



First Semester 2018-2019

COURSE HANDOUT (Part-II)

In addition to part-I (General Handout for all courses) printed on page 1 of the timetable book, this portion gives further specific details regarding the course.

Course Number : **BIO F213**
Course Title : **CELL BIOLOGY**
Instructor-in-Charge : **MANOJ KANNAN**

1. Course Outline:

Fundamental processes of life at cellular and sub-cellular levels; cell environments; membrane transport; cell movements; division and control mechanisms.

2. Scope and Objective:

A fundamental branch in biological sciences, cell biology exposes the learner to the structural and functional organization and working of the cell, the basic unit of life. The field is dynamic and constantly evolving. This course will give an introduction to this branch of biology, by providing experimental data wherever possible. Some of the major topics covered include the working of the cell at microscopic and molecular levels, their physiological properties, structure, intracellular organelles, interactions with microenvironments, division, regulatory mechanisms and related experimental procedures. The topics learned in this course will also be foundational for advanced courses in cell and molecular biology, as well as genetics and developmental biology.

3. Text Book (TB):

Sheeler, P. and Bianchi, DE. (2009). *Cell and Molecular Biology (3/E)*. New Delhi: Wiley.

4. Reference Books (RB):

RB1: Hardin, J., Bertoni, G. and Kleinsmith, L.J. (2016). *Becker's World of the Cell (8/E)*. Essex: Pearson Education Limited.

RB2: Alberts, B., et al. (2014). *Essential Cell Biology (4/E)*. New York: Garland Science.

RB3: Cooper, G.M. and Hausman, R.E. (2015). *The Cell: A Molecular Approach (7/E)*. United States: Sinauer Associates Inc.

RB4: Lodish, H., Berk, A., Kaiser, C.A., Kreiger, M. and Bretscher, A. (2016) *Molecular Cell Biology (8/E)*. United States: W H Freeman & Co.

5. Tentative Lecture Plan:

S. No.	Topic	Details of coverage	Number of lectures	References
i.	Orientation and Introduction	Orientation to the pedagogy, course administration and the class; overview of cell organelles; the composite animal, plant and bacterial cells; mycoplasma and viruses	3	Ch.1 (TB) Ch. 4 (RB1) Ch. 1 (RB2)



S. No.	Topic	Details of coverage	Number of lectures	References
ii.	Microscopy	Light, fluorescent and confocal and electron microscopy; preparation of sample for microscopy and specialized applications.	2	Ch.1 (TB) Ch. 1 (RB2)
iii.	Cell Membrane and cell-cell junctions	Structure and chemical organizations of plasma membrane; lipids, carbohydrates and proteins in the membrane; membrane fluidity and lipid asymmetry; cell-cell junctions and other specialized structures.	4	Ch. 15 (TB) Ch. 7 (RB1) Ch. 11 (RB2)
iv.	Membrane functions	Passive movement through cell membrane, facilitated diffusion, active transport, bulk transport, endo- and exocytosis; membrane channels, channel inhibitors and their therapeutic importance.	3	Ch. 15 (TB) Ch. 8 (RB1) Ch. 12, 15 (RB2)
v.	Endomembrane system	Membrane-enclosed organelles, protein trafficking and transportation, post-translational modifications	4	Ch. 15 (RB2) Ch. 12 (RB1)
vi.	Cytoskeleton	Cytoplasmic filaments, microtubules, spindle fibers and centriole structures and functions	3	Ch. 23 (TB) Ch. 17 (RB2)
vii.	Nuclear organization and transcription	Nuclear organization, transcription, division and cytokinesis	3	Ch. 20 (TB), Ch. 7,19 (RB2)
viii.	Ribosome and translation	Eukaryotic and prokaryotic ribosome and their compositions; process of translation	3	Ch. 22 (TB) Ch. 7 (RB2)
ix.	Cell growth	Growth curve and kinetics. Continuous culture of cells; synchronous cell cultures ; cell quantitation and sorting.	3	Ch. 2 (TB)
x.	Cell cycle	Overview of the cell cycle, regulation of cell cycle; cell cycle and cell division; growth control and cancer	4	Ch. 19 (RB1) Ch. 18 (RB2)
xi.	Apoptosis	Mechanism of programmed cell death/apoptosis	2	Ch. 18 (RB2)
xii.	Cell communication	General principles; signaling molecules, receptors, secondary messengers, signal transduction, receptor-mediated signaling	3	Ch. 14 (RB1) Ch. 16 (RB2)
xiii.	Modern Techniques and Applications of Cell Biology	Cell organelles and human diseases; cloning, gene therapy, embryonic stem cells; transgenesis and applications of cell biology; cell biology of aging; cell biology in forensic science	3	Class notes



6. Evaluation Scheme:

Component	Weightage	Duration	Date and Time	Remarks
Mid-semester Test	35 (17½%)	1½ hrs.	9/10 2:00 - 3:30 PM	Closed-book type
Comprehensive Examination	75 (37½%)	3 hrs.	3/12 FN	One section will be open-book type
In-class Quizzes and Homework	55 (27½%)	-	To be held periodically, some unannounced	Some quizzes and all homework will be open-book type
End-term Assignment	20 (10%)	-	To be turned in before 24-Nov-18	May co-terminate with an oral examination
Class Participation	15 (7½%)	-	-	Regular attendance will also be considered

7. Academic Conduct Policy:

It is expected that all students follow the highest standard of academic practice when participating in every evaluation component, including assignments and homework.

8. Attendance Policy:

Students are expected to be present in all contact sessions - lectures and tutorials. An excused absence can be sought through email or personal intimation.

9. Grading Policy:

Award of grades would be guided in general by the histogram of marks and course average. If a student misses in entirety any one of the evaluative components or appears in evaluation components just for the sake of appearing, without applying himself/herself to the task, his/her performance in the course may be reported as 'NC' (Not Cleared).

Award of grades for borderline cases will be based on the student's sincerity demonstrated by attendance in classes and promptness in turning in assignments/homework.

10. Makeup Policy:

Missing an evaluation component due to a genuine reason (serious medical causes leading to hospitalization, personal/family emergencies or absence from classes due to official purposes) makes a student eligible to apply for a makeup. In case of missing an unannounced evaluation component (such as quiz or homework), application for makeup will be considered only when there is an excused absence. In either case, it is the student's responsibility to apply for makeup.

11. Chamber Consultation:

Thursdays 4:30 – 5:30 PM, or by appointment.

Contact details: (01596) 515855, manojkannan@pilani.bits-pilani.ac.in

12. Course Announcements and Notices:

All announcements regarding the course will be made in the classroom. Notices, when required, shall be displayed only on Department notice board.

Instructor-in-Charge
BIO F213