#### Course Title: Applied microbiology

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| **University** | **Benha** |
| **Faculty** | **Faculty of Agriculture** |
| **COURSE SPECIFICATIONS:** |
| Program of which the course is given | **Food safety** |
| Major or Minor element of Program | **General course** |
| Departments offering the Program | **Agric. Botany (microbiology branch)**  |
| Department offering the course | **Agric. Botany (microbiology branch)**  |
| Academic year / Level | **Second level / First semester** |
| Date of specification approval |  |

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| **A- BASIC INFORMATION**  |
| Title  | Applied microbiology |
| Code |  |
| Credit Hours  | 56 hours |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week  |
| Total: |  4 Hours/ week |

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| **B- PROFESSIONAL INFORMATION** |
| **1 – OVERALL AIMS OF COURSE** |
| **Providing the students with the basic information on the beneficial applied role of microorganisms in different environmental habitant such as soil, food, milk, water and air.** |

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| **2 – Intended Learning Outcomes of Course (ILOs)** |
| **A. Knowledge and Understanding:** |
| 1. **Show the importance applied microbiological processes.**
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| 1. **Apply the microbiological knowledge in the area of soil, food, milk, water and air.**
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| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:***  |
| 1. **Define the important applied microbiological processes.**
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| 1. **Choose the best applicable microorganisms in different habitants.**
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| C. Professional and Practical Skills: |
| 1. **Use and benefit from applicable microorganisms.**
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| 1. **Work individually with minimum supervision.**
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| 1. **Plan and implement tasks concerning the applied microbiology.**
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| D. General and Transferable Skills: |
| 1. **Use of new technologies tools of applicable microorganisms.**
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| 1. **Utilize different references concerning the microorganism's application.**
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| 3. a- LECTURES CONTENTS |
| **Topic** | **No. of hours** | **Lectures** |
| **Introduction to applications of microbiology in agriculture.** | 2 | 1 |
| **Organic manures, farmyard manure, and composts and importance to soil fertility.** | 2 | 1 |
| **Bio-fertilizer and biofertilization: Microorganisms used as bio-fertilizers:** | 2 | 1 |
| **N2.fixing micro-organisms (bacteria, cyanobacteria, azolla, and frankia.** | 2 | 1 |
| **P-dissolving microorganisms (bacteria and fungi).** | 2 | 1 |
| **Silicate-dissolving microorganisms.** | 2 | 1 |
| **S-oxidizing microorganisms.** | 2 | 1 |
| **Inocula preparation: Preparation of Rhizobia, *Azotobacter,* Cyanobacteria, Azolla, Frankia, Azospirillumfnocufo, Phosphate- solubilizing inocula.** | 2 | 1 |
| **Composting and compost preparation: Composts and green manures as soil fertilizers and conditioners.** | 2 | 1 |
| **Silage production as animal feed stuff.** | 2 | 1 |
| **Rotting of fiber plants.** | 4 | 2 |
| **Biological control: Microorganisms used in biological control and their application** | 4 | 2 |
| **Composting and compost preparation: Composts and green manures as soil fertilizers and conditioners.** |
| **Silage production as animal feed stuff.** | **No. of hours** | **Practical** |
| **Water microflora** | 2 | 1 |
| **Coliform bacteria** | 2 | 1 |
| **Water microbial contamination**  | 2 | 1 |
| **Examination of Azotobacter** | 2 | 1 |
| **Examination of Rhizobia** | 2 | 1 |
| **Examination of Bacillus megaterium** | 2 | 1 |
| **Staining of lactic acid bacteria**  | 2 | 1 |
| **Examination of moulds** | 2 | 1 |
| **Microbial toxins** | 2 | 1 |
| **Food borne pathogens** | 2 | 1 |
| **Air borne pathogens** | 4 | 2 |
| **Estimation of some fermentative enzymes** | 4 | 2 |

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| 4. TEACHING AND LEARNING METHODS |
| 1. The main subject areas are covered in the lectures (see syllabus Plan).
2. Several student seminar sessions give the opportunity for students to bring questions or discuss any aspects of the course with the tutor.
3. Students are given a topic to research in small groups which they report as an oral presentation. Collective feedback on the strengths and weaknesses of the presentations are provided.
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| 5. STUDENT ASSESSMENT METHODS |
| ***Students will be evaluated by attendance, fulfillment and effort in exercises and presentations, and examination grades:***1) Laboratory work: to assess the ability of students to understand and perform small laboratory experiments. |

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| 6. ASSESSMENT SCHEDULE |
| No | Assessment | **Week** |
| 1 | Periodical exam  | 4th, 8th and 12th Week |
| 2 | Practical exam | 14th Week |
| 3 | Oral exam | 15th Week |
| 4 | Final exam | 16th Week |

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| 7. WEIGHTING OF ASSESSMENT |
| No | Assessment | **%** |
| 1 | Periodical exam  | 15% |
| 2 | Practical exam | 15% |
| 3 | Oral exam | 10 % |
| 4 | Final exam | 60 % |
| TOTAL | 100 % |

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| 8. LIST OF REFERENCES |
| -Bergey's Mannual of Systematic Bacteriology (2001). Williams & Wilkins, Baltimore, U.S.A.  |

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| 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING |
| 1. Teaching aids/ materials: e.g. boards – overhead projector – data-show projector – stationary.. etc.
2. Teaching room/hall.
3. Computers.
4. Facilities for site visits etc., which are necessary for teaching the course.
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| **Course Coordinators:**  | **Prof. Dr.** **Prof. Dr.**  |
| **Date: / / 2015** |