#### Course Title: Chemistry 4 (Recycling)

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| **University** | **Benha** |
| **Faculty** | **Agriculture** |
| **COURSE SPECIFICATIONS:** |
| Program of which the course is given | Agricultural Biotechnology Program |
| Major or Minor element of program | Minor |
| Departments offering the program | Agricultural Chemistry  |
| Department offering the course | Agricultural Chemistry  |
| Academic year (level) | Level 2 (Second Semester) |
| Date of specification approval |  |

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| **A- BASIC INFORMATION**  |
| Title  | Chemistry 4 (Recycling)  |
| Code | AC 0904 |
| Credit Hours  | 4 Hours / week (14 week) |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week  |
| Total: | 56 Hours |

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| **B- PROFESSIONAL INFORMATION** |
| 1. OVERALL AIMS OF COURSE |
| * To Explain biological value of recycling
* To know the appropriate methods of recycling.
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| 2. INTENDED LEARNING OUTCOMES OF COURSE (ILOs) |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should:**** Identify the physical and chemical structure of farm by-product.
* State the economical and biological value of recycling.
* Explain the chemical principles of main recycling technology.
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| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:**** Predict the relation between chemical composition of major farm by-product compounds and their use recycling method Solve the problems for the agriculture and food plant using computers.
* Speculate the economic value of farm by-product.
* Analyze the suitable recycling method
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| C. Professional and Practical Skills: |
| * Asses the chemical composition of farm by-product (extraction and quantification of different chemical components)
* Analysis of agriculture and industrials waste using computerized methods.
* Estimate the identified compounds.
* Apply the recycling methods in laboratory.
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| D. General and Transferable Skills: |
| * Appreciate issues of sample selection accuracy, precision and uncertainty during collection, recording and analysis of data in the field and laboratory.
* Solve numerical problems using computer- based and non-computer based techniques.
* Act through team work.
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| 3. CONTENTS |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| 1. Environmental wastes, chemical structure of their major components.
 | 12 | 6 | 6 |
| 1. Bioconversion of environmental wastes to produce useful safe materials.
 | 22 | 11 | 11 |
| 1. Chemical and technological methods for maximization benefits of environment wastes.
 | 22 | 11 | 11 |

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| 4. TEACHING AND LEARNING METHODS |
| 1. The main subject areas are covered in the lectures (see syllabus Plan).
2. Lecture and practical sessions using power point presentations (data show) and overhead projector
3. Multimedia (Video) to demonstrate new techniques.
4. Internet searching.
5. Assignments and reports.
6. Several student seminar sessions give the opportunity for students to bring questions or discuss any aspects of the course with the tutor.
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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. Med-term exam: to assess the knowledge & understanding skills.
2. Oral-exam: to assess the knowledge, understanding, intellectual and general skills.
3. Practical-exam: to assess Professional, intellectual and general skills.
4. Laboratory work: to assess the ability of students to understand and perform small laboratory experiments.
5. Final-exam: to assess relined knowledge & understanding skills.
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| 6. ASSESSMENT SCHEDULE |
| No | AssessmentAssessment | **Week** |
| 1 | Periodical exam  | 7 |
| 2 | Practical exam | 11 |
| 3 | Oral exam | 13 |
| 4 | Final exam | 14 |

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| 7. WEIGHING OF ASSESSMENT |
| No | AssessmentAssessment | **%** |
| 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 |
| 1. **Polprasert, C. 2007.** Organic waste recycling: Technology and management. 3rd Ed., International Water Association (IWA) Publishing London UK. [**Link**](http://books.google.de/books?id=owycqJMjoZoC&printsec=frontcover&dq=Organic+waste+recycling:+Technology+and+management&hl=en&sa=X&ei=l_P3UpbGN8eEtAb9gYHwDw&ved=0CDwQ6AEwAA#v=onepage&q=Organic%20waste%20recycling%3A%20Technology%20and%20management&f=false)

Sally Morgan, 2009. Waste, recycling and reuse. Evans Brothers, London UK. [Link](http://books.google.de/books?id=M64YV5SgOm4C&printsec=frontcover&dq=Waste,+recycling+and+reuse&hl=en&sa=X&ei=sPP3UpbAD4jnswbk1YDwDA&ved=0CEEQ6AEwAA#v=onepage&q=Waste%2C%20recycling%20and%20reuse&f=false) |

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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** |