



## Course Specifications

<b>Course Title:</b>	Sanitation and Water Microbiology
<b>Course Code:</b>	MBIO 344
<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> 2(1+0+2)
<b>2. Course type</b> a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/> b. Required <input type="checkbox"/> Elective <input checked="" type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 5 <sup>th</sup> Level
<b>4. Pre-requisites for this course (if any):</b> Microbial Ecology and Pollution (MBIO 340)
<b>5. Co-requisites for this course (if any):</b> NA

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

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

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

No	Activity	Contact Hours
1	Lecture	15
2	Laboratory/Studio	30
3	Tutorial	
4	Others (specify)	
	<b>Total</b>	45

## B. Course Objectives and Learning Outcomes

<p><b>1. Course Description</b> Course Description: Introduction-Water as Biotopes for Microorganisms- Distribution of Microorganisms in the aquatic habitats –Microorganisms and Water pollution – Microbial flora of Sewage – Pathogenic Microorganisms in water and sewage- Sewage treatments –Role of Microorganisms in the Purification of Water –Preparation of water for drinking and other purposes –Chemical and Biological tests of water- the economic significance of Aquatic Microorganisms</p>
<p><b>2. Course Main Objective</b></p> <p>1. What is the main purpose for this course?</p> <p>Summary of the main learning outcomes for students enrolled in the course.</p> <ul style="list-style-type: none"> <li>➤ Student will gain the skill of how to design experiments to be used in water microbiology</li> <li>➤ Student will appreciate sanitary microbiology as it relates to water and wastewater engineering and environmental science</li> <li>➤ Student will be familiar with the major microorganisms that are important to water and wastewater treatment</li> </ul>

- Student will recognize the benefits and the disadvantages that microorganisms offer to water and wastewater practices
  - Student will be familiar with how water and wastewater regulations address microorganisms of concern
  - Student will be familiar with microorganisms that cause common water- related diseases
  - Student will understand controls that can be used on microorganisms found in water and wastewater
  - The Student will be able to gain the skill to isolate a selective microorganism under certain condition
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web-based reference material, changes in content as a result of new research in the field)
- Using the internet to search for the new in the field of water microbiology and answering given home work
  - Design experiments to isolate a selective microorganism from water under certain physical & chemical factors
  - Design experiments to determine the number of microbes in waters

### 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 define water as a biotope for microorganisms	K1
1.2	At end of the course, the student will be able to describe the distribution of microorganisms in the aquatic habitats	K2
<b>2</b>	<b>Skills :</b>	
2.1	At end of the course, the student will be able to evaluate factors influencing the growth and spread of microorganisms in water.	S1
2.2	At end of the course, students will be able to identify microorganisms and water pollution, as well as the microbial flora of sewage.	S1
<b>3</b>	<b>Values:</b>	
3.1	At end of the course, the student will be able to work both independently and as part of a team.	V1

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction	2 (1+0+2)
2	Water as Biotopes for Microorganisms	2 (1+0+2)
3	Distribution of Microorganisms in the aquatic habitats	4 (2+0+4)
4	Factors affecting growth and distribution of microorganisms in the waters	4 (2+0+4)
5	Microorganisms and Water pollution	4 (2+0+4)
6	Microbial flora of Sewage Pathogenic Microorganisms in water and sewage	4 (2+0+4)
7	Sewage treatments	4 (2+0+4)
8	Role of Microorganisms in the Purification of Water, Preparation of water for drinking and other purposes	4 (2+0+4)
9	The economic significance of Aquatic Microorganisms	2 (1+0+2)
<b>Total</b>		<b>30 (15+0+30)</b>

## 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 define water as a biotope for microorganisms	Lectures Practical classes	Final Exam Practical Exam Midterm exams
1.2	At end of the course, the student will be able to describe the distribution of microorganisms in the aquatic habitats	Oral presentation and discussion	Quizzes 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 evaluate factors influencing the growth and spread of microorganisms in water.	Lectures Practical classes	Final Exam Midterm exams Practical Exam Quizzes
2.2	At end of the course, students will be able to identify microorganisms and water pollution, as well as the microbial flora of sewage.	Preparation of Lab report	Performance based assessment using rubrics
<b>3.0</b>	<b>Values</b>		
3.1	At end of the course, the student will be able to work both independently and as part of a team.	Lecture and practical lessons	Performance based assessment using rubrics

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes	3 <sup>th</sup> , 5 <sup>th</sup> , 7 <sup>th</sup> , 9 <sup>th</sup> , 11 <sup>th</sup>	5%
2	Midterm 1	8 <sup>th</sup>	10%
3	Oral presentation and discussion	12 <sup>th</sup>	5%
4	Midterm 2	13 <sup>th</sup>	10%
5	Practical Exam	14 <sup>th</sup>	20%
6	Lab report	Weekly	10%
7	Final exam	16 <sup>th</sup>	40%

\*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:** 1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- Office hours: 2 hours weekly
- During a declare office time and by booking in advance through the e mail address of the tutor

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	1. List Required Textbooks <a href="#">Gabriel Bitton</a> (2011) Wastewater Microbiology (Wiley Series in Ecological and Applied Microbiology) Wiley-Blackwell, 804 pages.
<b>Essential References Materials</b>	(Journals, Reports, etc.) Gabriel Bitton (2011) Wastewater Microbiology (Wiley Series in Ecological and Applied Microbiology) Wiley-Blackwell, 804 pages
<b>Electronic Materials</b>	List Electronic Materials, Web Sites, Facebook, Twitter, etc.
<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.)	Data show room Laboratory E learning room
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Computer supported with important softwares, printer and scanner
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students- course coordinator	– questioners – indirect
Extent of achievement of course learning outcomes	Faculty	Exam and quizzes- direct
Teaching strategy	Peer Reviewer – faculty - students	Direct - questioners
End of term college evaluation of course by students	Faculty - students	questioners

**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

<b>Council / Committee</b>	Academic Accreditation and Evaluation Committee 
<b>Reference No.</b>	Update-1443
<b>Date</b>	17/11/1443