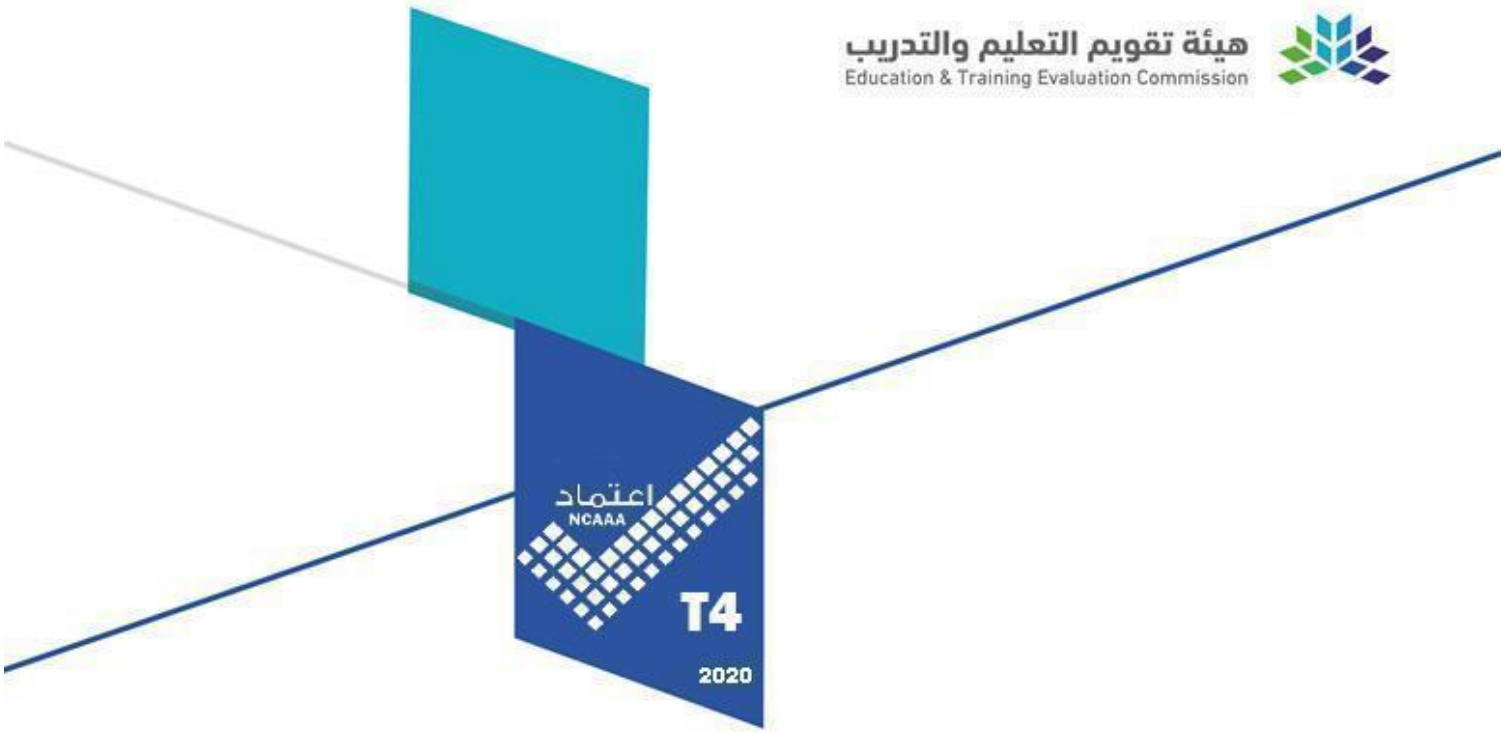
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	**Physiology of Microorganisms**
Course Code:	**BIO336**
Program:	**Bachelor of Science in Biology**
Department:	**Department of Biology**
College:	**Faculty of Science**
Institution:	**University of Tabuk**

Table of Contents

A. Course Identification

1. Credit hours:	**3 (2 Theoretical + 1 Practical) hours**
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☐ Elective ☑
3. Level/year at which this course is offered:	**Levels 6, 7 or 8/ Third or Fourth Year**
4. Pre-requisites for this course (if any)**: General Microbiology (BIO231)**	
5. Co-requisites for this course (if any)**: None**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	2	50%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Laboratory**	2	50%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	26
2	**Laboratory/Studio**	26
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	**52**

B. Course Objectives and Learning Outcomes

1. Course Description

- The course covers topics on culturing microorganism in different media including methods of preparing pure culture with emphasis on bacteria and fungi, Growth of microorganisms; Typical curve and factors affecting growth of microorganisms, preservation of microorganisms, Nutrition in microorganisms; carbon nutrition and nitrogen nutrition, Vitamins and growth factors (Inhibitory substances).

2. Course Main Objective

- Identify and describe the functioning of microorganisms
- Identify the forms of bacterial and fungi.
- Distinguish growth and culture of bacteria and fungi.
- Identify preservation techniques of microorganisms.
- Describes carbon and nitrogen nutrition in microorganisms.
- Describes role of vitamins and other factors in growth of microorganisms.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	To describe the physiological features, metabolic processes, behavioral responses, and regulatory mechanisms of bacteria and fungi.	K1
1.2	To recognize the concepts and fundamental principles of microbiology and physiology.	K1
2	**Skills :**	
2.1	To measure bacterial growth and assays of enzymes and cellular components.	S2
2.2	To apply the principles of the energy yielding and consuming reactions, the various catabolic and anabolic pathways, the transport systems and the mechanisms of energy conservation in microbial metabolism.	S1
3	**Values:**	
3.1	To show ethical behavior in individual work or as a member in a team in microbiological project.	V1

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and Culturing microorganisms Bacteria and Fungi	2
2	Typical Growth Curve	2
3	Typical Growth Curve	2
4	Factors Affecting Growth	2
5	Factors Affecting Growth	2
6	Preservation of Microorganisms	2
7	Preservation of Microorganisms	2
	Mid Term exam	
8	Carbon Nutrition	2
9	Carbon Nutrition	2
10	Growth of Microorganisms	2
11	Nitrogen Nutrition	2
12	Nitrogen Nutrition	2
13	Vitamins and Growth Factors	2
	Vitamins and Growth Factors	2
	Final Exam	
Total		**26**

No	List of Practical Topics	Contact Hours
1	Estimation of fungal biomass by gravimetric analysis	2
2	Catalase and oxidase activity	2
3	Catalase and oxidase activity	2

4	Effect of pH on the growth of bacteria	2
5	Effect of pH on the growth of bacteria	2
6	Urease activity	2
7	Nitrate reduction and denitrification	2
	Midterm Exam	
8	Assessing the indole, H2S production & motility of bacteria using SIM agar	2
9	Assessing the indole, H2S production & motility of bacteria using SIM agar	2
10	Citrate utilization	2
11	Citrate utilization	2
12	Gelatinase activity	2
13	Fermentation of carbohydrates	2
	Final Exam	
Total		**26**

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	**Knowledge and Understanding**		
1.1	To describe the physiological features, metabolic processes, behavioral responses, and regulatory mechanisms of bacteria and fungi.	- Lectures. - Case studies. - Activities.	- Quizzes. - Homework. - Final exam.
1.2	To recognize the concepts and fundamental principles of microbiology and physiology.		
2.0	**Skills**		
2.1	To measure bacterial growth and assays of enzymes and cellular components.	- Lectures. - Short assay. - Lab demonstrations. - Individual presentation and group team presentation.	- Assessment of lab reports and practical examinations. - Individual presentation and group team presentation. - Case studies.
2.2	To apply the principles of the energy yielding and consuming reactions, the various catabolic and anabolic pathways, the transport systems and the mechanisms of energy conservation in microbial metabolism		
3.0	**Values**		
3.1	to show ethical behavior in individual work or as a member in a team in microbiological project	- Essay writing. - Lab demonstrations. - Individual presentation and group team presentation.	- Written scientific report. - Interactive discussion and participation

2. Assessment Tasks for Students

#	*Assessment task	Week Due	Percentage of Total Assessment Score
1	Quizzes + Assignments + Class discussion	1-13	10%
2	Midterm Theoretical Exam	8	25%
3	Practical Exam	8	10%
4	Practical Exam	14	15%
5	Final Exam	15	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 :

- Include amount of time teaching staff are expected to be available each week.
- Direct Supervision by staff over the lab. Session.
- Office hours 6hr/week at office.
- Academic advice (by 30 student/ teaching staff member).
- Electronic communication through blackboard and e-mail.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- Madigan, M., Matinko, J., Dunlap, P. V. and Clark, D. P. (2008). Brock Biology of Microorganisms, 12th edition. Prentice Hall, USA. - White, D. (2007). The physiology and biochemistry of prokaryotes, 3rd edition. Oxford University Press, UK.
Essential References Materials	Willey, J. M., Sherwood, L., Prescott, M. L. and Woolverton, C. J. (2008). Prescott, Harley, and Klein's Microbiology, McGraw-Hill Higher Education. - Griffin, D. H. (1994). Fungal Physiology, 2nd edition. John Wiley & Sons, Inc. ISBN: 978-0-471-16615-3.
Electronic Materials	http://www.textbookofbacteriology.net/kt_toc.html
Other Learning Materials	Web of science

2. Facilities Required

Item	Resources
Accommodation Classrooms, laboratories, demonstration) (.rooms/labs, etc	Classrooms, laboratories
Technology Resources AV, data show, Smart Board, software,) (.etc	Data show, Smart Board, virtual session provided by the blackboard (allowing discussion , sharing ppt and video)
Other Resources Specify, e.g. if specific laboratory) equipment is required, list requirements or (attach a list	Laboratory instruments such as: autoclave- oven- microscope- spectrophotometer- incubator-air laminar flow-shaking incubator-distillatory-

	ultrabalance-refrigerator- deep freezer. Bunsen burner flame

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Indirect questionnaires
Extent of achievements of course learning outcomes	Program committee. Staff members Student	Direct Questionnaires Reports Meetings
Quality of learning resources	Program leaders Peer reviewer	Direct Questionnaires Reports Meetings

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 Council
Reference No.	
Date	1/6/2022