

COURSE OUTLINE

(1) GENERAL

SCHOOL	TECHNOLOGY		
DEPARTMENT	FORESTRY, WOOD SCIENCES & DESIGN		
LEVEL	POSTGRADUATE		
COURSE CODE	MB111	SEMESTER	1 st
COURSE TITLE	BIOECONOMY AND FOREST ECOSYSTEMS		
ACTIVITIES		WEEKLY HOURS	ECTS
Lectures		2	6
TOTAL		2	6
TYPE OF COURSE	OBLIGATORY		
PREREQUISITES	NO		
LANGUAGE OF TEACHING AND EXAMINATION	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
WEBPAGE COURSE (URL)	https://eclass.uth.gr/courses/FWSD_P_106/		

(2) LEARNING OUTCOMES

Learning Outcomes
<p>The purpose of the course is to understand the basic principles of the bioeconomy with gradual specialization in the bioeconomy of the forest and the natural environment which is its most important pillar. The bioeconomy is based on the framework of using natural resources resulting from the practice of multifunctional Forestry with more wisdom, but also efficiency in cooperation with natural systems to achieve both social and economic goals. The course responds to the rapid development of the global bioeconomy by providing fundamental knowledge and skills required in today's competitive and fast-growing business and work environment, with a focus on businesses in the value chain of wood and other forest products. It is a basic introductory course, which will enable students to delve into the concepts required for the sustainable utilization of forest ecosystems and the development of the bioeconomy in the modern economic and not only becoming.</p> <p>Upon successful completion of the course students will:</p> <ul style="list-style-type: none"> • Have developed basic knowledge and skills in the fields of bioeconomy and in particular the forest industry value chain, circular economy and sustainable development. • Have acquired a comprehensive view and ability to assess the ways in which the bioeconomy has already begun to change production methods, industrial structures and sectors, market dynamics and strategic decision-making. • Have been introduced in the context of the bioeconomy that includes the state, users, citizens, and third parties and to recognize the emerging socio-economic trends in the bioeconomy. • Become aware of the ethical and legal issues that people and society at large face and will face in the near future as a result of these changes. • Understand and utilize the knowledge of product life cycle analysis in the context of forest bioeconomy and make use of this knowledge in the development of business strategies or even more specialized ones, such as production strategy, marketing, in order to respond to modern competitive challenges.

- Know introductory concepts of innovations, technologies and the new required abilities and skills in order to create new products and services attractive to the market but also in accordance with the new imperatives of the circular bioeconomy.

Γενικές Ικανότητες

(3) COURSE CONTENT

The course content is as follows:

- **Update on the course. Introduction to the Bioeconomy and the application of its principles to the management of natural resources.** Introductory concepts in the bioeconomy and natural resources, Key concepts (natural resources: biotic, abiotic), General description of the EU strategy for forest ecosystems in the context of the Bioeconomy.
- **Natural resources and value chains.** Natural resources and value: from value chains to value loops. Product / industry life cycle. Differentiation of natural resources (potential, actual, stock). Renewable natural resources – the forest as a renewable natural resource.
- **Conditions for a sustainable bioeconomy.** Sustainable development goals. Efficient use of resources. Climate impact – conflicting goals. The role of global governance.
- **The role of the bioeconomy and global development challenges.** The bioeconomy as a source of economic development. Bioeconomy product development processes. Bioeconomy adoption processes by companies and organizations in the forest industry.
- **Bioeconomy – sustainability and forest ecosystems.** Sustainability, resource and material efficiency. Forest ecosystems (industrial forests, non-industrial forests). Social and economic multiple importance of forest ecosystems. The EU strategy for forest ecosystems.
- **Bioeconomy and sustainable development.** The transition to a sustainable bioeconomy. Policy and strategy for the bioeconomy in Europe. Procurement, sustainability management and entrepreneurship. The framework of the EU.
- **Bioeconomy and circular economy.** From the Industrial Revolution of linear production to the current state of circular production and minimal residue/waste. Circular economy butterfly diagram analysis. The basic principles and systems of the circular economy. The connection of the bioeconomy with the circular economy.
- **Biomass from forestry – Technologies based on the bioeconomy.** The bio-based production value chain. Origin of biomass. The use of biomass for the production of fuels and chemicals. Green biorefineries.
- **The bioeconomy in the light of the innovative economy.** Innovation and knowledge systems. The economy of change. The limits of development. Applications of innovative economy in ecosystems. Development of new value chains.
- **Challenges and requirements for a competitive bioeconomy.** Availability and management. Technology and production costs. Quality / functionality requirements. Consumer acceptance factors (features, risk benefit perception, added value, etc.).
- **Circular Bioeconomy and business utilization.** Industrial symbiosis. Analysis of Industrial Symbiosis in Forestry. The ecological design (ecodesign).
- **Sustainable bioeconomy transition scenarios, innovation systems and good practices.** Development strategies compatible with the environment. Bioeconomy and ecomodernism. The process of learning based on the principle of sustainability.
- **Presentations of final course assignments.**

The course takes place two (2) hours per week and is conducted using PCs, ppt slides, projector. The learning process is supported through the E-class electronic platform.

An interactive whiteboard, as well as eight (8) PCs in the Laboratory are used as media to exercise students in a questionnaire processing program.

Speakers relevant to the subject of the course are invited from time to time.

Every one or two weeks assignments are given to practice topics related to the subject of the course, while the final (6th assignment) should be undertaken and prepared by the student (individually) until the end of the MSc semester.

The relevant directions are given, while rich material and instructions are posted in the corresponding E-class course.

The final assignment includes, in addition to paper and electronic submission, a public oral presentation on the chosen topic, on a set date (usually the 12th or 13th week of classes). The presentation lasts 15 minutes and is followed by 5 minutes of questions from the students present. The teacher intervenes - if necessary - for comments, observations, corrections. Students are graded on the overall performance of their final paper: 70% on the content and editorial specifications and 30% on the preparation of the online presentation and its oral support.

These grades count for a total of 40% of the overall grade that students will receive after the final written theory exam.

(4) TEACHING AND LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD	In class and remotely	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	<ul style="list-style-type: none"> • Use of PCs, ppt slides, projector • Learning process support through the e-class electronic platform • Interactive Whiteboard • Eight (8) PCs in the Laboratory for student exercise in a questionnaire processing program 	
MANAGEMENT OF TEACHING	Activity	Semester Workload
	Lectures	26
	Six (6) individual assignments related to the subject of the course	70
	Small individual practice tasks	10
	Independent study	44
	Course Total	150
STUDENT EVALUATION	<p>The achievement of the learning objectives will be evaluated based on a total of six (6) assignments and the written examination course.</p> <p>In order to secure a passable grade (at least 5) it is necessary to achieve a passable grade in weighted average of six (6) assignments and the final exam.</p> <p>I. Written final exam (60%) which includes:</p> <ul style="list-style-type: none"> • Short answer questions from all the material in the book. • Solving exercises related to the subject of the course (e.g. pricing, advertising, sales, product life cycle). <p>II. Successful delivery of six (6) assignments and presentation of the individual final (6th) assignment (40%)</p>	

(5) RECOMMENDED-BIBLIOGRAPHY

- Suggested Bibliography:

Cooke P. 2013. Growth Cultures: The global bioeconomy and its bioregions. Routledge.

D' Amours S., M. Ouhimmou, J.F.Audy and Y. Feng. 2016. Forest value chain optimization and sustainability. CRC P.

Ellen MacArthur Foundation (2013) Towards the circular economy.

http://www.mckinsey.com/~media/mckinsey/dotcom/client_service/sustainability/pdfs/towards_the_circular_economy_ashx

Kovacs B. (ed.). 2015. Sustainable agriculture, forestry and fisheries in the bioeconomy – a challenge for Europe. Standing Committee on Agricultural Research – 4th Foresight Exercise. European Commission, Brussels.

Lewandowski I. (ed.). 2017. Bioeconomy: Shaping the Transition to a Sustainable, Biobased Economy. Springer.

Lovrić M., N. Lovrić and R. Mavsar. 2017. Synthesis on forest bioeconomy research and innovation in Europe.

Odegard I., H. Croeze and G. Bergsma. 2012. Cascading of biomass: 13 solutions for a sustainable bio-based economy. CE Delft, Delft.

Pietzch J. 2018. Εισαγωγή στη Βιοοικονομία, Bookstation.gr, Επιμέλεια Βοργιάς Κ.

Βλάχου Α. 2001. Περιβάλλον και φυσικοί πόροι: Οικονομική θεωρία και πολιτική. Τόμος Α'. Αθήνα, Εκδόσεις Κριτική

- *Related scientific journals:*

Journal of Cleaner Production

- Forests
- International Journal of Life Cycle Assess
- Sustainability
- The Forestry Chronicle
- Forest policy and economics
- Scandinavian Journal of Forest Research
- Bioproducts Business
- Bioresources