London South Bank University

EST 1892

Module Guide

Biology of the Cell

ASC_4_406

School of Applied Sciences

Be what you want to become

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1. MODULE DETAILS

Module Title: Biology of the Cell

Module Level: 4

Module Reference Number: ASC_4_406_1920

Credit Value: 20 credits

Student Study Hours: 200

Contact Hours: 39

Private Study Hours: 161

Pre-requisite Learning (If applicable): None

Co-requisite Modules (If applicable): None

Year and Semester Module Coordinator: 2019/2020 - Semester 1 / 2

MC Contact Details (Tel, Email, Room): Alison Alvarez
alvareza@lsbu.ac.uk

Summary of Assessment Method:

Coursework 1 - Essay

Pre-released title

Coursework 2 - Class based summative assessment

Laboratory skills and Theory

This guide is designed to help you structure your learning by providing an indicative structure and content for the module. It is a guide and not a definitive statement of what you will be taught. We will try to follow this published schedule as far as possible, but there may be some variation as the module develops and as we try to match the pace and content of our teaching to students needs.

2. SHORT DESCRIPTION

This is an introductory module providing a foundation for further studies in all areas of biology and biosciences. The cellular organisation of living organisms is introduced and the organisation and functions of eukaryotic cells are explored. In particular focus is the regulation of cellular homeostasis and metabolism, including the flow of energy and genetic information, cell death, renewal and differentiation and their relation to human health and disease. In addition, current research approaches and methods for studying cells and manipulating genes will be highlighted.It aims to provide students with practical experience in a number of laboratory-based biological techniques.

3. AIMS OF THE MODULE

The aims of this module are:

- Provide a basis for further study of cell biology and other related topics in later modules.
- Explore the complexity of animal, plant and microbial cells.
- Develop an understanding of key cellular structures and their role.
- Develop an understanding of key cellular processes.
- To introduce proteins and biological membranes and their role in cells.
- Explore the relationship between structure and function in eukaryotic cells
- Introduce some of the techniques used in cell biology research.
- Develop practical experience in a number of laboratory-based biological techniques

4. LEARNING OUTCOMES

4.1 Knowledge and Understanding

- Origin and evolution of cells as the basic units of living organisms

- Cells and cell theory, the differences between prokaryotic and eukaryotic cells.
- The plasma membrane and membrane-bound organelles.

- Principles of cell membrane transport. Cells and energy

- Intracellular trafficking and communication

- Genetic information, its storage and expression

- Introduction to genetic technology and to the use of DNA technology
- Regulation of cell death, renewal and differentiation in relation to human health and disease
- Cells as experimental models: tools and research methods in Cell Biology

As an important learning outcome, the students are expected to acquire skills that would enable them to:

4.2 Intellectual Skills

- Describe the cellular basis of life and the complexity within cells that underpins multicellularity
- Integrate knowledge on sub-cellular and cellular organisation to explain how this can inform the future development of Forensics.
- Demonstrate the ability to read and evaluate scientific papers in a broad field of Cell Biology
- Acquire and effectively analyse specific, topic-related information
- Formulate and express own opinions on various current issues in contemporary cell research

4.3 Practical Skills

- Display essential numerical, reasoning and logical skills
- Search and retrieval of information, using variety of electronic and print media sources
- Analyse and interpret scientific data in order to answer specific questions
- Write brief and clear answers to specific questions, drawing on presented evidence
- Identify and understand the principle components of a light microscope, TM and EM. set up and use a light microscope.
- Identify, magnify and measure specimens

4.4 Transferable Skills

- Develop skills in research and critical scientific writing
- Develop skills in rational argument and data analysis for the testing of ideas and experimental outcomes

5. ASSESSMENT OF THE MODULE

The module will be assessed by means of two coursework (CW) assignment- The first, a research essay and the second, a class based assessment at the end of Semester 1.

The assessments will be done using LSBU VLE, including the Turnitin, on-line plagiarism detection service. Results and feedback will be available through the same VLE site. Please note that **tutors could seek clarification and discuss with students their submitted coursework before awarding the marks.** Any submitted piece of assignment scoring higher than 20% similarity will have failed to meet the module learning outcomes and will result in failure of that piece of coursework. All elements of assessment must be passed to complete the module.

CW 1 (20%):

This element of assessment will comprise a submission of a research-based essay which is structured and well-referenced, to a conventional scientific standard. It is a topic-specific essay, based on a pre-released title. This formative assessment would support outcome-driven learning and provide an additional opportunity for students to improve their skills in searching for relevant scientific information, reading, analysing and interpreting the data relevant to the subject discipline.This coursework would also allow students to practice their skills in critical scientific writing and rational argumentation.

Students will be expected to expand on lecture material and demonstrate their extensive independent reading. Students' preparation will be further supported through guidance related to the expectations associated with scientific writing at university level.

CW 2 (80%)

This element of assessment will comprise a class based assessment-based on

1. Microscopy. Students will have an opportunity to demonstrate their knowledge of microscopy. It will also assess students ability to apply their knowledge of practical and numerical skills.

2. Subject-specific knowledge. This will allow students to demonstrate their subject knowledge. Students will be expected to demonstrate their ability to apply this knowledge when appropriate.

6. FEEDBACK

Feedback will normally be given to students 15 working days after the submission of an assignment.

7. INTRODUCTION TO STUDYING THE MODULE

7.1 Overview of the Main Content

The cell as the basic unit of living organisms. Evolution and cell theory. Common features of cells. Origin and structure of eukaryotic cells. Endosymbionts. Functional significance of compartmentalisation. Key structure and functions associated with particular compartments and the trafficking of molecules within the cell. Intra- and inter-cellular signalling. Methods for studying cells.

Nucleus and chromatin, genes and their expression. Introduction to the molecular basis of information storage and expression and to contemporary methods for analysing and manipulating genes.

Cell cycle control, cell differentiation and oncogenic transformation. Cell division, differentiation and their regulation. Mitosis and meiosis. Chromosome aberration. DNA reparation. Oncogenesis and its control. Immune surveillance as a function of highly differentiated communities of cells.

7.2 Overview of Types of Classes

The module's presentation takes into careful consideration the diversity of educational experience of students entering the university. The module comprises 8 formal lectures and 3 labs. Considerable emphasis is being put on independent, self-directed, task-driven learning, which also involves practical activities in written communication

7.3 Importance of Student Self-Managed Learning Time

Self-managed learning time is a key aspect of this module and it is important that students make full use of this time to consolidate the lecture material and to further develop the subject knowledge.

7.4 Employability

This module provides the foundations for further study in all aspects of modern biology. This will underpin more specialised and vocational study at higher levels.

8. THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Week 1	Introduction to module
	Origins of life from prokaryote to eukaryote.
	Endosymbiont theory
Week 2	Evolution and cell theory.
	Domains of life.
	Discovery of the world beyond the human eye.
	Microscopy
Week 3	Chemistry of Life
Week 4	Introduction to cells
	Prokaryotes
	Eukaryotes – Animal & plants
	Cell organelles - Compartmentalisation, organelles bound by single membrane envelopes
	Peroxisomes
	E.R. (Rough and Smooth)
	Golgi apparatus
	Lysosomes
	Nucleus and cytosol
	Chloroplasts
	Mitochondria . Mitochondrial DNA

Week 5 Intracellular trafficking (Endomembrane system)

Week 6 Tutorial

Week 7 Microscopy Lab

Week 8 Microscopy Lab

Week 9 Chromosomes and DNA

Nucleic acids and structure of DNA and RNA

Transcription and translation

Fertilisation and Inheritance

Week 10 Cell cycle and control of cell number

Mitosis. Meiosis

Week 11 Cell signalling, interactions and the Extracellular matrix.

Week 12 Tutorial

Week 13 Summative assessment

Note: mobile phones and other recording devices are NOT permitted in lectures

9. STUDENT EVALUATION

Generic feedback on assessments will be posted on Moodle.

10. LEARNING RESOURCES

10.1 Core reading

- **Molecular Cell Biology** - Harvey Lodish, Arnold Berk, Chris A Kaiser, Monty Krieger 2016
- **Essential cell biology** - Bruce Alberts 2014
- **Cell Biology: A Short Course** - Bolsover, S.R., Shephard, E., White, H., and Hyams, J.S. 2011

10.2 Optional reading

- **Becker's World of the Cell** - Jeff Hardin, Gregory Paul Bertoni, Lewis J. Kleinsmith 2011
- **The language of the genes: biology, history and the evolutionary future** - Jones, Steve 2000
- **Biology** - Reece, Jane B., Campbell, Neil A. 2014
- **BIOS instant notes in microbiology** - Simon Baker, J. Nicklin, Caroline Griffiths 2011
- **BIOS instant notes in immunology** - Peter M. Lydyard, A. Whelan, Michael W. Fanger 2011

Notes