#### Course Title: Chemistry 3 (Analytical)

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

|  |
| --- |
| **A- BASIC INFORMATION**  |
| Title  | Chemistry 3 (Analytical) |
| Code | AC 0903  |
| Credit Hours  | 4 Hours / week (14 week) |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week  |
| Total: | 56 Hours |

|  |
| --- |
| **B- PROFESSIONAL INFORMATION** |
| 1. OVERALL AIMS OF COURSE |
| The course concerns studying the basis of qualitative and quantitative analysis and its tools and methods and aims to: * Understand the chemical composition of substances important for life acid/base reactions with all types of acidosis, and indicators.
* Apply the knowledge of how to prepare a buffer solutions and calculate the equivalent molecular weight of chemical compounds.
* How to detect the titrations end points, preparing standards and oxidation-reduction reactions.
* Specify the precipitation analysis with its indicators and gravimetric analysis
 |

|  |
| --- |
| 2. INTENDED LEARNING OUTCOMES OF COURSE (ILOs) |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should:**** Know more knowledge and information about the chemical composition of many substances which are important in our daily lives.
* Understand the calculation of the equivalent weight.
* Detect the end point of titrations.
* Prepare the standard and buffer solutions.
* Deal with the balancing of reduction- oxidation reactions as well as the equilibrium constant of a reaction.
 |

|  |
| --- |
| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:**** Understand the principles of analytical chemistry.
* Understand both the process and methods of chemical analysis.
* Have the critical thinking and problem solving in chemistry, analysis and forensic science.
* Design a simple programme for calculation and determination of pH for different acids
* Choose the best methods for analysis and determination of elements.
 |
| C. Professional and Practical Skills: |
| * Determine the normality of acids and bases.
* Prepare the standard and indicator solutions.
* Analyze the commercial samples and different water resources.
 |
| D. General and Transferable Skills: |
| * Contribute constructively to group discussions.
* Analysis by using the modern methods and techniques.
* Listen to appreciating and evaluating the views of others.
* Work in a team with positive intent.
 |

|  |
| --- |
| 3. CONTENTS |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| 1. Concentration, volumetric analysis (acidimetric and alkalimetry, oxidation and reduction, precipitation reactions).
 | 8 | 4 | 4 |
| 1. Equilibrium and law of mass action, hydrogen ion concentration and pH, buffer solutions, and titration curves.
 | 8 | 4 | 4 |
| 1. Spectrum analysis (spectrophotometry, ultraviolet, and flame photometry).
 | 8 | 4 | 4 |
| 1. Chromatography analysis (paper, thin-layer, liquid, and gas-liquid
 | 16 | 8 | 8 |
| 1. Gas Chromatography-Mass spectroscopy ‘G.C-Mass’, Gel-electrophoresis, and amino-acid analysis.
 | 16 | 8 | 8 |

|  |
| --- |
| 4. TEACHING AND LEARNING METHODS |
| 1. Case study.
2. Cooperative groups
3. The main subject areas are covered in the lectures (see syllabus Plan).
4. Several student seminar sessions give the opportunity for students to bring questions or discuss any aspects of the course with the tutor.
5. Brain storming
 |

|  |
| --- |
| 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.
 |

|  |
| --- |
| 6. ASSESSMENT SCHEDULE |
| No | AssessmentAssessment | **Week** |
| 1 | Periodical exam  | 7 |
| 2 | Practical exam | 11 |
| 3 | Oral exam | 13 |
| 4 | Final exam | 14 |

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

|  |
| --- |
| 8. LIST OF REFERENCES |
| 1. **David G.L. 2001.** Analytical chemistry. Universities Press India. [**Link**](http://books.google.de/books?id=-dTfQ4m8ZK4C&printsec=frontcover&dq=Analytical+chemistry&hl=en&sa=X&ei=1fP3UpHJNYnJtAav2oGwDw&ved=0CDwQ6AEwAQ#v=onepage&q=Analytical%20chemistry&f=false)
2. **Kealey, D.‏ and Haines P. J. 2002.** Bios instant notes in analytical chemistry. Garland Science – Bios Scientific Publishers Ltd., Oxford UK. [**Link**](http://books.google.de/books?id=Z-YKjSfF4oIC&printsec=frontcover&dq=Bios+instant+notes+in+analytical+chemistry&hl=en&sa=X&ei=8PP3Urxxg8q1BuHBgIgO&ved=0CDcQ6AEwAA#v=onepage&q=Bios%20instant%20notes%20in%20analytical%20chemistry&f=false)
 |

|  |
| --- |
| 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING |
| 1. Teaching aids/materials: e.g. smart board-data show projector-stationary.. etc.
2. Teaching room/hall.
3. Computers connected to the internet.
4. Equipped lab.
5. Fine chemicals.
 |

|  |  |
| --- | --- |
| **Course Coordinators:**  | **Prof. Dr.** **Prof. Dr.**  |
| **Date: / / 2015** |