**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.  |

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| University of Baghdad College of Engineering | 1. Teaching Institution |
| Environmental eng. dep | 2. University Department/Centre |
| Environmental Microbiology 105 EVMB | 3. Course title/code |
| * Organizations of the microbial world.
* Microorganisms in the water, air and soil environment.
* Aspects of bacteria of special interest to environmental engineering.
* Biochemical reactions.
* Introduction to biological reactor configurations.
 | 4. Programme(s) to which it contributes |
| First year | 5. Modes of Attendance offered |
| Course  | 6. Semester/Year |
| 30 (Theo.)+45(prac.) | 7. Number of hours tuition (total) |
| 2/3/2015 | 8. Date of production/revision of this specification  |
| 9. Aims of the Course:* students fulfill understanding of the branches of Environmental Microbiology.
* Understand the different methods for the characterization of microbial communities (biochemical) and decide which one to apply in order to attempt at solving major open problems such as reducing drug resistance in biofilms.
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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode  |
| 1. Knowledge and Understanding

A1. Learn and understand basic principles of microbiology (cell structure and function, microbial growth and growth control) in order to apply this knowledge to solve open problems.A2. Full knowledge of basic of laboratory microbiology.A3.A4.A5. A6 .  |
|  B. Subject-specific skillsB1. (Theo.) + (prac.)B2.B3. |
|  Teaching and Learning Methods |
| 1. Students will know fundamental principles and have familiarity with environmental in Microbiology.
2. Students will know Microorganisms in the water and soil.
3. Students will know an aspect of great importance in environmental biotechnology, that is microbial ecology or the interactions among organisms and their environment
4. Understand the Biochemical reactions.
5. Understand the biological reactor.
6. Understand that the Microbiological environment can impact human health.
7. Students will be able to apply the Scientific method to field and laboratory studies.
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|  Assessment methods  |
| Strategies for Achieving Outcomes andAssessment Methods |
| Lecture recap and in-class activities: each class will commence with a recap of the previous lecture, questions will be asked and the responses will be used to evaluate the students’ understanding of the topics covered. In addition, short activities will be given Throughout the semester. Immediately following these exercises answers will be reviewed and discussed. |
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| Reviews preceding exams – a question-answer in-class review session will precede each examination. The question-answer session will allow for Assessment of the student’s comprehension of topics covered. Class discussion of the material will be encouraged and material will be recapped briefly. |
| Mid-semester examinations (Theoretical and practical) each exam will be reviewed in class, with class discussion. |
| Non-graded pre- and post- course knowledge survey |
| Lecture recap and in-class activities. Laboratory work. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development) D1.D2.D3.D4.  |

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| 11. Course Structure |
| Assessment Method | TeachingMethod | Unit/Module or Topic Title | ILOs | Hours | Week |
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| Lecture recap and in-class activities: each class will commence with a recap of the previous lecture, questions will be asked and the responses will be used to evaluate the students’ understanding of the topics covered. In addition, short activities will be given Throughout the semester. Immediately following these exercises answers will be reviewed and discussed. | Students will know Microorganisms in the water and soil. | Microorganisms in the water, air and soil environment. |  | 2 | 1 |
| Lecture recap and in-class activities: each class will commence with a recap of the previous lecture, questions will be asked and the responses will be used to evaluate the students’ understanding of the topics covered. In addition, short activities will be given Throughout the semester. Immediately following these exercises answers will be reviewed and discussed. | Students will know an aspect of great importance in environmental biotechnology, that is microbial ecology or the interactions among organisms and their environment | Aspects of bacteria of special interest to environmental engineering. |  | 6 | 3 |
| Reviews preceding exams – a question-answer in-class review session will precede each examination. The question-answer session will allow for Assessment of the student’s comprehension of topics covered. Class discussion of the material will be encouraged and material will be recapped briefly. | Understand the Biochemical reactions. | Biochemical reactions. |  | 4 | 2 |
| Mid-semester examinations (Theoretical and practical) each exam will be reviewed in class, with class discussion. | Understand the biological reactor. | Introduction to biological reactor configurations. |  | 8 | 4 |
| Non-graded pre- and post- course knowledge survey | Understand that the Microbiological environment can impact human health. |  |  |  |  |
| Lecture recap and in-class activities. Laboratory work. | Students will be able to apply the Scientific method to field and laboratory studies. |  |  |  |  |

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| 12. Infrastructure |
| Environmental Biotechnology principles and Applications.Bruce E. RittmannPerry L.McCarty | Required reading:· CORE TEXTS· COURSE MATERIALS· OTHER |
|  | Special requirements (include for example workshops, periodicals, IT software, websites) |
|  | Community-based facilities(include for example, guestLectures , internship , field studies) |

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| 13. Admissions |
|  | Pre-requisites |
| 9 | Minimum number of students |
| 28 | Maximum number of students |