GENERAL

COURSE TITLE	WINE AND HEALTH			
UNIVERSITY	MEDICAL UNIVERSITY OF PLOVDIV			
DEPARTMENT	HYGIENE			
LEVEL OF STUDY	POSTGRADUATE			
COURSE UNIT CODE	60.15	**SEMESTER OF STUDY**	2nd	
COURSEWORK BREAKDOWN			**TEACHING HOURS**	**ECTS Credits**
Lectures			15	3.0
Seminar training			30	
LANGUAGE OF INSTRUCTION/EXAMS:	English			

II. Learning Outcomes

Learning Outcomes

The course is designed to provide students with in-depth comprehension of and the ability to apply and synthesize knowledge in the following areas:

- The core concept of health, anti-aging and longevity
- The role of wine in medicine
- The wine-derived compounds influencing the life span
- The relationship between wine consumption and favourable disease outcomes
- The concept of wine in moderation as an essential element of a healthful diet

General Skills

- Creativity and problem-solving
- Attention to detail
- Critical thinking

III. COURSE CONTENTS

- Understand and define the concept of health, anti-aging and longevity
- Know the history and role of wine in medicine
- Define moderate wine consumption
- Know the benefits of moderate wine consumption
- Understand how wine is associated with health and anti-aging properties
- Identify the key wine-derived compounds in relation to health
- Discuss the health preventive properties of wine

IV. Resources

Recommended textbook:
Baxter R. (2019). Wine&Health: Making sense of the new science, and what it means for wine lovers. Board and Bench Publishing, San Francisco, USA ISBN (paperback): 978-1-935879-11-4, ISBN (epub): 978-1-935879-12-1