



## Course Specifications

<b>Course Title:</b>	<b>Petroleum Microbiology</b>
<b>Course Code:</b>	<b>2014217-3</b>
<b>Program:</b>	<b>Bachelor in Microbiology</b>
<b>Department:</b>	<b>Biology Department</b>
<b>College:</b>	<b>College of Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

## Table of Contents

<b>A. Course Identification</b> .....	<b>3</b>
6. Mode of Instruction (mark all that apply) .....	3
<b>B. Course Objectives and Learning Outcomes</b> .....	<b>3</b>
1. Course Description .....	3
2. Course Main Objective.....	3
3. Course Learning Outcomes .....	3
<b>C. Course Content</b> .....	<b>4</b>
<b>D. Teaching and Assessment</b> .....	<b>4</b>
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods .....	4
2. Assessment Tasks for Students .....	4
<b>E. Student Academic Counseling and Support</b> .....	<b>5</b>
<b>F. Learning Resources and Facilities</b> .....	<b>5</b>
1. Learning Resources .....	5
2. Facilities Required.....	5
<b>G. Course Quality Evaluation</b> .....	<b>6</b>
<b>H. Specification Approval Data</b> .....	<b>6</b>

## A. Course Identification

<b>1. Credit hours:</b> 3h
<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> 12 <sup>th</sup> level – 4 <sup>rd</sup> year
<b>4. Pre-requisites for this course (if any):</b> Microbial Physiology - 2013215-3
<b>5. Co-requisites for this course (if any):</b> None

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

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	6 hrs/Week	100
2	Blended	-	-
3	E-learning	-	-
4	Distance learning	-	-
5	Other	-	-

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

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (specify)	-
	<b>Total</b>	60

## B. Course Objectives and Learning Outcomes

<b>1. Course Description:</b> This course investigates the theories of petroleum formation, bacterial and fungal species that assist in oil extraction, role of these species in petroleum analysis, metabolic pathways of gaseous hydrocarbons, aliphatic ring, aromatic ring, biotic destruction of alien compounds, methane-producing bacteria, petroleum contamination of natural environments and their disposal by microbes.
<b>2. Course Main Objective:</b> The main purpose of this course is to provide knowledge about the major theories of petroleum formation and the role of microorganisms in formation and recovery of oil in addition to their importance in removal of petroleum residues from oil-contaminated sites.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding:</b>	
1.1	Define theories of petroleum formation	K3
2	<b>Skills:</b>	

CLOs		Aligned PLOs
2.1	Investigate the role of microorganisms in, oil recovery, microbial influenced corrosion and suggest solutions.	S2
2.2	Apply experiments for removal of oil contaminants in various environments	S3
<b>3</b>	<b>Values:</b>	
3.1	Write scientific report on role of microorganisms in reduction of pollution with oil residuals	V1
3.2	Interpret experimental data using the statistical systems.	V2

### C. Course Content

No	List of Topics	Contact Hours
1	<b>Unit 1:</b> Introduction and theories of petroleum formation	6L + 6P
2	<b>Unit 2:</b> Methods of oil recovery and production	6L + 6P
3	<b>Unit 3:</b> Role of certain microorganisms in enhanced oil recovery	6L + 6P
4	<b>Unit 4:</b> Role of certain microorganisms in microbial influenced corrosion	6L + 6P
5	<b>Unit 5:</b> Role of certain microorganisms in biodegradation and removal of oil contaminants in various environments.	6L + 6P
<b>Total</b>		30L + 30P

### D. Teaching and Assessment

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

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	<b>Knowledge and Understanding:</b>		
1.1	Define theories of petroleum formation and role of microorganisms in enhanced oil recovery	Lectures	Paper-based exams
2.0	<b>Skills:</b>		
2.1	Investigate the role of microorganisms in, oil recovery, microbial influenced corrosion and suggest solutions.	Lectures	Paper-based exams
2.2	Apply experiments for removal of oil contaminants in various environments	Lectures Interactive learning	Paper-based exams Practical reports
3.0	<b>Values:</b>		
3.1	Write scientific report on role of microorganisms in reduction of pollution with oil residuals	Open discussion Small group activities	Assignments
3.2	Interpret experimental data using the statistical systems.	Interactive learning Brain storming	Practical exam

#### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments and activities:		

#	Assessment task*	Week Due	Percentage of Total Assessment Score
	1- Written Assignment 2- Power-point presentation	Variable	10
2	Midterm Exam	5 <sup>th</sup>	20
3	Periodic Exam	7 <sup>th</sup>	10
4	Practical Reports	Continuous	15
5	Final Practical Exam	11 <sup>th</sup>	5
6	Final Exam	12 <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 :**

6 hours per week for academic advice and consultations

Teaching staff is also available using Blackboard web site and Taif University “Edugate” System

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	James G. Speight, Nour Shafik El-Gendy. Introduction to Petroleum Biotechnology. Elsevier Science, 2017
<b>Essential References Materials</b>	Bernard Ollivier, Michel Magot. Petroleum Microbiology. ASM Press, 2005
<b>Electronic Materials</b>	Blackboard website Website of Saudi digital Library
<b>Other Learning Materials</b>	Computer-based programs and professional software

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> <li>▪ Classroom (capacity not more than 40 students) for 2 h/week.</li> </ul> Microbiology Lab (capacity not more than 20 students) for 3 h/week.
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> <li>▪ Data Show projectors, smart blackboard</li> </ul> Computer Portable PowerPoint presentations to special lectures.
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> <li>▪ Autoclave</li> <li>▪ Incubators</li> <li>▪ Micropipettes and its tips</li> <li>▪ Petri dishes</li> <li>▪ Disinfectants</li> <li>▪ Culture media</li> </ul> Samples of oil contaminated soil and water

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Peer Reviewer Students	Direct Indirect
Extent of achieving the course learning outcomes	Peer Reviewer Students	Direct Indirect

**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	Biology Department
Reference No.	Committee number 14 - Academic Year 1442-1443H
Date	22\5\2022G – 21\10\1443H

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