**TEMPLATE FOR COURSE SPECIFICATION**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

 **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 program specification.  |

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| College of EngineeringUniversity of Baghdad | 1. Teaching Institution |
| Environmental Engineering Department | 2. University Department/Centre |
| What are solid wastes? What are the impacts of solid waste generation? What is the magnitude of the problem? What does the future hold with respect to solid waste generation? What are the future challenges and opportunities for change? How did the field of solid waste management evolve? Why are the various activities associated with waste generation, onsite storage, collection, transfer and transport, processing and recovery, and disposal identified as functional elements? What are the day-to-day responsibilities of an operating agency? The student after studying this science may wish to study further more detailed texts on integrated solid waste management.  | 3. Course title/code and description |
| Environmental Engineering Department | 4. Program (s) to which it contributes |
| Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-weeks regular subjects. | 5. Modes of Attendance offered |
| 1st and 2nd / Academic Year 2014-2015 | 6. Semester/Year |
| 60 hrs./ 2 hrs per week | 7. Number of hours tuition (total) |
| Feb. 25th , 2015 | 8. Date of production/revision of this specification  |
| **9. Aims of the Course** |
| This text examines municipal solid waste, its composition and characteristics—physical, chemical and biological. An important concern of the developed world is the development of ecologically sound and health promoting ways for the management of the millions of tonnes of urban solid waste that are generated, the student should be aware that solid waste must be managed in a way to achieve optimal use of natural resources and to cause minimal contamination. |

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| **10· Learning Outcomes, Teaching ,Learning and Assessment Method**1. Understand the basic concepts of solid waste management and will be able to describe the different sources and characteristics of solid waste.
2. Students will understand the physical, chemical, and biological properties of municipal solid waste solid waste..
3. Students will be able to describe how to calculate solid waste generation for different sources.
4. Students will understand On site handling , storage and processing of solid waste
5. Students will recognize the main two collection systems, different equipments, and labor requirement, collection frequency calculations, transfer station types, locations, design , equipments, accessory requirements and Sanitation requirements and transport of solid waste.
6. Students will recognize disposal methods of solid waste, Type of disposal methods

Landfill design and all design criteria. 1. Students will study the Sustainable development for solid waste through recovery reuse, reduce and recycle)
2. Students will discuss national legislation.
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| ***11. Teaching and Learning Methods***1- Lectures.2- Homework and Assignments.3- Tests and Exams.4- In-Class Questions and Discussions.5- Connection between Theory and Application.6- In- and Out-Class oral conservations. |
| ***12. Assessment Methods***1. Examinations, Tests, and Quizzes.2. Extracurricular Activities.3. Student Engagement during Lectures.4. Responses Obtained from Students, Questionnaire about curriculum and faculty member (Instructor) |

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| ***13. Grading Policy***1. Quizzes: - There will be four quizzes during the academic semester. The quizzes will count 5% of the total course grade.  2. Exams: - There will be three closed books and notes exam during the academic year, The mid-term exam will count 20% of the total course grade. 3. HomeworkThere will be homework after each week and will account 5% of the total course grade7. Final Exam:  - The final exam will be comprehensive, closed books and notes,  The final exam will count 70% of the total course grade.  |

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| 14. Course Structure |
| Assessment Method | TeachingMethod | Unit/Module or Topic Title | ILOs | Hours | Week |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Evaluation of solid waste management** | a, b,  | 2 (Theo.)  | 1 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Evaluation of solid waste management** | a, b,  | 2 (Theo.) | 2 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Sources, types, and composition of municipal solid wastes** | a, b, c | 2 (Theo.) | 3 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Sources, types, and composition of municipal solid wastes** | a, b, c,d | 2 (Theo.) | 4 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Sources, types, and composition of municipal solid wastes** | a, b, c,d | 2 (Theo.) | 5 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Physical, chemical, and biological properties of municipal solid waste** | a, b, c, d | 2 (Theo.) | 6 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Physical, chemical, and biological properties of municipal solid waste** | a, b, c, d | 2 (Theo.) | 7 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Physical, chemical, and biological properties of municipal solid waste** | a, b, c,d | 2 (Theo.) | 8 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Physical, chemical, and biological properties of municipal solid waste** | a, b, c,d | 2 (Theo.) | 9 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Generation of solid waste , measurements rates (input, output, at source, at site, loud count analysis, weight volume analysis, material balance analysis ) methods** | a, b, c,d | 2 (Theo.) | 10 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Generation of solid waste , measurements rates (input, output, at source, at site, loud count analysis, weight volume analysis, material balance analysis ) methods** | a, b, c,d | 2 (Theo.) | 11 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Generation of solid waste , measurements rates (input, output, at source, at site, loud count analysis, weight volume analysis, material balance analysis ) methods** | a, b, c,d | 2 (Theo.) | 12 |
|  |  | **Examination** |  | 2 (Theo.) | 13 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Waste handling and separation, storage, and processing at source** | a, b, c, d,e | 2 (Theo.) | 14 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Waste handling and separation, storage, and processing at source** | a, b, c, d,e | 2 (Theo.) | 15 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Waste handling and separation, storage, and processing at source** | a, b, c, d,e | 2 (Theo.) | 16 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Collection systems, equipments, and labor requirement**  | a, b, c, d,e | 2 (Theo.) | 17 |
| 1 – 4 of article (12) | 1-6ofarticle (11) | **Collection frequency calculations, Transfer station types**  | a, b, c, d,e | 2 (Theo.) | 18 |
| 1 – 4 of article (12) | 1-6ofarticle (11) | **locations, design , equipments, accessory** | a, b, c, d,e | 2 (Theo.) | 19 |
| 1 – 4 of article (12) | 1-6ofarticle (11) | **Sanitation requirements**  | a, b, c, d | 2 (Theo.) | 20 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Transport of solid waste** | e,f,g,h | 2 (Theo.) | 21 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Separation and processing**  | e,f,g,h | 2 (Theo.) | 22 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Separation and processing** |  | 2 (Theo.) | 23 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Transfer and transport** | E,f,g,h | 2 (Theo.) | 24 |
| 1 – 4 of article (12) | 1-6ofarticle (11) | **Transfer and transport** | E,f,g,h | 2 (Theo.) | 25 |
| -------- | ---------- | **Exam.** | -------- | ------- | 26 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Landfilling** | E,f,g,h | 2 (Theo.) | 27 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Landfilling** | E,f,g,h | 2 (Theo.) | 28 |
| 1 – 4 of article (12) | 1-6 ofarticle (11) | **Landfilling** | E,f,g,h | 2 (Theo.) | 29 |
| 1 – 4 of article (12) | 1-6ofarticle (11) | **National Legislations** | E,f,g,h | 2 (Theo.) | 30 |

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| 15. Infrastructure |
| George Tchobanoglous, and Frank Kreith, 1993, “Integrated Solid Wastes Engineering principles and Management” Second EditionREFERENCES1. p. AArine Vesilind, William A. Worrell and Debra R. Reinhart, 2002 “Solid Wastes Engineering”
2. Bishop, Paual L. "Pollution Prevention: Fundamentals and Practice", McGraw – Hill International Editions, 2000.
3. Davis, L., Mackenzie, and Cornwell, A., David. 1985. “Introduction to Environmental Engineering” 2nd Edition, McGraw Hill. Inc.
 | Required reading:· CORE TEXTS· COURSE MATERIALS· OTHER |
| Available electronic books related to the subject.Extracurricular activities. | Special requirements (include for example workshops, periodicals, IT software, websites) |
| Field study. | Community-based facilities(include for example, guestLectures , internship , field studies) |

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| 16. Admissions |
| EnE  | Pre-requisites |
| 7 | Minimum number of students |
| 25 | Maximum number of students |
| **Instructor: Assistant Prof. Dr. Instructor: Assistant Prof. Dr**. Jathwa Abdul Kareem Ibraheem Al-AmeenEnvironmental Engineering DepartmentCollege of EngineeringUniversity of BaghdadCell phone: 009647702988716E-mail: jathwa58@yahoo.com.  | 17. Course Instructor |