BF2701 INTRODUCTION TO BIOENGINEERING

Version: 2017.1.0

1. GENERAL INFORMATION

Title der Module: Introduction to Bioengineering

Code: BF2701

Credit: 2(1-1-1-4)

- Lecture: 15 hours
- Tutorial/Seminar: 15 hours
- Practical: 15 hours

2. DESCRIPTION

The course introduces: Biotechnology and Bioengineering concept, Biotechnology and Bioengineering development history, Biotechnology sub-sectors: the applications of biotechnology in the fields of industry, agriculture, medicine/pharmaceuticals and the environment, the curriculum of Bioengineering program of Hanoi University of Science and Technology. Students are introduced to the ethical and biosafety rules applied in the field of biotechnology, learn the principles, how to operate and apply equipment and instruments in biotechnology at the laboratory and pilot scale. The course also introduces the trends of biotechnology and bioengineering development in the world, in Vietnam and career opportunities in the field.

In addition, the course also provides students with the teamwork skills, presentations and attitudes needed to work in the future.

3. OBJECTIVES AND EXPECTED LEARNING OUTCOMES

Students who successfully complete this module are capable of:

Objectives/LO	Description of objectives/Expected LO	LO/ Level (I/T/U)
[1]	[2]	[3]
M1	**Understanding basic concepts and terminology in biotechnology and bioengineering, Biotechnology sub-sectors**	2.1.1, 2.1.2, 2.3.1, 2.5.4,3.2.5 , 4.1.1, 4.1.2
M1.1	Understand the concept of biotechnology and Bioengineering, basic terms in biotechnology, training program Bioengineering of HUST	[4.1.1, 4.1.2] (IT)
M1.2	Identify the biotechnology sub-sectors	[2.1.2] (TU)
M1.3	Ability to learn the specific application of biotechnology and bioengineering in the different field of life and in production	[2.1.1, 2.1.2, 2.3.1, 2.5.4, 3.1.1, 3.2.5] (U)
M2	**Identify biosafety of biotechnology**	[1.3.5, 2.1.2, 4.1.3]

Objectives/LO	Description of objectives/Expected LO	LO/ Level (I/T/U)
M2.1	Understand principles of equipment and its application in biotechnology	[1.3.5, 2.1.2] (TU)
M2.2	Understanding the principles of working in the Biotechnology laboratory	[4.1.3] (I)
M2.3	Understanding the concept of bioethics, recognizing conflicting views about genetically modified organisms	[2.1.2] (TU)
M3	**Identify development trends of biotechnology and bioengineering, opportunities, challenges**	2.1.2, 2.5.4, 3.2.5, 4.1.3, 4.1.5, 4.2.2
M3.1	Understand and identify the latest biotechnology applications	[2.1.2, 2.5.4, 3.2.5, 4.1.5, 4.2.2] (TU)
M3.2	Identify the opportunities and challenges of biotechnology	[2.1.2, 2.5.4, 3.2.5] (TU)

4. REFERENCES

Text book

[1] Nguyễn Hoàng Lộc (2007). *Introduction to Biotechnology*. Hue University Publishing House

[2]

Reference book

[1] John E. Smith (2004) *Biotechnology*, Study on Biology. 5th edition, Cambridge University Press, 2004.

[2] Đỗ Năng Vịnh (2008). Fundamentals biotechnology. Agricultural publisher

[3] Laboratory biosafety manual (2004). WHO.

[4] W.T. Godbey (2015). Introduction to Biotechnology. The Science, Technology and Medical Applications. Academic Press.

5. ASSESSMENT METHODS

Points	Assessment methods	Description	CĐR được đánh giá	Proportion
[1]	**[2]**	**[3]**	**[4]**	**[5]**
A1. Midterm point (*)	**Evaluation**			**50%**
	A1.1. Seminar	Presentation	M1.2; M1.3; M3.1; M3.2	20%
	A1.2. Excursion	Discussion	M1.2; M1.3;	10%

	A1.3. Practical	Report	M2.1; M2.2;	20%
A2. Final point	**A2.1. Final test**	Writing	M1.1÷M1.2 M3.1÷M3.3	**50%**

6. TEACHING PLAN

Weeks	Contends	Expected LO	Activities	Assessment
[1]	[2]	[3]	[4]	[5]
1	CHAPTER I. Introduction I.1. Definition of Biotechnology and Bioengineering I.2. Biotechnology, bioengineering and history of developments	M1.1 M1.2 M1.3	Lectures	A2.1
2	Chapter I (continue) I.3. Biotechnology sub-sectors 1.4. Current status of Biotechnology in the world and in Vietnam	M1.1 M1.2 M3.1 M3.2	Lectures	A2.1
3	Chapter I (continue) I.5. Bioengineering syllabus in HUST I.6. Bioethics and biosafety Chapter II. Bioengineering process for production of bioproducts II.1 Microorganism and genetic modified microorganism	M1.1 M1.2 M3.1 M3.2	Lectures	A2.1
4	Chapter II. (continue) II.1 Microorganism and genetic modified microorganism Practical 1: Biotechnology equipment and biosafety in Bio - laboratory	M1.1 M1.2 M3.1 M3.2 M3.3	Lectures	A2.1 A1.3
5	Chapter II. (continue) II.2 Fermentation process for production of bioproducts Practical 2: Biotechnology equipment and biosafety in Bio - laboratory	M1.3 M3.1 M3.2 M3.3	Lectures	A2.1 A1.3
6	Chapter II. (continue) II.3 Downstream process Practical 3: Biotechnology equipment and biosafety in Bio - laboratory	M1.3 M3.1 M3.2 M3.3	Lectures	A2.1 A1.3

Weeks	Contends	Expected LO	Activities	Assessment
[1]	[2]	[3]	[4]	[5]
7	Chapter II. (continue) II.3 Downstream process Chapter III. Biotechnology sub-sectors	M1.3 M3.1 M3.2 M3.3	Lectures	A2.1
8-9	Chapter III. Biotechnology sub-sectors III. White Biotechnology Seminar	M1.2 M1.3 M3.1 M3.2	Presentation Discussion	A1.1 A2.1
10-11	Chapter III. Biotechnology sub-sectors (continue) III.2 Red Biotechnology Seminar	M1.2 M1.3 M3.1 M3.2 M3.3	Presentation Discussion	A1.1 A2.1
12-13	Chapter III. Biotechnology sub-sectors (continue) III.3 Green Biotechnology Seminar	M1.2 M1.3 M3.1 M3.2 M3.3	Presentation Discussion	A1.1 A2.1
14	Chapter III. Biotechnology sub-sectors (continue) III.4 Environmental Biotechnology Seminar	M1.2 M1.3 M3.1 M3.2	Presentation Discussion	A1.1 A2.1
15	Excursion to biotechnology plant	M1.2	Guide	A1.2

7. INQUIRY TO STUDENTS

- Students should participate in all practical hours in laboratory
- Students have to participate in presentation

8. DATE OF APPROVAL: ……..

Chairman **Lecturers responding for buiding the Module**

PGS. Lê Thanh Hà **PGS Quản Lê Hà**

9. UPDATE PROCESS

Number	Adjusted content	Date	Apply time	Note
1	……			
2	……			