



## Course Specifications

|                      |                                 |
|----------------------|---------------------------------|
| <b>Course Title:</b> | <b>Microbial Physiology</b>     |
| <b>Course Code:</b>  | <b>2013215-3</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>          |

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## A. Course Identification

|  |
|--|
| <b>1. Credit hours:</b> 3h   |
| <b>2. Course type</b><br>a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/><br>b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| <b>3. Level/year at which this course is offered:</b>  |
| <b>4. Pre-requisites for this course (if any):</b> 9 <sup>th</sup> level / 3 <sup>rd</sup> year  |
| <b>5. Co-requisites for this course (if any):</b> Bacteriology / 2013112-3   |

## 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><br>Microbial Physiology is an intensive course with the goal of integrating biochemistry and genetics to enhance the understanding of the microbial cell and the robust and diverse nature of life. This course explores the physiology of microbial cells  |
| <b>2. Course Main Objective:</b><br>This course is providing scientific knowledge about:<br>The nutrition and cultivation of microbial cells, nutrient transport, enzymes, central metabolic pathways, and the biochemical activities associated with cellular metabolism. Growth and reproduction of microorganisms. The environment and ecological; and chemical factor affecting on the microbial growth |

## 3. Course Learning Outcomes

|   | CLOs                         | Aligned PLOs |
|---|------------------------------|--------------|
| 1 | Knowledge and Understanding: |              |

| CLOs     |   | Aligned PLOs |
|----------|---|--------------|
| 1.1      | Describe the nutrition and cultivation of microorganisms  | K2           |
| 1.2      | Memorize bioenergetics and microbial metabolism, and energy production  | K3           |
| <b>2</b> | <b>Skills:</b>  |              |
| 2.1      | Evaluate the different ways in the isolation and cultivation of microorganisms under conditions of sterilization. | S1           |
| 2.2      | Explain the methods used in counting, description and definition of the microorganisms.                           | S4           |
| <b>3</b> | <b>Values:</b>  |              |
| 3.1      | Present scientific reports in different topics related to microbiology independently and in small groups.         | V1           |

### C. Course Content

| No           | List of Topics  | Contact Hours  |
|--------------|---|----------------|
| 1            | <b>Chapter 1:</b> Culture media and cultivation of microorganisms.  | 3L + 3P        |
| 2            | <b>Chapter 2:</b> Sources of energy, carbon and electrons, nutritional types of microorganisms.   | 3L + 3P        |
| 3            | <b>Chapter 3:</b> Transport of nutrients.   | 3L + 3P        |
| 4            | <b>Chapter 4:</b> Growth and reproduction of microorganisms.  | 3L + 3P        |
| 5            | <b>Chapter 5:</b> Microbial enzymes, characteristics of enzymes, classification of enzymes, enzyme kinetics   | 3L + 3P        |
| 6            | <b>Chapter 6:</b> Bioenergetics and microbial metabolism, Free-energy change, coupling reactions, oxidation-reduction reactions, electron path, components of the electron transport system, phosphorylation. | 6L + 6P        |
| 7            | <b>Chapter 7:</b> Metabolic pathways.   | 3L + 3P        |
| 8            | <b>Chapter 8:</b> Effect of physical and environmental factors on microbial growth.   | 3L + 3P        |
| 9            | <b>Chapter 9:</b> Effect of chemicals on microbial growth.  | 3L + 3P        |
| <b>Total</b> |   | <b>30L+30P</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        | Describe the nutrition and cultivation of microorganisms  | Lectures<br>Concept maps | Paper-based exams  |
| 1.2        | Memorize bioenergetics and microbial metabolism, and energy production  | Lecture                  | Paper-based exams  |
| <b>2.0</b> | <b>Skills:</b>  |                          |                    |
| 2.1        | Evaluate the different ways in the isolation and cultivation of microorganisms under conditions of sterilization. | Lecture                  | Paper-based exams  |

| Code | Course Learning Outcomes  | Teaching Strategies                       | Assessment Methods                  |
|------|---|---|-------------------------------------|
| 2.2  | Explain the methods used in counting, description and definition of the microorganisms.                   | Open discussion<br>Small group activities | Assignments                         |
| 3.0  | <b>Values:</b>  |   |                                     |
| 3.1  | Present scientific reports in different topics related to microbiology independently and in small groups. | Interactive learning<br>Brain storming    | Practical reports<br>Practical exam |

## 2. Assessment Tasks for Students

| # | Assessment task*   | Week Due         | Percentage of Total Assessment Score |
|---|--|------------------|--------------------------------------|
| 1 | Assignments and activities:<br>1- Written Assignment<br>Power-point presentation | Variable         | 10                                   |
| 2 | Midterm Exam   | 5 <sup>th</sup>  | 20                                   |
| 3 | Periodic Exam  | 7 <sup>th</sup>  | 10                                   |
| 4 | Practical Reports  | Continuou<br>s   | 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>             | Madigan, M.T., Martinko, J.M., Parker, J. Brock Biology of Microorganisms. Ninth edition. USA (2000). |
| <b>Essential References Materials</b> | Dubey, R.C., Maheshwari, D.K. A textbook of Microbiology. New Delhi (2004).                           |
| <b>Electronic Materials</b>           | Blackboard website<br>Website of Saudi digital Library  |
| <b>Other Learning Materials</b>       | Computer-based programs and professional software.  |

## 2. Facilities Required

| Item   | Resources   |
|--|---|
| <b>Accommodation</b><br>(Classrooms, laboratories, demonstration rooms/labs, etc.)   | Classroom (capacity not more than 40 students) for 2 h/week.<br>Microbiology Lab (capacity not more than 20 students) for 3 h/week. |
| <b>Technology Resources</b><br>(AV, data show, Smart Board, software, etc.)  | Data Show projectors, smart blackboard<br>Computer Portable PowerPoint presentations to special lectures.                           |
| <b>Other Resources</b><br>(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | Incubators, Autoclaves, Ovens, Micropipettes and its tips, Petri dishes, Disinfectants, Culture media                               |

## G. Course Quality Evaluation

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

|                            |  |
|----------------------------|--|
| <b>Council / Committee</b> | Biology Department                             |
| <b>Reference No.</b>       | Committee number 14 - Academic Year 1442-1443H |
| <b>Date</b>                | 22\5\2022G – 21\10\1443H                       |

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