

DIGIT-Bio-TECH

2019-1-BG01-KA203-062371

M.Sc. PROGRAMME “GREEN BIOTECHNOLOGY AND ICT”

SYLLABUS

COURSE:

ENVIRONMENTAL BENEFIT FROM MODERN BIOTECHNOLOGY AND ICT APPLICATIONS

AUTHORS:

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Academic work		Type	Number of classes
In-class work	Lectures		30
	Seminars		20
Total in-class work			50
Out-of-class work	Presentations		25
	Projects		20
	Self-guided library/database work		30
Total out-of-class work			75*
Total of academic work			125
ECTS credits in-class work			2.0
ECTS credits out-of-class work			3.0
Total ECTS credits			5.0
Nº	Grading		% of the grade
1.	Workshops/discussions of reports and papers		20 %
2.	Case studies		20 %
3.	Homework assignments and tests		10 %
4.	Exams		50 %

* One credit corresponds to 25 hours of work.

Outline of the course

This LO offers educational content that emphasizes on the tools for acceptability in social context of modern biotechnology applications. It explains the factors influencing the social perception of modern biotechnology: societal Impact, establishment and spreading of knowledge, Science and Technology (S&T) impact on society, ethical issues. Information is presented about the norms, value systems and cultural backgrounds as indices that determine the variety of social acceptance patters of modern biotechnology, focused on opinions and reasons depending on cultural context; attitude towards science and technology; bioethical patters; demographic influence. The societal acceptability of benefits and risks imposed by modern biotech applications is given as well in terms of: societal dilemma benefits vs. risks; risk acceptance as a key element in risk perception; tools for measuring public attitudes towards risks and benefits. The risk management approaches, i.e., the ways for identification and formulation of issues related to societal development and their placement into the processes and institutional systems where biotechnological development is designed, monitored and regulated are explained. Special emphasis is given to the acceptance and diffusion of modern biotechnology and its possible negative impacts on socio-economy, biodiversity and sustainable agriculture, and public welfare.

The LO offers educational content that emphasizes on the enlightenment of the acceptability of modern biotechnology tools from the stand point of European policies. It offers to the trainees vision to the main regulatory measures and aspects in the development of modern biotechnology, its products, and services. The regulatory picture at European level that goals to improve current regulatory frameworks for modern biotechnology development and link them to the bio-economy is described. The main reasons for the improvement of this regulatory frameworks are outlined. The training material encompasses as well information about the sectoral policy in the field of Modern Biotechnology tackling the need for regulation, specific to it. It emphasizes on the major modern biotechnology areas that are subjected to regulation: agriculture and food; health care, energy, and industrial processing focusing on the high-profile debates on the regulation of materials/services derived from modern biotechnology applications. The major international legal instruments and regulatory structures for biotechnology applications are outlined; the political and environmental factors sustaining these matters on policy agendas are revealed; the importance to implement regulations to act as direct promoters of cleaner industrial processes is stressed upon. The main regulatory documents concerning the management of the relations with the natural environment, the intellectual property rights & security are discussed as well in the light of human and environmental health and safety, global trade and manipulation of genetic resources.

Educational goals

Modern biotechnology has been recognized as the bound of the next technological revolution. It is a forceful machine that offers a range of potential environmental, social and economic profits and requires stringent attention. On the other hand, innovative technologies are having a significant impact on the development of biotechnology processes and biotech products manufacture. The merging between these advanced technologies has been a subject of social debate. Due to these reasons, the educational goals of this LO are to present the basics of the social framework regarding modern biotechnology tools acceptability through:

- revealing the factors that influence the social attitude towards modern biotechnology, the advantages of societal acceptability and the bottleneck steps of the process
- explaining the societal acceptability of benefits and risks from biotechnological applications
- presenting the acceptance and diffusion aspects of modern biotechnology
- commenting the debate on acceptability of modern biotechnology tools and institutional systems in terms of possible negative impacts.

The progress in modern biotechnology has been so quick in the last years, since it is linked to the important process of convergence between biotech approaches and other advanced technologies for their realization. The application of process biotechnology tools: from classical selection methods through recombinant DNA techniques and protein engineering, to bioprocessing are more and more facilitated by other technological advancements. However, the acceptability of modern biotechnology tools is a matter of political debate, especially in the advanced countries. Thus, the educational goals of this LO are to outline the political framework of the acceptability process that reflects among all the social acceptability. The information is focused on:

- modern Biotechnology regulatory framework
- sectoral policy in the Modern Biotechnology fields agriculture and food, healthcare energy, and industrial processing
- management of relations with the natural environment
- Intellectual Property Rights and security.

Expected outcomes

Knowledge and Skills:

As a result of the training students will be able to:

- recognize and understand the factors influencing the social perception of modern biotechnology
- distinguish and apply the indices that determine the variety of social acceptance patterns of modern biotechnology: norms, value systems and cultural backgrounds
- present societal acceptability of benefits and risks imposed by modern biotech applications
- evaluate the societal dilemma: benefits vs. risks
- know and use the structural models predicting attitude towards biotechnology
- Distinguish the tools for measuring public attitudes towards risks and benefits
- identify and formulate issues related to possible negative impact of biotechnological development on socio-economy, biodiversity and sustainable agriculture, public welfare

- know and recognize the major biosafety issues of modern biotechnology
- express the vision to the main regulatory measures and aspects in the development of modern biotechnology, its products, and services
- recognize the main reasons for the improvement of regulatory frameworks for modern biotechnology
- know the basics of the sectoral policy in the field of modern biotechnology tackling the need for regulation, specific to it
- present the major points in the high-profile debate on the regulation of foods derived from modern biotechnology applications
- emphasize on the international legal instruments and regulatory structures for biotechnology applications concerning health care and safety, international trade and use of genetic resources
- know and understand the political and environmental factors sustaining the energy matters on policy agendas
- explain the main approaches for biofuels production from biomass sources and downstream technologies
- recognize the implementation of regulations to act as direct promoters of cleaner industrial processes
- know the main regulatory documents concerning the management of the relations with the natural environment, the intellectual property rights & security.

Problem-solving skills: Decision making, creative thinking, analytical, research and interpreting skills

Digital competencies and skills: strategic web and database searching; data analysis and presentation; data management and preservation; digital communication; networks and file management.

Personal skills: initiative and independence, time management, good oral and written communication skills, teamwork.

Syllabus

№	Topic	Number of classes
1.	Unit 1 BL - Modern Biotechnology at a Glance	25 h
1.1	Practical Applications of Modern Biotechnology.	1 h
1.2	Social Attitude to Modern Biotechnology: Societal Impact. Establishment and spreading of knowledge. Science and Technology (S&T) impact on society. Perception of modern biotechnology applications.	4 h
1.3	Benefits and Risks from Biotechnology Applications: Benefits vs. risks societal dispute. Risk acceptance. Risk Management. Social benefits of modern biotechnology.	3 h
1.4	Acceptance and diffusion of modern biotechnology.	2 h
1.5	Possible negative impacts of modern biotechnology: Socioeconomical Impacts. Impacts on biodiversity and sustainable agriculture. Impacts on public welfare.	3 h
1.6	Biosafety issues of modern biotechnology.	2 h
1.7	Seminars	10 h
2.	Unit 2 AL - Regulatory Tools and Frameworks for Modern Biotechnology	25 h
2.1	Modern biotechnology regulatory framework.	2 h
2.2	Sectoral policy in the field of Modern Biotechnology. Agriculture and Food. Health care. Energy. Industrial processing.	4 h
2.3	Management of relations with the natural environment.	3 h
2.4	Modern Biotechnology and Intellectual Property Rights.	3 h
2.5	Modern Biotechnology and Security.	3 h
2.6	Seminars	10 h