**TEMPLATE FOR COURSE SPECIFICATION**

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

Course Instructor : Dr. Nahla Shadeed Ajeel

**COURSE SPECIFICATION**

**Full knowledge of basics of microbiology, principles of microbiology to the solution of environmental**

|  |  |
| --- | --- |
| 1. Teaching Institution | University of Baghdad/ College of Engineering |
| 2. University Department/Centre | Environmental Engineering Department |
| 3. Course title/code | Microbiology |
| 4. Modes of Attendance offered | 2 days per week electronic |
| 5. Semester/Year | Semester |
| 6. Number of hours tuition (total) | 45 h |
| 7. Date of production/revision of this  specification |  |
| 8. Aims of the Course | |
| 1. Students fulfill understanding of the branches of Environmental Microbiology. | |
| 1. Learn and understand basic principles of microbiology (cell structure) function)microbial,growthaaaaaaaa | |
| 3- Cell function, microbial, growth and growth control. | |
| 4-Prevention of the spread through water of pathogens among humans and other species. | |
|  | |
|  | |
|  | |
|  | |

9· Learning Outcomes, Teaching ,Learning and Assessment Method

|  |  |  |
| --- | --- | --- |
| A- Cognitive goals .   |  | | --- | | A1. After completion of the course students should be able to treatment of industrial and municipal wastewaters | | A2. Biochemical reactions |   A3. Attract and welcome undergraduate students to our Bachelor of Science program in Environmental Engineering, and to graduate B.S. students who are innovative problem solvers, who become leaders in their organizations, and who possess the knowledge and skills required for a wide range of careers and career changes. |
| B. The skills goals special to the course.   |  | | --- | | B1.Restoration of industrial, commercial, and government sites contaminated with hazardous materials. | | B2. Reduction in industrial residuals in order to reduce resource consumption and the production of pollutants requiring disposal.  and resource recovery/recycling, transport. |   B3.Concentrating on scientific research and its leading role in helping to serve the society and solving its problems through conducting application researches |
| Teaching and Learning Methods |
| More description of case studies and applications |
| Assessment methods |
| Homework related to problem solving |
| C. Affective and value goals   |  | | --- | | C1. Microorganisms in the water, air and soil environment | | C2. Aspects of bacteria of special interest to environmental engineering  C3.Prepare students for successful careers in environmental engineering |   . |
| Teaching and Learning Methods |
| Intensive studies of regulations |
| Assessment methods |
| Case studies |

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

|  |
| --- |
| D1. Become more effective, independent and confident self-directed learners |
| D2. Improve their general skills for study and career management  D3. Articulate personal goals and evaluate progress towards their achievement  D4.An ability to identify, formulate, and solve engineering problems |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 10. Course Structure | | | | | |
| Week | Hours | ILOs | Unit/Module or  Topic Title | Teaching  Method | Assessment  Method |
| 1 | 3 | Environmental biotechnology | General applications in environmental microbiology | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 2 | 3 | Protection from contaminants | Protection or restoration of rivers, lakes, estuaries, and coastal waters from contaminants contaminants | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 3 | 3 | Organizations of the microbial world | Bacteria | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 4 | 3 | Organizations of the microbial world | Archaea | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 5 | 3 | Organizations of the microbial world | Eukarya (Fungi) | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 6 | 3 | Fungi | Nutritional and environmental requirement for Fungi | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 7 | 3 | Organizations of the microbial world | Eukarya (Algae ) | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 8 | 3 | Algae | Reproduction and Growth for Algae | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 9 | 3 | Protozoa | Reproduction and Growth for Protozoa | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 10 | 3 | Multicellular organisms | Other multicellular organisms such as (Crustacea, Nematodes and Rotifers) | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 11 | 3 | Viruses | Typical structures of viruses | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 12 | 3 | Biochemical reactions | Reactor types | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 13 | 3 | Reactor configurations | Several reactor configurations are used for treatment of wastewaters or sludges | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 14 | 3 | Fermenters | Types of Fermenters | Electronic | Questions during the lectures ,quiz, exam, present in the class |
| 15 | 3 | Sterilization | Several types of Sterilization | Electronic | Questions during the lectures ,quiz, exam, present in the class |

|  |  |
| --- | --- |
| 11. Infrastructure | |
| 1. Books Required reading: | 1-Environmental Biotechnology principles and Applications  Bruce E.Rittman  Perry L.MCCarty. |
| 2. Main references (sources) | Microbiology for sanitary Engineers Ross E. McKinney  New York, McGraw\_ Hill  Book Company , INC.1962. |
| A- Recommended books and references (scientific journals, reports…). | Journals  Plant Growth-Promoting Bacteria  Facilitate the Growth of Barley and Oats  in Salt-Impacted Soil: Implications for  Phytoremediation of Saline Soils |
| B-Electronic references, Internet  sites… | * Comparison of Petroleum Hydrocarbons Degradation by *Klebsiella pneumoniae* and *Pseudomonas aeruginosa.* * Biodegradation of petroleum by Klebsiella pneumoniae isolated from drilling fluid. |

12. The development of the curriculum plan

The development could concentrate on more applications through taking 2 courses instead of one.