#### Course Title: Chemistry 5 (Instrumental)

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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 5 (Instrumental)  |
| Code | AC 0905 |
| 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 |
| This course concerns providing students with information about chromatographic and spectroscopic analysis methods. By completion of this course, students should be able:* To develop students' ability to practice some chemical analysis techniques in agricultural applications
* To know the chemical analysis techniques in improving agricultural products.
* To define different chemical analysis techniques in different biological samples.
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| 2. INTENDED LEARNING OUTCOMES OF COURSE (ILOs) |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should be able to:**** Explain the role of different chemical analysis techniques in the field of food and agriculture technology.
* Identify the principles and procedures used for chromatographic analysis methods.
* Recognize the basics of spectroscopic analysis methods.
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| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:**** Predict appropriate principles, premises, and theories to solve problems.
* Relate appropriate biochemical theories, concepts and principles from a range of disciplines.
* Suggest a professional hypotheses, design an experiment, investigation, survey or other means to assess hypotheses.
* Analyze information, synthesizing and summarizing the outcomes.
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| C. Professional and Practical Skills: |
| * Prepare different solvent systems for each and every equipment used in the analysis system.
* Apply the fractionation and the isolation of the different chemical compounds by paper and thin layer chromatographic methods.
* Analyze a commercial samples by GLC and HPLC methods.
* Determine the blood biochemical parameters using spectrophotometer.
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| D. General and Transferable Skills: |
| * Analysis of agriculture and industrials waste using different equipment’s.
* Browse the Internet critically as a means of communication and a source of information.
* Act through a teamwork.
* Manage team capabilities in proper way.
* Manage time effectively.
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| 3. CONTENTS |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| 1. Instrument of spectrum analysis (spectrophotometry, ultraviolet analysis, and flame photometry).
 | 14 | 7 | 7 |
| 2) Instruments of chromatography analysis (paper chromatography ’PC’, thin-layer chromatography ‘TLC’, high performance liquid chromatography ‘HPLC’, and gas-liquid chromatography ‘GLC’). | 14 | 7 | 7 |
| 1. Gas Chromatography-Mass spectroscopy ‘G.C-Mass’, Gel-electrophoresis, and amino-acid analysis.
 | 14 | 7 | 7 |
| 1. Instruments of atomic absorption and atomic-emission.
 | 14 | 7 | 7 |

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| 4. TEACHING AND LEARNING METHODS |
| 1. Case study.
2. Several student seminar sessions give the opportunity for students to bring questions or discuss any aspects of the course with the tutor.
3. Students are given a topic to research in small groups which they report as an oral presentation. Collective feedback on the strengths and weaknesses of the presentations are provided.
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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 |
| Rouessac, F. and Rouessac, A. 2013. Chemical analysis: Modern instrumentation methods and techniques. 2nd Ed., Wiley, UK. [Link](http://books.google.de/books?id=4XmjFLkJGygC&printsec=frontcover&dq=Chemical+analysis:+Modern+instrumentation+methods+and+techniques&hl=en&sa=X&ei=W_P3Uvv0CcmrtAbN-IGQAQ&ved=0CDcQ6AEwAA#v=onepage&q=Chemical%20analysis%3A%20Modern%20instrumentation%20methods%20and%20techniques&f=false)Sharma B. K. 2000. Instrumental methods of chemical analysis. GOEL Publishing House-Krishna Prakashan Media, India. [Link](http://books.google.de/books?id=igR_jsqfcowC&printsec=frontcover&dq=Instrumental+methods+of+chemical+analysis&hl=en&sa=X&ei=dvP3Uq3RLojItQaL5oC4BQ&ved=0CC4Q6AEwAA#v=onepage&q=Instrumental%20methods%20of%20chemical%20analysis&f=false) |

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| 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING |
| 1. Teaching aids/materials: e.g. smart boards-overhead projector-data-show projector.
2. Teaching room/hall.
3. Connected Wi-Fi Computers.
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| **Course Coordinators:**  | **Prof. Dr.** **Prof. Dr.**  |
| **Date: / / 2015** |