

**BIOSCIENCE AND
BIOTECHNOLOGY
2020-1**

I. INFORMACIÓN GENERAL

CURSO	BIOSCIENCE AND BIOTECHNOLOGY
CLAVE	ING308
CRÉDITOS	3
HORAS DE DICTADO	CLASE: 3 Semanal EXAMEN:
HORARIO	1022
PROFESORES	

II. PLANES CURRICULARES DONDE SE DICTA EL CURSO

ESPECIALIDAD	ETAPA	NIVEL	CARÁCTER	REQUISITOS
INGENIERÍA ELECTRÓNICA	PREGRADO EN FACULTAD	0	ELECTIVO	Cred.en Especialidad : 140.00

Tipos de requisito

- 04 = Haber cursado o cursar simultáneamente
- 05 = Haber aprobado o cursar simultáneamente
- 06 = Promedio de notas no menor de 08
- 07 = Haber aprobado el curso

III. DESCRIPCIÓN DEL CURSO

Biotechnology is the third wave in the advancement of biological science and represents an interface of basic and applied sciences, where gradual and subtle transformation of science into technology can be witnessed. Biotechnology can be defined as the application of scientific and engineering principles to process matter with biological agents to provide goods and services. By presenting applications of Biotechnology in life science and industries, we expect an easy understanding of biotechnology for non-biology students and an opportunity to discover how deeply biotechnology is related to every day's life.

IV. SUMILLA

This course is based on the general ideas about the "Bioscience" and "Biotechnology". The effects of biotechnology on our every life are explained with examples of various applications area. Each area where the techniques of biotechnology are efficiently applied will be explained showing significant advantages of using biological techniques. By presenting biotechnology applications in life science and industries, the easy understanding of biotechnology is expected. It will provide the opportunity of discover of "how deeply biotechnology are related with our life". Finally, the biological materials and biocatalysts (enzymes) will be also explained to provide wide information of biotechnology to students.

V. OBJETIVOS

The course aims to provide a comprehensive overview of biotechnology in life science and their broad applications in industrial and medical areas. Through these lessons, the advantages and challenges of biotechnology applications will be presented to students.

These objectives contribute significantly to the achievement of the following results of student:

- Habilidad de aplicar los conocimientos de matemáticas, ciencias e ingeniería.
- Habilidad de diseñar sistemas, componentes o procesos que satisfagan las necesidades deseadas dentro de restricciones reales, tales como: económico, medio ambiente, social, político, ético, salud y seguridad, fabricación, y sostenibilidad.
- Habilidad de trabajar y desenvolverse adecuadamente en equipos multidisciplinarios.
- Entendimiento de la responsabilidad profesional y ética.

VI. PROGRAMA ANALÍTICO

SESIÓN 1 INTRODUCTION: SCIENTIFIC PRINCIPLES OF BIOTECHNOLOGY: HISTORICAL PERSPECTIVE (1 sesiones)

Biotechnology has been used for thousands of years, however modern biotechnology takes advantage of knowledge gathered in the last hundred years.

SESIÓN 2 INTRODUCTION: SCIENTIFIC PRINCIPLES OF BIOTECHNOLOGY (1 sesiones)

Perspectives of Industrial Biotechnology development and innovation in the world (Europe, US, Asia)

SESIÓN 3 BIOTECHNOLOGY IN BIOMEDICAL APPLICATIONS 1 (1 sesiones)

How biotechnology is involved in human health life in history: Antibiotic, antibody, vaccination

SESIÓN 4 BIOTECHNOLOGY IN BIOMEDICAL APPLICATIONS 2 (1 sesiones)

DNA replication techniques and their applications to medical areas like diagnosis and therapy.

SESIÓN 5 CLASS WITH INVITED LECTURE (1 sesiones)

Inorganic materials in biotechnological applications.

SESIÓN 6 ENZYMES 1 (1 sesiones)

The definition and classification of enzymes and their catalytic mechanism

SESIÓN 7 ENZYMES 2 (1 sesiones)

Several representative enzymes and their industrial applications

SESIÓN 8 BIOTECHNOLOGY IN AGRICULTURE AND FOOD INDUSTRIES 1 (1 sesiones)

Biotechnology in agricultural and food industrial applications: conventional and modern processes. Genetically modified organism (GMO): advantages and disadvantages

SESIÓN 9 NO CLASS (1 sesiones)

MIDTERM EXAM

SESIÓN 10 ETHICAL CONSIDERATION ABOUT THE PRODUCTS OF BIOTECHNOLOGY (1 sesiones)

Familiarize students with current social controversies in the use of products of biotechnology such as genetically modified organisms for improved food security and stem cells from a historic and scientific perspective and discuss his theme with scientific articles.

SESIÓN 11 PERSONAL PROJECT PRESENTATION: INTEREST IN BIOTECHNOLOGY RELATED STUDY CASES (1 sesiones)

SESIÓN 12 BIOTECHNOLOGY IN INDUSTRIAL APPLICATIONS 1: TEXTILE INDUSTRY AND COSMETIC INDUSTRY (1 sesiones)

How biotechnology involved in textile and cosmetic industry. Comparing conventional and modern processes using industrial enzymes. Protein and peptide engineering for hair and skin treatments

SESIÓN 13 BIOTECHNOLOGY IN INDUSTRIAL APPLICATIONS 2: BIOSENSORS (1 sesiones)

Definition and characterization of sensors and what kinds of biosensors are used in medical area and in development for other applications

SESIÓN 14 NANOTECHNOLOGY (1 sesiones)

Definition, structural analysis and classification of nanotechnology and nanomaterials. The applications of nanotechnology in various industrial areas: medicine, water treatments, material modifications

SESIÓN 15 NATURAL BIOPOLYMERS (1 sesiones)

In nature, we can obtain many attractive polymers which have specific characteristics. Those appropriate properties can be applied to medical, cosmetic, nano materials and etc. The characterization and applications area of natural biopolymers will be talked. In the end of class, the potential of biopolymer applications will be discussed.

SESIÓN 16 NO CLASS (1 sesiones)

FINAL TERM EXAM

VII. METODOLOGÍA

This course will consist of 11 lectures taught remotely and 3 workshop-style sessions facilitated by the professor.

VIII. EVALUACIÓN

Sistema de evaluación

Nº	Codigo	Tipo de Evaluación	Cant. Eval.	Forma de aplicar los pesos	Pesos	Cant. Eval. Eliminables	Consideraciones adicionales	Observaciones
1	Nf	Nota Unica	1	Por Evaluación	Nf1=1			

Fórmula para el cálculo de la nota final

$$(1Nf1) / 1$$

Aproximación de la nota final No definido

Consideraciones adicionales

Se aplica la modalidad de evaluación 4 (nota única).

IX. BIBLIOGRAFÍA

Referencia obligatoria

- Libro
Hayashi, R.
2002
Trends in high pressure bioscience and biotechnology Vol.19, Progress in Biotechnology
Elsevier, 2002
- Libro
Illanes, A.
2008
Enzyme Biocatalysis: Principles and applications
Springer, 2008
- Libro
Shimasaki. C.D.
2009
The business of bioscience
Springer, 2009
- Libro
Vo-Dinh T.
2010

Nanotechnology in Biology and medicine

X. POLÍTICA CONTRA EL PLAGIO

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www.pucp.edu.pe/documento/pucp/plagio.pdf