**University** Benha **Faculty** Agriculture

**Course specifications**

**Programs on which the course is given:** Agricultural Biotechnology, Food safety and Agribusiness

**Major or minor element of programmes:** Minor

**Department offering the programme:** General

**Department offering the course:** Soil and water

**Academic Level/semester:** 1st level/1st semester

**Date of specification approval: May 2014**

**A- Basic Information**

**Title: Biophysics Code: SO 0502**

**Weekly Teaching Hours:** Lecture**:** 28hours; Practical/tutorial**:** 28hoursTotal**:** 56 hours

**B- Professional Information**

**1 – Overall aims of course**

Provide students with knowledge, understanding on how physics lows and theories work in biological and material matters and environment through kinetic and related topics . All help in comprehending and appreciating the living world and management of biological resources.

**2 – Intended learning outcomes of course (ILOs)**

**a- Knowledge and understanding**:

a1- Comprehend states of matter.

a2- Classify phase of solid, liquid and vapour phases.

a3.Relate colloidal systems to practical states.

a.4.Illustrate basics of spectroscopy.

**b- Intellectual skills**

b1- Select definite systems of colloids. , compare, separate , contrast, classify , compute , solve

b2- Contrast systems .

b3- Classify binary phases.

**c- Professional and practical skills**

c1-Evaluate buffering capacity of media. support and conclude , select and recognize , criticize

c2-Judgevariations and differences in state phase.

c3- Conclude systems of matter transport in systems.

c4- Recognize structures and functions of membranes

**d- General and transferable skills**

d1- Participate in groups solve biophysical problems.

d2- Use computer programs in analysis of data.

d3- Utilize web-site data base and information relating biophysics.

**3- Contents:**

|  |
| --- |
| **Theoretical part of Biophysics course**  |
| Lectures | Hours | Topic |
| 1 | 2 | States and phases of matter. |
| 1 | 2 | Colloidal systems |
| 1 | 2 | Electro-kinetic potentials. |
| 1 | 2 | The Tyndall and the Brownian movement phenomena. |
| 1 | 2 | Overall assessment on colloidal systems.  |
| 1 | 2 | Surface tension and osmosis. |
| 1 | 2 | Buffer phenomena and buffering capacity. |
| 1 | 2 | Adsorption and desorption; ionic and molecular transport. |
| 1 | 2 | Redox potential and pH. |
| 1 | 2 | Diffusion and types of diffusion. |
| 1 | 2 | Membranes and their function. |
| 1 | 2 | Membranes and their function and types. |
| 1 | 2 | Basics of spectroscopy and chromatography |
| 1 | 2 | Revision of course topics. |

|  |
| --- |
| **Practical part of Biophysics course**  |
| Lectures | Hours | Topic |
| 1 | 2 |  Examples of matter phase taking H2O as example. |
| 1 | 2 | Preparation of colloidal systems. |
| 1 | 2 | Monitoring the Tyndall effect and the Brownian motion.. |
| 1 | 2 | Actual specimens and examples of colloidal systems. |
| 1 | 2 | Solution preparation and pH measurements.  |
| 1 | 2 | Practical observation of surface tension in liquids.  |
| 1 | 2 | Buffer and buffering capacity using suspension systems. |
| 1 | 2 | Demonstration of adsorption / desorption operations.. |
| 1 | 2 | Examples of diffusion operation using membranes |
| 1 | 2 | Instrumental work of chromatography |
| 1 | 2 | Operation of chromatography instruments  |
| 1 | 2 | Different proteins ,and examples.  |
| 1 | 2 | Theoretical exercise with equations |
| 1 | 2 | General revision.. |

**4– Teaching and learning methods**

4.1- Lectures

4.2-Assignments

4.3- Tutorials and written case-solving exercise.

4.4- Laboratory practice and tutorial activities.

4.5- Specimen and example shows

4.6- Practical and Laboratory work

**5- Student assessment methods**

5.1Semester performance to assess knowledge and comprehending intellectual skills

5.2 Follow-up exams to assess general skills

5.3 Oral exams to assess intellectual, general and transferable skills

5.4 Semester Terminal Exam to assess knowledge, comprehending and intellectual skills **Assessment schedule**

Assessment 1 Semester performance exams week 8th and 12th.

Assessment 2 Practical exam Week 15th.

Assessment 3 Oral exam Week 15th.

Assessment 4 Semester terminal exam Week 16th.

**Weighing of assessments**

Follow-up & Practical exams 30% (follow-up, Mid-term and practical)

Oral exam. 10 %

Semester Terminal Exam 60%

Total 100%

**Any formative only assessments to be described**

**6- List of references**

6.1- Course notes, specialized notes and paragraphs by teaching staff.

6.2- Text book **Glaser, R. 2012.** Biophysics: An introduction. 2nd Ed., Springer-Verlag, Germany,

:

**7- Facilities required for teaching and learning**

Transportation means for site visits ;

white board and ink markers, data show, laboratory ready-made scientific specimens.

 Glassware, filter papers, chemicals**,** flame emission spectrometry, reference materials, refrigerators, gloves, masks, chemicals.

**Course coordinator:** Prof Dr. Hasan Hamza Abbas

**Head of Department:** Prof Dr. Abo-El-Nasr Hashem Abdel-Hamid.

**Date:** 15 / 10 / 2014

|  |
| --- |
| **Matrix for Biophysics Course (Lecture Part)** |
| d | c | b | a | Lectures |
| d3 | d2 | d1 | c4 | c3 | c2 | c1 | b3 | b2 | b1 | a4 | a3 | a2 | a1 |
|  |  | x |  |  | x | x |  |  | x |  |  |  | x | States and phases of matter. |
|  |  | x |  |  | x | x | x |  | x |  |  | x | x | Colloidal systems |
| x |  | x | x |  |  |  | x |  | x |  |  | x | x | Electro-kinetic potentials. |
|  |  | x |  |  | x |  | x |  | x |  |  |  | x | The Tyndall and the Brownian movement phenomena. |
|  | x |  |  | x | x |  | x | x | x | x | x | x | x | Overall assessment on colloidal systems.  |
|  |  |  | x |  |  |  |  | x |  |  |  |  |  | Surface tension and osmosis. |
|  |  | x |  | x |  |  | x |  |  |  |  | x |  | Buffer phenomena and buffering capacity. |
| x | x | x |  |  | x |  |  |  |  |  | x |  |  | Adsorption and desorption; ionic and molecular transport. |
| x | x | x |  |  |  | x |  | x |  |  | x |  | x | Redox potential and pH. |
| x | x | x | x | x | x |  |  | x |  |  | x |  | x | Diffusion and types of diffusion. |
| x |  |  |  | x |  | x |  | x |  | x |  |  | x | Membranes and their function. |
| x | x | x |  | x | x |  | x |  | x | x | x |  | x | Membranes and their function and types. |
| x | x |  | x |  | x |  |  |  | x | x |  |  |  | Basics of spectroscopy and chromatography |
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | Revision of course topics. |

|  |
| --- |
| **Matrix for Biophysics Course (Practical Part)** |
| **d** | **c** | **b** | **a** | **Practicals** |
| d 3 | D2 | d1 | c 4 | c 3 | c 2 | c1 | b 3 | b 2 | b1 | a 4 | a 3 | a 2 | a1 |
| x |  | x |  |  | x | x |  |  | x |  |  |  | x |  Examples of matter phase taking H2O as example. |
|  | x |  |  | x |  | x | x |  |  | x |  |  | x | Preparation of colloidal systems. |
| x |  | x |  | x | x |  |  | x |  |  | x |  |  | Monitoring the Tyndall effect and the Brownian motion.. |
|  | x | x |  |  | x |  | x |  |  |  |  | x |  | Actual specimens and examples of colloidal systems. |
| x |  | x |  |  | x |  | x |  | x |  |  | x |  | Solution preparation and pH measurements.  |
| x |  | x |  |  | x |  |  | x | x |  | x |  | x | Practical observation of surface tension in liquids.  |
| x | x | x | x |  | x | x |  |  | x |  |  | x | x | Buffer and buffering capacity using suspension systems. |
|  | x | x |  | x |  | x |  | x | x |  |  |  | x | Demonstration of adsorption / desorption operations.. |
|  | x | x | x | x |  | x |  | x |  | x | x |  | x | Examples of diffusion operation using membranes |
| x |  | x | x |  |  | x | x | x |  | x | x |  | x | Instrumental work of chromatography |
| x |  | x |  | x |  |  |  | x | x | x |  |  |  | Operation of chromatography instruments  |
| x | x |  | x | x |  |  |  |  | x | x |  |  | x | Different proteins ,and examples.  |
| x | x | x |  |  |  | x |  | x |  |  |  | x |  | Theoretical exercise with equations |
| x | x | x | x | x | x | x | x | x | x | x | x | x | x | General revision.. |