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| **Benha University** **Faculty of Science****جامعة بنهاDepartment of Zoology** |
| **Course Specification****311Z: Immunology and Radiobiology** |
| **A- Affiliation** |
| **Relevant program:** | Zoology B.Sc. Program |
| **Department offering the program:** | Department of Zoology |
| **Department offering the course:** | Department of Zoology |
| **Academic year/level:**  |  third level |
| B - Basic information |
| **Title: Immunology andRadiobiology** | **Code:**311Z | **Year/level:** third level |
| **Teaching Hours:** | **Lectures:**2 | **Tutorial:**  |
|  | **Practical:**2 | **Total:**3 h/week |
| C - Professional information |
| **1 – Course Learning Objectives:** |
| **At the end of this course the students will be able to understand** * Basic concept of immunobiology and their applications.
* Study radioactive materials and devices used in measuring radiation, effect of radiation on tissue and cell compounds, using radiation in conservation methods, how to protect workers in the field of radiation and radiation therapy.
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| **2 - Intended Learning Outcomes (ILOS)** |
| **a - Knowledge and understanding:**a1- Describe the immune system.a2- Understanding the importance of immunology and its reactions.a3- Recognize and state the concept of applications of immunoassays. a4- List different sources and different types of radiations .  a5- Investigate radiation enjery in different body systems. a6- Memories different methods for protection from radiation. |
| **b - Intellectual skills:**On successful completion of the course, the student should be able to. b1- Compare between innate and adaptive immune systems.b2- Interpret different immune system reactions. b3- Link between type of radiation and radiation symptoms. b4- Interpret quantitative data in figures related to radiation. |
| **c - Practical and professional skills:**On successful completion of the course, the student should be able to: c1- Identity various types of radiation. c2- Describe radiation symptoms in different samples. c3- Report the funtion of immune system. c4- Identity various types of immune system. |
| **d - General skills:** |

On successful completion of the course, the student should be able to:

d1- Collaborate effectively with teamwork members.

d2- Effectively manages tasks, time, and resources.

 d3- Search for information and engage in life-long self learning discipline.

 d4- Use computers and internet for communication.

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| **3 - Contents** |
| **Topic** | **Lecture hours** | **Tutorial hours** | **Practical hours** |
| * Immunology

-Basic structure of the immune system and Types of immunity.  | 2 | 0 | 2 |
| -Types of immune responses and mechanisms of immune responses. | 2 | 0 | 2 |
| -Biology of cells of immune system and biology of antibody structue and function | 2 | 0 | 2 |
| -Biological response modifiers and biological aspects of immunogens and haptens | 2 | 0 | 2 |
| -Biological aspects of antigens and pathogens and mechanism of antibody production and secretion | 2 | 0 | 2 |
| -HLA class I and II molecules and Basis of immunoassays | 2 | 0 | 2 |
| -Mathematical evaluation of immunoassays performance and Numerical and non-numerical statistical evaluation of immunoassays performance | 2 | 0 | 2 |
| * Radiology

-Radioactive materials. | 2 | 0 | 2 |
| - Devices used in measuring radiation. | 2 | 0 | 2 |
| - Effect of radiation on cell compounds and tissues | 2 | 0 | 2 |
| - Using radiation in conservation methods.  | 2 | 0 | 2 |
| - How to protect workers in the field of radiation. | 2 | 0 | 2 |
| - Radiation therapy. | 2 | 0 | 2 |
| - Radiation protection. | 2 | 0 | 2 |
| **Total hours** | **28** | 0 | **28** |

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| **4 - Teaching and Learning methods:** |

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| **Intended Learning Outcomes** | **Lecture** | **Presentations & Movies** | **Discussions & Seminars** | **Practical** | **Problem solving** | **Brain storming** |
| **Knowledge & Understanding** | a1 | Describe the immune system. | x | x | x | x | 0 | 0 |
| a2 |  Understanding the importance of immunology and its reactions. | x | 0 | x | x | 0 | x |
| a3 | Recognize and state the concept of applications of immunoassays. | x | x | x | x | 0 | 0 |
| a4 |  List different sources and different types of radiations. | x | x | x | x | 0 | x |
| a5 | Investigate radiation enjery in different body systems | x | x | x | x | x | x |
| a6 | Memories different methods for protection from radiation. | x | x | x | x | x | x |
| **Intellectual Skills** | b1 | Compare between innate and adaptive immune systems. | x | **0** | x | x | x | x |
| b2 | Interpret different immune system reactions | x | **0** | x | x | x | x |
| b3 | Link between type of radiation and radiation symptoms. | x | **0** | x | x | x | x |
| b4 | Interpret quantitative data in figures related to radiation. | **0** | **0** | x | x | x | x |
| **Practical and professional skills** | c1 | Identity various types of radiation | x | x | x | x | x | 0 |
| c2 | Describe radiation symptoms in different samples. | x | x | x | x | x | 0 |
| c3 | Report the funtion of immune system. | x | x | x | x | x | x |
| c4 | Identity various types of immune system | x | x | x | x | x | 0 |
| d1 | Collaborate effectively with teamwork members. | 0 | 0 | x | x | x | x |
| d2 |  Effectively manages tasks, time, and resources. | 0 | 0 | 0 | x | 0 | 0 |
| d3 | Search for information and engage in life-long self learning discipline. | 0 | 0 | 0 | 0 | x | x |
| d4 |  Use computers and internet for communication. | 0 | 0 | 0 | 0 | x | 0 |

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| **5- Students’ Assessment Methods and Grading:** |

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| **Tools:** | To Measure | **Time schedule** | **Grading** |
|  Mid-Term Exam | a1, a4 ,b1, b3 and d2 |  Sixth week | 16% |
| Oral exam &semester work | a1 to a6, b1 to b4 and d1 to d4  |  Biweekly | 12% |
| Practical exams | a1 to a5, b1 to b4 and c1 to c4 | Fourteenth week | 24% |
| Written exam | a1 to a6 and b1 to b4  | Sixteenth week | 48% |
| Total | 100% |

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| **6- List of references:** |
| **6-1 Course notes**Notes approved by Department of Zoology.**6-2 Required books.****-**Principles and Practice of Radiation Therapy Charles M. Washington and Dennis T. Leaver Mosby, 2009**-** -Immunobiology - the immune system in health and disease, by Charles Janeway, Jr. and Paul Travers. Garland Publishing, Inc. Fifth edition, 2001.**6-3 Recommended books.*** Basic Immunology by Abul K. Abbas and Andrew H. Lichtman, Saunders, 2001.
* Fundamentals of Diagnostic Radiology, by Brant and Helms. ISBN: 9780781761352.
* The Book Essential Radiology Clinical Presentation • Pathophysiology • Imaging Second Edition Edit By Richard B. Gunderman, M.D., Ph.D., M.P.H, 2006.

**6-4 Periodicals, Web sites, etc.** -http://www.bio.umass.edu/micro/immunology/immtexts.htm -http://medicalppt.blogspot.com/2008/11/microbiology-immunology-slides2.html  -http://ard.bmj.com/content/47/6/527.3.full.pdf-[www.radiologywiki.org](http://www.radiologywiki.org)-[www.radiology.org](http://www.radiology.org)-[www.rtog.org](http://www.rtog.org/)-[www.onlineradiologyschools.org](http://www.onlineradiologyschools.org) |

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| **7- Facilities required for teaching and learning:** |
| * Physiology Lab.
* Figers for effect of radiation on tissue and cell compounds.
* Computer, Data show.
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| **Course coordinator:**  | Prof. Dr. Mohamed N. SeddekDr. Doaa Sabry Ibrahim  |
| **Head of the Department:**  | Prof. Dr. Moshira M.E. Seliem |
| **Date:**  | 2017 / 2018 |