GM-423 - INDUSTRIAL MICROBIOLOGY - Mühendislik Mimarlık Fakültesi - Gıda Mühendisliği Bölümü

General Info

Objectives of the Course

To provide information on how microorganisms are used in industrial processes such as fermentation and the synthesis of microbial metabolites

Course Contents

General information about microorganisms, principles of industrial fermentation applications, industrial-scale production of various microbial products, their applications, and other areas where microorganisms are used in industry.

Recommended or Required Reading

El-Mansi, Mansi, C.Bryce. 1999. Fermentation microbiology and biotechnology. Taylor&Francis Group; Michael T. Madigan and John M. Martinko, 2010. Brock Mikroorganizmaların Biyolojisi, Çeviri editörü: Prof. Dr. Cumhur Çökmüş

Planned Learning Activities and Teaching Methods

Oral presentation, question-and-answer session

Recommended Optional Programme Components

Not available

Instructor's Assistants

Not available

Presentation Of Course

Face to face

Dersi Veren Öğretim Elemanları

Prof. Dr. Hilal Yıldız

Program Outcomes

1. Understand the importance of industrial microbiology.
2. Knows the use of microorganisms in industrial production.
3. Determine the microbial profile and the growth requirements of microorganisms to plan processes for new product design.
4. Knows the microorganisms that can be used in industry and their characteristics.
5. Knows the products produced by microorganisms and their production pathways.
6. Design functional products

Weekly Contents

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
1	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Course Introduction	Lecture and discussion Laboratory Practice	Introduction to Industrial Microbiology and its History	
2	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Bacteria of industrial importance	Lecture and discussion Laboratory Practice	Introduction to Industrial Microorganisms	
3	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Yeasts of industrial importance	Lecture and discussion Laboratory Practice	Microbial growth	
4	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Molds of industrial importance	Lecture and discussion Laboratory Practice	Fermentations of industrial importance	
5	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Preparation of culture media	Lecture and discussion Lecture and discussion	Fermentations of industrial importance	
6	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Preparation of culture media	Lecture and discussion Laboratory Practice	The relationship between microbial growth and the environment	

Order	PreparationInfo	Laboratory	TeachingMethods	Theoretical	Practise
7	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Preparation of culture media	Lecture and discussion Laboratory practice	Fermenters and Media used in fermenters	
8	During the midterm week, students are expected to review lecture notes provided at the beginning of the semester, consolidate concepts, and revise topics covered up to that point for the exam.			Midterm Exam	
9	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	solation of pure culture from a mixed culture	Lecture and discussion Laboratory practice	Media used in fermenters	
10	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Postbiotic Production from Lactic Acid Bacteria	Lecture and discussion Laboratory practice	Primary and Secondary Metabolites	
11	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Yogurt production	Lecture and discussion Laboratory practice	Starter cultures and production methods	
12	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Stocking of Pure Cultures (-80 °C)	Lecture and discussion Laboratory practice	Methods for preserving microbial cultures	
13	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Designing novel functional beverages with students	Lecture and discussion Laboratory practice	Fermented foods and fermented beverages	
14	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Designing novel functional beverages with students	Lecture and discussion Laboratory practice	Fermented foods and fermented beverages	
15	The content of each week will be covered using lecture notes prepared by the instructor. These notes have been provided to students at the beginning of the semester, with weekly topics clearly indicated.	Determination of the antimicrobial activities of postbiotics produced by Lactic Acid Bacteria	Lecture and discussion Laboratory Practice	Metabolites produced by Lactic Acid Bacteria and their antimicrobial effects	

Workload

Activities	Number	PLEASE SELECT TWO DISTINCT LANGUAGES
Vize	1	2,00
Final	1	2,00
Derse Katılım	14	4,00
Ders Öncesi Bireysel Çalışma	14	2,00
Ders Sonrası Bireysel Çalışma	14	2,00
Uygulama / Pratik	14	2,00

Assesments

Activities	Weight (%)
Ara Sınav	40,00
Final	60,00

Gıda Mühendisliği Bölümü / GIDA MÜHENDİSLİĞİ X Learning Outcome Relation

	P.O. 1	P.O. 2	P.O. 3	P.O. 4	P.O. 5	P.O. 6	P.O. 7	P.O. 8	P.O. 9	P.O. 10	P.O. 11	P.O. 12	P.O. 13	P.O. 14
L.O. 1	5	4	5	5	3									
L.O. 2	4	5	4	5	3	5			5		4		4	5
L.O. 3	5	4	4	5	3									
L.O. 4	4	5	5	4	3	5			5		4		4	
L.O. 5	5	4	4	4	3									
L.O. 6	5	5	5	5	3	5		5	5	5		5	5	

Table :

P.O. 1 : Gıda Mühendisliği ile ilgili temel mühendislik konularında yeterli alt yapıya sahiptir.

P.O. 2 : Alanı ile ilgili problemleri belirleme, tanımlama ve çözme becerisine sahiptir.

P.O. 3 : Nitelikli araştırma planlama, uygulama ve sonuçları analiz etme bilgi ve becerisine sahiptir.

P.O. 4 : Modern teknik ve araçları seçer, kullanır ve bilişim teknolojilerinden etkin biçimde yararlanır.

P.O. 5 : Bilgiye erişebilme yöntemlerini kavrar.

P.O. 6 : Bireysel olarak farklı çalışma gruplarında etkin çalışabilir ve sorumluluk alma özgüvenine sahiptir.

P.O. 7 : Etkin sözlü ve yazılı iletişim kurma becerisine ve en az bir yabancı dil bilgisine sahiptir.

P.O. 8 : Yaşam boyu öğrenmenin gerekliliği bilincindedir; bilim ve teknolojideki gelişmeleri izler ve kendini sürekli yeniler.

P.O. 9 : Mesleki ve etik sorumluluk bilincine sahiptir.

P.O. 10 : Proje hazırlama ve değerlendirme bilgi ve yeteneklerine sahiptir.

P.O. 11 : İşletme yönetimi, çalışanların sağlığı, çevre ve iş güvenliği konularında bilinç sahibidir.

P.O. 12 : Mühendislik çözümlerinin ve uygulamalarının evrensel ve toplumsal boyutlardaki etkilerini kavrar.

P.O. 13 : Gıda üretim prosesleri, kalite kontrolü, ürün kalitesinin artırılması, ürün geliştirme ve gıda analizleri alanlarında yeterli düzeyde bilgi ve beceriye sahiptir.

P.O. 14 : Gıda güvenilirliği açısından önem arz eden risklerin ortadan kaldırılması veya minimum düzeye indirilmesine yönelik bilgi birikimi ve uygulama becerisine sahiptir.

L.O. 1 : Endüstriyel mikrobiyolojinin önemini kavrayabilir.

L.O. 2 : Endüstriyel üretimlerde mikroorganizmaların kullanımını bilir.

L.O. 3 : Yeni ürün üretiminde prosesi planlayabilmek için mikroorganizma profilini ve mikroorganizmaların gelişim isteklerini belirleyebilir.

L.O. 4 : Endüstride kullanılabilecek mikroorganizmaları ve özelliklerini bilir.

L.O. 5 : Mikroorganizmalar tarafından üretilen ürünleri ve üretim yolaklarını bilir.

L.O. 6 : Fonksiyonel ürünler dizayn eder.