#### Course Title: Cell Biology

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| **University** | **Benha** |
| **Faculty** | **Faculty of Agriculture** |
| **COURSE SPECIFICATIONS:** | |
| Program of which the course is given | **Agricultural Biotechnology** |
| Type: | **□** obligatory **■** optional |
| Major or Minor element of Program |  |
| Departments offering the Program | **General course** |
| Department offering the course | **Agricultural Botany (Agricultural Botany branch)** |
| Academic year / Level | **First level / First semester** |
| Date of specification approval |  |

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| **A- BASIC INFORMATION** | |
| Title | **Cell Biology** |
| Code | **AB0802** |
| Credit Hours | |
| Lecture | **2 Hours / week** |
| Practical | **2 Hours / week** |
| Total: | **56 H / Semester** |

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| **B- PROFESSIONAL INFORMATION** |
| **1 – OVERALL AIMS OF COURSE** |
| The course explains the cell theory and the structure and biology of the living cells, the prokaryotic ( cells having no nuclei) and the eukaryotic ( cells having true nuclei). Cell specialization, active and passive transport, movement across membranes, cell division and cell cycle are included . |

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| **2 – Intended Learning Outcomes of Course (ILOs)** |
| **A. Knowledge and Understanding: By the end of the course, the students will be able to** |
| 1. **Define and describe basic terms in cell biology.** |
| 1. **Explain the fundamental features of prokaryotic and eukaryotic cells.** |
| 1. **Describe the structure, composition and role of prokaryotic and eukaryotic cell organelles.** |
| 1. **Understand the influence of endogenous and environmental signals in cells.** |
| 1. **Identify and give roles for components of the extracellular matrix.** |
| B. Intellectual Skills: |
| 1. **Analyze specific processes and proteins involved in membrane transport.** |
| 1. **Conclude the major stages of the cell cycle.** |
| 1. **Discuss receptor subclasses and their possible uses in cell signaling.** |
| C. Professional and Practical Skills: |
| 1. **Examine prokaryotic and eukaryotic cells.** |
| 1. **Achieve skills in laboratory work .** |
| 1. **Learn some common methods and techniques used in cell biology.** |
| 1. **Recognize and give roles for the major cell organelles.** |
| D. General and Transferable Skills: |
| **1- Work in groups with minimum supervision.** |
| **2- Use of new technologies tools of cell biology.** |
| **3- Apply theoretical knowledge in resolving practical problems.** |
| **4-write scientific reports and proposals.** |

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| 3. CONTENTS | | | |
| **Topic** | **No. of hours** | **Lectures** | **Practical** |

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| **6** | **6** | **12** | **Cell theory, structure and function. Prokaryotic and eukaryotic cells. Plant-epidermis, vascular tissue and cortex. Animal – epithelia, connective tissue, nervous tissue, muscle, blood, germ cells and sensory cells.** |
| **6** | **6** | **12** | **Endoplasmic reticulum, lysosomes, Golgi complex, peroxisome ( micro body), centriole, mitochondria, cytoskeleton-microtubules, intermediates filaments, actin filaments, mechanism of muscle contraction, cilia& flagella, nucleus, special properties of plant cells-cell wall, vacuoles and chloroplast.** |
| **6** | **6** | **12** | **Overton's lipid nature of membrane, Langmuir's lipid layers theories of Langmuir Gorter and Grendel, Davson and Danielle. Robertson's unit membrane, Singer and Nicolson's fluid mosaic. 2D lipid bi-layer . lipid bi-layer composition. Asymmetric nature, fluidity, membrane proteins and their function.** |
| **6** | **6** | **12** | **Passive: simple diffusion, facilitated diffusion-transporters( uni-porters and co-transporters) and channel proteins. Active: pumps, group translocation and electrochemical gradient.** |
| **4** | **4** | **8** | **Mitosis, meiosis, and cytokinesis, role of protein kinases and cyclin-dependent kinase – complex ( CDK-complex) in controlling cell cycle. Control of cell proliferation in multi-cellular organisms. Programmed cell death.** |
| **28** | **28** | **56** | **Total** |

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| 4. TEACHING AND LEARNING METHODS |
| **■ Lectures ■ Laboratory practical ■ Activities ■Discussion** |

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| 5. STUDENT ASSESSMENT METHODS |
| **■ Regular exam ■Oral exam ■ Practical exam ■ Final exam.** |

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| 6. ASSESSMENT SCHEDULE | | |
| No | AssessmentAssessment | **Week** |
| 1 | Periodical exam | **4th, 8th and 12th Week** |
| 2 | Oral exam | **14th Week** |
| 3 | Practical exam | **15th Week** |
| 4 | Final exam | **16th Week** |

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| 7. WEIGHTING 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 | |
| **Course notes** | Make the reports fairly brief (3-4 pages may sometimes suffice) with an introduction (include hypothesis), results (tables or graphs) and discussion |
| **Essential books (text books)** | - Öpik, H. and Stephen, A. R. (2005). The Physiology of Flowering Plants, (4th Edition) edition, Cambridge University Press, Online ISBN:9781139164450, Hardback ISBN:9780521662512, Paperback ISBN:9780521664851.  -Verma, S.K and Mohit, V. ( 2008). A text book of plant physiology, Biochemistary and biotechnology. S. chand & Company LTD. Ramnagar New Delhi- 110055.  -[William, V. D.](http://www.amazon.com/s/ref=ntt_athr_dp_sr_1?_encoding=UTF8&field-author=William%20V%20Dashek&search-alias=books&sort=relevancerank) and  [Marcia, H.](http://www.amazon.com/s/ref=ntt_athr_dp_sr_2?_encoding=UTF8&field-author=Marcia%20Harrison&search-alias=books&sort=relevancerank) (2010): Plant Cell Biology, Science Publishers; 1 edition , ISBN-13: 978-1578083763, Enfield, NH, USA .  -[Brian, E. S. G](http://www.google.com.eg/search?hl=ar&tbo=p&tbm=bks&q=inauthor:%22Brian+E.+S.+Gunning%22).,  and Steer, M[. W.](http://www.google.com.eg/search?hl=ar&tbo=p&tbm=bks&q=inauthor:%22Martin+William+Steer%22) (1996): Plant Cell Biology, Structure and Function, 1st edition,  Publisher: Jones & Bartlett Learning ISBN: [0867205040](http://ebookee.org/go/?u=)  Wall Street, Burlington, MA 01803. |
| **Recommended books** | - Hall, J. L.; Flowers, T. J. and Roberts, R.M. (1982): Plant Cell Structure and Metabolism. Longman Gr., Essex.  -Hopkines,W.G. and Norman ,P.A.(2008): Introduction to plant physiology, (4th Edition), John Wiley and Sons, Inc.  - Gill, p.s.(2000). Plant physiology, S. Chand & Co Ltd, ISBN 8121917948, 9788121917940, New Delhi. |
| **- Periodicals, Web sites, etc.** | Literature sources available on Internet – for example: Cell Biology Online  www.Google.com (search key cell biology) [www.publish.csiro.au/journals/ajsr](http://www.publish.csiro.au/journals/ajsr) www.amazon.com |

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| 9. FACILITIES REQUIRED FOR TEACHING AND LEARNING |
| **Teaching class – Laboratory – Data show – Boards – plant samples –Microscopes – Computer- Chemicals..** |

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| **Course Coordinators:** | **Prof. Dr. Hosny Mohamed Abd El-Dayem** |
| **Head of Department:** | **Prof. Dr. Hosny Mohamed Abd El-Dayem** |
| **Date: / / 2015** | |