#### Course Title: Crop Breeding for Disease and Insect Resistance

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| **University** | **Benha** |
| **Faculty** | **Faculty of Agriculture** |
| **COURSE SPECIFICATIONS:** | |
| Program of which the course is given | Biotechnology & Food safety programs. |
| Major or Minor element of program | Minor element |
| Departments offering the program | Food safety & Biotechnology |
| Department offering the course | Agronomy |
| Academic year (level) | Fourth year |
| Date of specification approval | 8\_ 11\_ 2015 |

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| **A- BASIC INFORMATION** | |
| Title | Agronomy (Fundamentals) |
| Code | AG 0106 |
| Credit Hours | 3 hours |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week |
| Total: | Hours |

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| **B- PROFESSIONAL INFORMATION** |
| 1. OVERALL AIMS OF COURSE |
| * Provide students with knowledge and skills related to nature of resistance to disease and insects. Description of mechanisms of crop infection, artificial infection, inheritance of resistance. Breeding programs for diseases and insects. Molecular biology and genetic engineering as new techniques for breeding for disease and insect resistance. |

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| 2. INTENDED LEARNING OUTCOMES OF COURSE (ILOs) |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should:***   * Define different terms related to breeding for disease and insect resistance such as : pathogenicity, horizontal and vertical resistance, etc. * Mention different defense mechanisms for resistance to disease and insects in crop plants. * Recognize different molecular techniques used in breeding for disease and insect resistance. |

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| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:***   * Differentiate between different methods of breeding for disease and insect resistance. * Determine the appropriate time of artificial inoculation with pathogen spores. * Solve problems in the area of breeding for disease and insect resistance. |
| C. Professional and Practical Skills: |
| * Design appropriate methods for breeding plants to disease and insect resistance. * Diagnose different symptoms of various diseases infection. * Apply modern techniques in breeding field crops for disease and insect resistance. |
| D. General and Transferable Skills: |
| * Manage time effectively. * Work in team. |

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| 3. CONTENTS | | | |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| 1. Disease infection mechanisms and nature of disease resistance. | 2 | 1 | 1 |
| 1. Disease defense mechanisms in resistant plants. | 4 | 2 | 2 |
| 1. Mechanisms of variability in causal pathogen. | 2 | 1 | 1 |
| 1. Inheritance of resistance foe some important diseases and insects. | 4 | 2 | 2 |
| 1. Methods of breeding for diseases and insects. | 4 | 2 | 2 |
| 1. New aspects in breeding for diseases and insects, tissue culture. | 6 | 3 | 3 |
| 1. Molecular markers and genetic engineering. | 6 | 3 | 3 |
| Total | 28 | 14 | 14 |

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| 4. TEACHING AND LEARNING METHODS |
| 1. Lectures. 2. Lab 3. Assignments. 4. Reports. |

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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. Laboratory work: to assess the ability of students to understand and perform small laboratory experiments. 2. Oral exam to assess understanding and intellectual skills. 3. Practical exam to assess practical skills. 4. Final exam to assess knowledge and intellectual skills. |

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| 6. ASSESSMENT SCHEDULE | | |
| No | AssessmentAssessment | **Week** |
| 1 | Periodical exam |  |
| 2 | Practical exam |  |
| 3 | Oral exam |  |
| 4 | Final exam |  |

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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. **Acquaah, G. 2012.** Breeding for resistance to diseases and insect pests.   John Wiley and Sons, UK.  <http://books.google.de/books?id=gupwMAEACAAJ&dq=.+Breeding+for+resistance+to+diseases+and+insect+pests&hl=en&sa=X&ei=9zz3Uu_RGIbtswa9oYH4BA&ved=0CDUQ6AEwAQ>   1. **Sambrook, J., Fritsch, E.F. and Manatis, T. 2001.** Molecular cloning: A laboratory manual .Cold Sprong Laboratory Press., NY, USA. Statistical procedures for agricultural research, 2nd Ed. John Wiley & Sons, NY, USA.   <http://books.google.de/books?id=SZ-FtgAACAAJ&dq=Molecular+cloning&hl=en&sa=X&ei=ozz3UvSAO4HEtQbS_4G4BA&ved=0CEEQ6AEwAA> |

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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. |

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| **Course Coordinators:** | **Prof. Dr. Sedhom Asaad Sedhom** |
| **Date: 8/ 11/ 2015** | |