#### Course Title: Pest Control Biotechnology

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| **University** | **Benha** |
| **Faculty** | **Faculty of Agriculture** |
| **COURSE SPECIFICATIONS:** |
| Program of which the course is given | Agricultural Biotechnology |
| Major or Minor element of Program | Major |
| Departments offering the Program | Plant protection department |
| Department offering the course | Plant protection department |
| Academic year / Level | **Level 4 Second semester** |
| Date of specification approval |  |

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| **A- BASIC INFORMATION**  |
| Title  | **Pest-control Biotechnology** |
| Code | **PP 0407** |
| Credit Hours  | 3 unite  |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week  |
| Total: | 56 Hours |

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| **B- PROFESSIONAL INFORMATION** |
| **1 – OVERALL AIMS OF COURSE** |
| * to know the student knowledge about methods of pests control by biological means and how to use them.
* to know the student the different methods on gene transfer to improve the biological control of pests and weeds.
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| **2 – Intended Learning Outcomes of Course (ILOs)** |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should:**** Understanding the different between biological control methods against others.
* Understanding the role of different methods of gene transfer from different Bacillus thuringiensis (Bt)strains.
* study the gene classification according to insect-control effectiveness.
* Understanding the relationship between molecular biology and pest control
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| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:***1. Solving the problems for environment by wide and long-term use of molecular biology for pest control.
2. Understanding the alternative methods to control pests without using pesticides
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| C. Professional and Practical Skills: |
| 1. Train the student on the methods of pests control by biological means and how to use them insects in the lab as well as mounting and identifying these insects.
2. Train the student on how to use predacious and parasitic insects or mites pheromones and pathogenic nematode as pest control agents.
3. Train the student on how to use Formulation, application and storage of commercial products and dissolve the problems ..
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| D. General and Transferable Skills: |
| 1. Acquire the skills of control insects and other pests and how to mange their infestations .
2. Gain the skills of differentiating between the different biological control methods.
3. Acquire the skills methods of gene transfer from different Bacillus thuringiensis (Bt)strains.
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| 3. CONTENTS |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| Introduction of Biological control methods. | 4 | 2 | 2 |
| Plants of compounds inducing pest control.Pheromones as pest control agents; resistance to pheromones; problems and benefits; commercialization.  | 4 | 2 | 2 |
| Pest predacious and parasitic mites families | 4 | 2 | 2 |
| Isolation and mass rearing of predacious mites. | 4 | 2 | 2 |
| Isolation and mass rearing of predacious mites. | 4 | 2 | 2 |
| Formulation, application and storage of commercial products. | 4 | 2 | 2 |
| Bait formulation technology for rodent and snail control. | 4 | 2 | 2 |
| Predacious insects and parasitoids. | 4 | 2 | 2 |
| Microbial insect control | 4 | 2 | 2 |
| Gene transfer from different *Bacillus thuringiensis* (Bt)strains  | 4 | 2 | 2 |
| Gene classification according to insect-control effectiveness | 4 | 2 | 2 |
| Molecular biology and pest control Bacteria, virus and protozoa and pest control. | 4 | 2 | 2 |
| Molecular biology and weed control | 4 | 2 | 2 |
| Future problems for environment by wide and long-term use of molecular biology for pest control.  | 4 | 2 | 2 |
| **Total**  | 56 | 28 | 28 |

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| 4. TEACHING AND LEARNING METHODS |
| 1. The main subject areas are covered in the lectures (see syllabus Plan).
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. mid – term exam to assess knowledge , understanding and intellectual skills
2. oral exam to assess knowledge , understanding and intellectual skills
3. practical examination to assess professional and practical skills
4. Final – term examination to assess knowledge , understanding and intellectual skills
5. Semester work to assess general and transferable skill
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| 6. ASSESSMENT SCHEDULE |
| No | AssessmentAssessment | **Week** |
| 1 | mid – term examination  | 7 |
| 2 | oral examination  | 15 |
| 3 | Periodical exam | 15 |
| 4 | Final-term examination | 16 |

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| 7. WEIGHTING OF ASSESSMENT |
| No | AssessmentAssessment | **%** |
| 1 | mid – term examination  | 15% |
| 2 | oral examination  | 15% |
| 3 | Periodical exam | 10 % |
| 4 | Final-term examination | 60 % |
| TOTAL | 100 % |

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| 8. LIST OF REFERENCES |
| **References:**1. **Gianessi, L., Silvers, C., Sankula, S., Carpenter, J. 2002**. Plant biotechnology: Current and potential impact for improving pest management in US agriculture: An analysis of 40 case studies. National Center Fd. Agric. Policy (NCFAP), USA.

<http://books.google.de/books?id=3mSmGwAACAAJ&dq=Plant+biotechnology:+Current+and+potential+impact+for+improving+pest+management+in+US+agriculture&hl=en&sa=X&ei=vUH3UuyMGcPpswas-oDgCw&ved=0CGkQ6AEwBw> 1. **Star, J.L., Cook, R. and Bridge J. 2002**. Plant resistance to parasitic nematodes CABI Publ., Wallingford, UK.

<http://books.google.de/books?id=5xT_bsDdm04C&printsec=frontcover&dq=Plant+resistance+to+parasitic+nematodes&hl=en&sa=X&ei=50H3Uo6VPInrswaR_4CADA&ved=0CC4Q6AEwAA#v=onepage&q=Plant%20resistance%20to%20parasitic%20nematodes&f=false> 1. **Walter, D.E. and Krantz, G. 2009.** A manual of acarology. Texas Tech University Press, Texas, USA.

<http://books.google.de/books?id=x00gAQAAMAAJ&q=A++manual+of+acarology&dq=A++manual+of+acarology&hl=en&sa=X&ei=-UH3UvrTE4GhtAbSgYH4DQ&ved=0CC4Q6AEwAA>  |

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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.Safaa Mahmoud Halawa** **Prof. Dr. Mohamed Mohamed Azab** |
| **Date: / / 2015** |