#### Course Title: Biomathematics

|  |  |
| --- | --- |
| **University** | **Benha** |
| **Faculty** | **Faculty of Agriculture** |
| **COURSE SPECIFICATIONS:** |
| Program of which the course is given | Agric. Biotechnology |
| Major or Minor element of Program |  |
| Departments offering the Program |  |
| Department offering the course | Agric. And Biosystems engineering |
| Academic year / Level | 1st year/1st level |
| Date of specification approval |  |

|  |
| --- |
| **A- BASIC INFORMATION**  |
| Title  | Biomathematics |
| Code | AE 1102 |
| Credit Hours  | 28 |
| Lecture | 2 Hours / week |
| Practical | 2 Hours / week  |
| Total: |  Hours |

|  |
| --- |
| **B- PROFESSIONAL INFORMATION** |
| **1 – OVERALL AIMS OF COURSE** |
| . It provides the student with knowledge about functions, curves, limits, curve fitting, differentiation, differential calculus, differential equations, mathematical series, matrix algebra and integration. Also, how to apply these topics in the biological science such as plant growth analysis, micro-organism development, the spread of diseases, population dynamics, and environmental data analysis |

|  |
| --- |
| **2 – Intended Learning Outcomes of Course (ILOs)** |
| **A. Knowledge and Understanding:** |
| ***By the end of the course, students should:**** Providing the student with the knowledges about linear algebra, calculus, differential equations,
* Understanding the methods of the matrices, differential equations and series solving.
* Understanding how to use these methods in the biological applications.
 |

|  |
| --- |
| B. Intellectual Skills: |
| ***Successful completion of this course will allow students to:**** Solving the problems of equations by using matrices and determinants.
* Solving problems of areas calculation by using matrices and determinants.
* Using different methods of differential equations solving and its application
* Using the integration methods in solving biomathematics problems.
 |

|  |
| --- |
| C. Professional and Practical Skills: |
| * Analyzing the different methods of differential equations solving
* Using computer in matrices solving
* Using integration applications in biomathematics problems
* Showing the data in mathematical forms
 |

|  |
| --- |
| D. General and Transferable Skills: |
| * **Using the mathematical methods in determining needs and requirements**
* **Using the logical way of thinking in problems**
 |

|  |
| --- |
| 3. CONTENTS |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |
| Matrices and determinants | 4 | 2 | 2 |
| Matrices and determinants applications |  |  |  |
| Derivatives and its applications | 4 | 2 | 2 |
| Integration and its applications | 4 | 2 | 2 |
| Differential equations | 4 | 2 | 2 |
| Differential equations and its applications | 4 | 2 | 2 |
| Fourier series and its applications  | 4 | 2 | 2 |
| Numerical methods | 4 | 2 | 2 |

|  |
| --- |
| 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.
 |

|  |
| --- |
| 5. STUDENT ASSESSMENT METHODS |
| ***Students will be evaluated by attendance, fulfillment and effort in exercises and presentations, and examination grades:***1) exercises, discussions and quizzes.  |

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

|  |
| --- |
| 7. WEIGHTING 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. **Mangel, M. 2006**. The theoretical biologist's toolbox. Quantitative methods for ecology and evolutionary biology, Cambridge Univ. Press, Academic and Professional Books. London, UK.
2. **Yeargers, E.K.,Herod J. V., and Shonkweilerr, R.W. 1996.**An introduction to the mathematics of biology.Birkhäuser Publ.,Boston, MA, USA
 |

|  |
| --- |
| 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING |
| 1. Boards – overhead projector – data-show projector – stationary.. etc.
2. Teaching room/hall.
3. Computers.
 |

|  |  |
| --- | --- |
| **Course Coordinators:**  | **Prof. Dr. Adel H. Bahnasawy****Prof. Dr. Taha Ashour** |
| **Date: / / 2015** |