



المركز الوطني للتقويم والاعتماد الأكاديمي
National Center for Academic Accreditation and Evaluation

ATTACHMENT 5.

T6. COURSE SPECIFICATIONS (CS)

Course Specifications

Institution: Tabuk University	Date:
College/Department : Ummlaj University College - Biology Department	

A. Course Identification and General Information

1. Course title and code:: Physiology of Microorganisms BIO (336) (Elective course)		
2. Credit hours:: 3 Credit Hours (2theoretical + 2 practical)		
3. Program(s) in which the course is offered. (Biology department programs)		
4. Name of faculty member responsible for the course :		
5. Level/year at which this course is offered:: Level 6 , 7 , 8		
6. Pre-requisites for this course (if any): BIO (202) General Biology		
7. Co-requisites for this course (if any): None		
8. Location if not on main campus:		
9. Mode of Instruction (mark all that apply):		
a. traditional classroom	<input checked="" type="checkbox"/>	What percentage? <input type="text" value="75%"/>
b. blended (traditional and online)	<input type="checkbox"/>	What percentage? <input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage? <input type="text"/>
d. correspondence	<input type="checkbox"/>	What percentage? <input type="text"/>
f. other (lab work)	<input checked="" type="checkbox"/>	What percentage? <input type="text" value="25%"/>
<p>Comments:</p> <p>Update this course and modify the syllabus even keep pace with the latest research and scientific discoveries in the field of bacteriology, biotechnology and medical bacteriology.</p> <p>-Try to trend the students to handle the microbiological processes more professionally, and prepare them to enter the labor market</p> <p>- Modification of this course in line with the needs and requirements of the labor market in various field.</p>		

B Objectives

1. What is the main purpose for this course?
 1-to provide the students with the basic information about microorganisms
 2-Develop the student's ability to learn and understand the mode of life of microorganisms
 3-Develop the students in the remedy common mistakes to be able to distinguish between bacteria and fungi
 4-To provide information about pathogenic, non-pathogenic and useful microbes.

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)
 1- Continuous updating of the material of study and work adjustment for modern scientific techniques developed in general microbiology by looking at research and access to the latest versions of the books published in this area and through the internet.
 2-Review course content on a regular basis by specialists in microbiology to add good and modern knowledge.
 3-Update the practical materials as well as the microbiology lab.
 4-The use of high-accuracy optical microscope to examine fungal and bacterial specimens.
 5-Evaluation of the course content and its scientific benefit by the students in practical ways.
 6-To encourage the student to the discussion during the lecture.

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description:
 This course provides a comprehensive idea about the nature of different microorganisms. The effects of the different environmental factors on their growth and reproduction. Knowing the best and most utilizable carbon and nitrogen sources. Thus finally, we will have students with a very good background and knowledge of microorganisms and their physiology.

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact hours
Culturing microorganisms Bacteria and fungi	1	3
Typical growth curve	1	3
Factors affecting growth	1	3
Preservation of microorganisms	1	3
Preservation of microorganisms	1	3
Carbon nutrition	1	3
Carbon nutrition	1	3
Revision and Pre Final Exam	1	3
Mid Term Vacation	1	3
Growth of microorganisms	1	3
Nitrogen nutrition	1	3

Nitrogen nutrition	1	3
Vitamins and growth factors	1	3
Vitamins and growth factors	1	3
Revision	1	3
Final Exam	1	2

2. Course components (total contact hours and credits per semester):

		Lecture	Tutorial	Laboratory/ Studio	Practical	Other:	Total
Contact Hours	Planned	26h			26		52
	Actual	26h			26		52
Credit	Planned	2			1		3
	Actual	2			1		3

3. Additional private study/learning hours expected for students 8 per week.

None

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Co de #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Upon successful completion of this course the student will be able to -Description of the knowledge to be acquired 1-Understanding of the concepts and fundamental principles of microbiology and physiology. 2-Understanding the key features of the structure, growth, physiology and behavior of microorganisms. 3-Describe the physiological features,	In class lecturing(using Power Point and illustrations on the white board) - Discussion - Self-learning and cooperative learning - Application of scientific method in thinking by solving	Pre-final and final exams. - Assessment of lab reports and practical examinations - Activities and homework evaluation

	<p>metabolic processes, behavioral responses, and regulatory mechanisms of bacteria and fungi.</p> <p>4-Read and discuss scientific literature on topics in microbial physiology, metabolism, biochemistry, genetics, and applications thereof.</p> <p>5-Identify the conceptual knowledge of aerobic and anaerobic respiration and various intermediary mechanisms involved, oxidative phosphorylation.</p> <p>6-Describe the nutritional requirements and O₂ requirements for the growth bacteria..</p> <p>7-Study the microbial growth curve.</p> <p>8- Understand the microbial metabolism, enzymes and learn how to design a microbial culture with optimum requirements and the growth in optimum condition.</p> <p>9-Discuss the biosynthesis and the degradation pathways involved in the microbial growth.</p>	<p>scientific problems</p> <ul style="list-style-type: none"> - Laboratory practice and microscope examination (conducting experiments and writing reports). - Activities and homework 	
2.0	Cognitive Skills		
2.1	<p>After successful completion of this course students are expected to be able to:</p> <p>1-Perform measurements of bacterial growth and assays of enzymes and cellular components.</p> <p>2-Explain 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.</p> <p>3-Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively.</p> <p>4-Specify the biological significance of biomolecules in metabolism</p> <p>5-Conceptual knowledge of properties, structure, function of enzymes, enzyme kinetics and their regulation ,enzyme engineering,</p> <p>6-Application of enzymes in large scale industrial processes.</p> <p>7- Perform optimization of the various physical and chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.</p> <p>8- Analyze recent microbial physiology</p>	<p>Use of microscopic illustrations</p> <ul style="list-style-type: none"> - Laboratory training - Activities and Homework -Project research 	<p>Evaluation of lab reports</p> <ul style="list-style-type: none"> - Evaluation of activities and homework Group discussion

	<p>related papers by working on assignments and to compose a concise report groupwise.</p> <p>9- Execute various analyses/experiments commonly involved in microbial physiology research and interpret and describe the results concisely in a report.</p> <p>10- Analyze the different applications of microbiology in biotechnology, industry and medicine.</p> <p>11- Comparing the nutritional requirements of the different groups of microorganisms.</p> <p>12- Using computers and internet data presentation and interpretation.</p> <p>12-develop abilities to read and assess scientific literature in microbiology area</p>		
3.0	Interpersonal Skills & Responsibility		
3.1	<p>Upon successful completion of this course the student will be able to</p> <p>1-Evaluating ability to work in a team to conduct a specific project</p> <p>2- Evaluating ability to conduct a specific project with minimal supervision</p> <p>3- Justifying results of work to others</p> <p>4- appreciate the diversity of microbial metabolisms and the strategies for their adaptive responses</p> <p>5-comprehend the principles underlying the dynamic nature of microbial physiology</p> <p>6-relate knowledge to practical application of microbes in industry and medicine</p>	<p>-Cooperative learning and application of scientific method in thinking by solving scientific problems.</p> <p>- work as part of a team</p> <p>- Conducting group experiments and writing reports</p> <p>- Dividing students into groups to cooperate with each other during the examination of microorganisms</p>	<p>- Assessment of group project</p> <p>- Assessment of projects</p> <p>Conducted individually</p> <p>Group discussion</p>
4.0	Communication, Information Technology, Numerical		
4.1	<p>Upon successful completion of this course the student will be able to</p> <p>1-Operating to work in a team to conduct a specific project.</p> <p>2- Operating to solve problems.</p> <p>3- Operating to use computers and internet.</p> <p>4- Operating to conduct searches and restore information.</p>	<p>-Promoting students to submit activities,</p> <p>-homework and writing reports.</p>	<p>Evaluation of the student by the supervisor in the laboratory</p> <p>Examination of student work through laboratory experiments</p> <p>Group discussion</p>
5.0	Psychomotor		
5.1	<p>1- Encouraging students to participate in the isolation of microorganisms and preparation of experiments and work on the devices in the lab.</p> <p>2-The student must be bold enough to do sterilization techniques.</p> <p>3-The student should perform the experiments with ambition and high</p>	<p>-Training the student on all laboratory skills through laboratory session.</p> <p>-Writing a laboratory report, and sheets.</p> <p>-Practical application and demonstration of each</p>	<p>-perform several practical experiments and answer a questionnaire for each experiment.</p> <p>-Make a check list for each skill and measure</p>

<p>efficiency. 4-The student should experience high skills and dedication. 5-The ability to choose the suitable methods to estimate the number of microorganisms in a sample (using, for example, viable plate count, and spectrophotometric methods).</p>	<p>experiment. -Field study, survey and isolation -identification of unknown samples or to perform any laboratory experiment</p>	<p>the efficiency of the student to perform this skill.</p>
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5. Schedule of Assessment Tasks for Students During the Semester			
	Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Activities and short Quizzes	Distributed	10%
2	2 Pre-final Practical Exam	8	10%
3	3 Pre-final theoretical Exam	8	25%
4	4 Final Practical Exam	15	15%
5	5 Final Theoretical Exam	Last week	40%

D. Student Academic Counseling and Support

<p>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)</p> <p>-Direct Supervision by staff over lab. Session - Office hours 8 hr/week - Academic advice(by 20 student/ teaching staff member)</p>

E Learning Resources

<p>1. List Required Textbooks 1-Michael Madigan, John Matinko, Paul V. Dunlap, and David P. Clark. (2008). Brock Biology of Microorganisms, 12th edition. Prentice Hall. 2-David White. (2007). The physiology and biochemistry of prokaryotes, 3rd edition. Oxford University Press.</p>
<p>2. List Essential References Materials (Journals, Reports, etc.) - Prescott, Harley, and Klein's Microbiology, by Joanne M. Willey, Linda M. Sherwood, and Christopher J. Woolverton, published by McGraw-Hill. 2-David H. Griffin. Fungal Physiology, 2nd edition. John Wiley & Sons, Inc. ISBN: 978-0-471-16615-3</p>
<p>3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) - Singleton, P.(1999). Bacteria. In Biology, Biochemistry and Medicine, Editiontion, John Wiely and Son.</p>

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| <p>4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
 http://www.textbookofbacteriology.net/kt_toc.html
 On-line textbook of Bacteriology: Kenneth Tobar, U. of Wisconsin-Madison, Department of Bacteriology. URL (http://www.textbookofbacteriology.net/)</p> |
| <p>5. Other learning material such as computer-based programs/CD, professional standards or regulations and</p> |

F. Facilities Required

<p>Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.)</p>
<p>1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)</p> <ul style="list-style-type: none"> - Lecture halls, containing white board and electronic monitors. The seats fit the number of the students. - Laboratories equipped with benches and water sources, microscopes.
<p>2. Technology resources (AV, data show, Smart Board, software, etc.) Computing resources (AV, data show, Smart Board, software, etc.) Smart board must be available Computers must be available for students Central library must be available and be equipped with tables and computers.</p>
<p>3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) Laboratory must be equipped infrastructure as well as with: autoclave- oven- microscope- spectrophotometer- incubator- air laminar flow- shaking incubator- distillatory- ultra-balance- refrigerator- deep freezer. Bunsen burner flame-</p>

G Course Evaluation and Improvement Processes

<p>1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching</p> <ul style="list-style-type: none"> - Distribution of questions for course evaluation by students - Student-teaching staff members meetings.
<p>2. Other Strategies for Evaluation of Teaching by the Program/Department Instructor</p> <ul style="list-style-type: none"> - Peer consultation by departmental course committee - Self-evaluation of program by the department.
<p>3. Processes for Improvement of Teaching</p> <ul style="list-style-type: none"> - Installation of modern microscopes, digital labs and maintenance - Implementation of suggestions administration - Implementation of suggestions by departmental course committee - Monitoring of teaching activities by administration.
<p>4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a</p>

sample of assignments with staff at another institution)

- Reviewing assessments by staff member/chairman/special committee when required and instructed by higher administration at the end of each semester

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Comparison of course with equivalent courses
- Reviewing course topics annually by the departmental committee
- Refreshment of teaching resources to ensure updating knowledge
- Use of statics of course evaluation by students to improve the course.

Name of Course Instructor:

Signature:

Date Specification Completed: 8/1/1441

Program Coordinator:

Signature: _____

Date Received: _____