



## Course Specifications

<b>Course Title:</b>	Training in Food, Environmental and Public Health Microbiology
<b>Course Code:</b>	492 MBIO
<b>Program:</b>	Microbiology (B. Sc.)
<b>Department:</b>	Botany and Microbiology
<b>College:</b>	Science
<b>Institution:</b>	King Saud University

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## A. Course Identification

<b>1. Credit hours:</b> 6(0+0+12)
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Seventh level
<b>4. Pre-requisites for this course (if any):</b> After 75 Credits
<b>5. Co-requisites for this course (if any):</b> MBIO 140

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	Blended		
3	E-learning		
4	Distance learning		
5	Other	90	100%

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	
2	Laboratory/Studio	90
3	Tutorial	
4	Others (specify)	
	<b>Total</b>	90

## B. Course Objectives and Learning Outcomes

<p><b>1. Course Description</b></p> <p>This training course will improve the students practical work with the main groups of microorganisms and their physiology, soil microbiology, cycles of elements, aquatic microbiology, sewage treatment, bioremediation, and applied microbiology encompassing food microbiology, industrial microbiology, and biotechnology</p>
<p><b>2. Course Main Objective</b></p> <p>During this course the students practice the various microbiological techniques for their applications in laboratories of commercial and research and developmental organizations. Hands on experience in applied microbiology methods at an advanced level.</p> <p>Knowledge and technical skills in basic microbiological concepts and their applications in food safety, quality control of drinking water, municipal sewage and waste water treatment, environmental conservation and public health and sanitation.</p> <p>Experience in diagnosis and identification of microbes.</p> <p>Acquisition of research skills through live experiments and exposure to contemporary research problems.</p>

### 3. Course Learning Outcomes:

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	At end of the course, the student will be able to recognize the basic concepts of microbiology through perception, logical thinking, and reasoning.	K1
1.2	At end of the course, the student will be able to identify approaches of isolation and identification the different microbes associated with various food samples, drinking water, waste water, municipal sewage, air, plant and other environmental samples of significance.	K2
<b>2</b>	<b>Skills :</b>	
2.1	At end of the course, the student will be able to analyze and discuss microbiological analytical data	S2
2.2	At end of the course, the student will be able to interpret and apply in food safety, quality control of drinking water, and waste water treatment, environmental conservation and public health .	S2
2.3	At end of the course, the student will be able to differentiate between the microbes associated with various food samples, drinking water, waste water, municipal sewage, air, plant and other environmental samples of significance.	S1
2.4	At end of the course, the student will be able to practice different research skills through live experiments and exposure to contemporary research problems.	S3
<b>3</b>	<b>Values:</b>	
3.1	At end of the course, the student will be able to ability to work in team group	V1
3.2	At end of the course, the student will be able to demonstrate the policy and legislation of microbiology and ethics	V2

### C. Course Content

No	List of Topics	Contact Hours
1	Orientation & Introductory lectures	6(0+0+12)
2	Microbial analysis of food samples: Enumeration and isolation of bacteria, yeasts and fungi in fresh, frozen and canned foods. Milk, fruit juices, canned fish, meat and vegetable salads from restaurants will be used as samples	12(0+0+24)
3	Microbial analysis of Drinking water samples: Bottled, ground water resources, tap water. Presence of heterotrophic bacterial populations, Total coliforms, faecal coliforms, <i>E.coli</i> , faecal streptococci.	24(0+0+48)
4	Enumeration and isolation of bacteria, fungi, protozoa and viruses of significance associated with soil, air, plants, animals, compost yard, and solid wastes employing conventional and latest state of art methodologies. Air samples from Riyadh city, Date palm farm, Date palm leaves and fruit;	12(0+0+24)
5	Waste water and sewage analysis: Municipal sewage, Milk processing waste water, water from swimming pool. Presence of bacteria, cyanobacteria, fungi, microalgae and viruses.	12(0+0+24)

6	Biofilm & Biodegradation: Biofilms in drainage pipes, Biodegradation of cellulosic paper wastes, plastic materials.	12(0+0+24)
7	Preparation of laboratory report and final presentation (oral) and final evaluation by a faculty member.	12(0+0+24)
<b>Total</b>		90

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	At end of the course, the student will be able to recognize the basic concepts of microbiology through perception, logical thinking, and reasoning.	Direct meeting	Performance based assessment using rubrics
1.2	At end of the course, the student will be able to identify approaches of isolation and identification the different microbes associated with various food samples, drinking water, waste water, municipal sewage, air, plant and other environmental samples of significance.	Direct meeting and practical activities	Performance based assessment using rubrics
<b>2.0</b>	<b>Skills</b>		
2.1	At end of the course, the student will be able to analyze and discuss microbiological analytical data	Direct meeting and practical activities	Performance based assessment using rubrics
2.2	At end of the course, the student will be able to interpret and apply in food safety, quality control of drinking water, and waste water treatment, environmental conservation and public health .	Direct meeting and practical activities	Performance based assessment using rubrics
2.3	At end of the course, the student will be able to differentiate between the microbes associated with various food samples, drinking water, waste water, municipal sewage, air, plant and other environmental samples of significance.	Direct meeting and practical activities	Performance based assessment using rubrics
2.4	At end of the course, the student will be able to practice different research skills through live experiments and exposure to contemporary research problems.	Direct meeting and practical activities	Performance based assessment using rubrics
<b>3.0</b>	<b>Values</b>		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	At end of the course, the student will be able to ability to work in team group	Group Discussion	Direct observation using rubrics
3.2	At end of the course, the student will be able to demonstrate the policy and legislation of microbiology and ethics	assignment project	Direct observation using rubrics

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	reports	every week	20
2	Laboratory activities	every week	20
3	Evaluation by oral presentation	15	20
4	field supervisor report	15	40
5			
6			
7			
8			

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**

- E-mail, blackboard and faculty personal website
- Office hours
- Practical support
- Student meeting.

## F. Learning Resources and Facilities

### 1.Learning Resources

<b>Required Textbooks</b>	□ Arora D.R./Bharti Arora (2007) Practical Microbiology, CBS Publishers & Distributors; 2Rev Ed edition 218 pages.
<b>Essential References Materials</b>	-Jose M.Lorenzo (2018). Main Groups of Microorganisms of Relevance for Food Safety and Stability: General Aspects and Overall Description. Innovative Technologies for Food Preservation. Pages 53-107.

<b>Electronic Materials</b>	<a href="http://www.microbiologyonline.org.uk/">http://www.microbiologyonline.org.uk/</a>
<b>Other Learning Materials</b>	such as computer-based programs/CD, professional standards or regulations and software.

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ol style="list-style-type: none"> <li>1) Data show room</li> <li>2) Laboratory</li> <li>3) E-learning room</li> <li>4) Live presentations from the internet</li> </ol>
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Computer supported with important softwares , printer and scanner and access to internet.
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Chemicals Disinfectant chemicals Cultural Media Protective gears Petri dishes Incubators Microscopically slides

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student feedback	Instructors	Direct-Evaluation questioner
Effectiveness of teaching and assessment	Student, peer reviewer, program leaders	<ul style="list-style-type: none"> <li>• Indirect (Course evaluation questioner by students)</li> <li>• Direct (faculty meetings)</li> </ul>
Extent of achievement of course learning outcomes	Program Leaders, faculty, quality and development unit	<ul style="list-style-type: none"> <li>• Indirect (Preparation of course report)</li> <li>• Peer consultation on teaching</li> <li>• Departmental council discussions</li> <li>• Revision of student results between previous semester</li> <li>• Self-evaluation</li> </ul>
Quality of learning resources	Student, faculty, internal and external auditors	<ul style="list-style-type: none"> <li>• Course evaluation</li> </ul>


Evaluation Areas/Issues	Evaluators	Evaluation Methods
		<ul style="list-style-type: none"> <li>• Self-study report</li> </ul>

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

Council / Committee	Academic Accreditation and Evaluation Committee 
Reference No.	Update-1443
Date	20/09/1443 H