



2nd-Aug-2016

First Semester 2016-17

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 F111**

Course Title : **GENERAL BIOLOGY**

Instructor-in-Charge : **Rajdeep Chowdhury (rajdeep.chowdhury@pilani.bits-pilani.ac.in)**

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1. Course Outline:

Living systems and their properties; biochemistry and cell biology; primary biochemical/metabolic pathways; introductory genetics; biotechnology and its applications; basic human physiological processes





2. Scope and Objectives:

The course is aimed to provide a broad introduction to the major principles and topics in biology. The relationship of the living organism with its environment at the molecular level is highlighted in line with modern research in biological sciences. Also, technological development aiding biological processes is discussed. By the end of the course, the student would have gained an overall understanding of the core biological principles and wide-ranging applications of biology in industry, medicine and human health.

3. Textbook:

Simon, E.J. *et. al.* Campbell Essential Biology with Physiology (5th edition). Noida: Pearson India Education Services Pvt. Ltd., 2016.

4. Additional Books for Reference:

RB1: Enger, E.D., Ross, F.C. and David B. Bailey. Concepts in Biology (14th edition, BITS-Pilani Custom Edition 2012). New Delhi: Tata McGraw-Hill Publishing Company Ltd., 2012.

RB2: Raven, P.H., *et. al.* Biology (9th ed.). Singapore: McGraw-Hill Publishing Company Ltd., 2012.

RB3: Starr, Cecie. Biology: Concepts and Applications (6th ed.). India: Thomson Brooks/Cole, 2007.

5. Lecture Plan:

*Unless specified otherwise, the numbers correspond to chapters from the textbook

Learning Objectives	Topics to be covered	No. of lectures	Chap. No.
Getting introduced to biology and its scope	Biology and scientific method; characteristics of life; diversity of life; two major types of cells	2	1,4
Organic chemistry of living things	Introduction to the macromolecules of cell	2	3
Components of the cell and its internal workings	Introducing microscopy; nucleus and ribosomes; endomembrane system; energy converters; cytoskeleton; ATP and cellular work; membrane function	2	4,5



How cells acquire energy	Energy flow and chemical cycling; cellular respiration - three stages of generating ATPs; process of fermentation	2	6
Processes involved in photosynthesis	Basics of plant physiology and photosynthesis; light reactions; Calvin cycle	2	7 Lecture Notes
Mechanisms and processes involved in cellular reproduction	The cell cycle and mitosis; meiosis and the origins of genetic variation; consequences of improper cell division (cancer and chromosomal disorders)	3	8
Patterns of inheritance: Mendelian genetics and beyond	Mendel's experimentation and laws; solving problems in Mendelian inheritance; family pedigrees; human disorders; variations of Mendel's laws	3	9
Structure and function of DNA, and viruses	DNA structure and replication; the genetic code; transcription; eukaryotic RNA processing; translation; mutations; viruses	4	10
Genetic regulation, Principles of DNA manipulation and applications of DNA technology	How and why genes are regulated; Introduction to recombinant DNA technology; gene cloning , gel electrophoresis, PCR , Transgenic organism, DNA fingerprinting, reproductive cloning, the genetic basis of cancer	5	11,12
Principles and functions of human digestive, excretory, circulatory and respiratory systems	Unifying concepts of each of the systems; structure of each system and components; disease association with each system	3	13,14, 15
Nervous, sensory and motor systems	Neurons and nerve impulses; central and peripheral nervous systems; senses; skeletal and muscular systems	3	19
Hormonal control in humans	General principles of hormone action and specific examples of glands and hormones	2	17



Concepts of human reproduction and development	Human male and female reproductive systems, gametogenesis; hormonal control of female reproduction; human development	2	18
The body's defenses (Immune system)	Nonspecific defenses; specific defenses (adaptive immune system); immune disorders	2	16
Evolution and Environment	Evolution and Natural Selection; Species, Population, Community, Genetic Diversity, Biodiversity and Environment.	2	12,13* (RB1)
Technological development aiding biological processes	Bridging biology with engineering	1	Lecture Notes

6. Evaluation Scheme:

#	Evaluation component	Duration	Marks	Date and Time	Remarks
1	Mid-semester Test	1½ hours	50	5/10 8:00 - 9:30 AM	Closed-book type
2	Course Quiz(s)	~ 1 hour	50	To be announced	Closed-book type
3	Assignments	Variable	20	Periodically conducted	Can be conducted in-class or take-home
4	Comprehensive Examination	3 hours	80	6/12 AN	Partly open book

7. Academic Conduct Policy:

It is expected that all students follow the highest standard of academic practice when participating in any evaluation component. Having a zero-tolerance for academic dishonesty, any case of misconduct. The case may be reported to the Examination Committee for necessary action.

8. Attendance Policy:





Students are expected to be present in all contact sessions - both lectures and tutorials. If a student anticipates absence in a class, he/she is expected to inform the instructor before hand for availing the benefit of excused absence.

9. Grading Policy:

Award of grades would be guided by the histogram of marks and course average. *If a student is absent in any one of components (listed in the Evaluation Scheme specified in item 6) entirely, his/her performance in the course may be reported as 'NC' (Not Cleared).* The same procedure will be followed for mid-semester and final grading. For a student on the borderline of two grades, the decision on the award of grade will be taken based on progressive improvement he/she has shown throughout the semester, overall course attendance and the tutorial instructor's recommendation (regarding student's promptness in turning in assignments and involvement shown in the class).

10. Make-up Policy:

If a student misses any of the evaluation components due to a genuine reason (serious medical causes leading to hospitalization, personal/family emergencies or absence from classes due to official purposes) there exists a provision to apply for make-up. Prior permission must be taken from the Instructor-in-Charge whenever possible, before applying; otherwise, he must be informed at the earliest after missing the component. The decision to grant make-up is taken by the Instructor-in-Charge in consultation with the instructor team and shall be final. No make up will be given for quizzes and assignments.

11. Chamber Consultation:

For any assistance in the course and clarifications, students can meet the instructors who will make themselves available appropriately. The lecture and tutorial instructors will announce their availability for consultation during the first class meeting.

12. Course Announcements and Notices:

All announcements regarding the course will be made in the lecture and tutorial classes. Certain others information (e.g. seating arrangement for exams) will be displayed on the notice boards of the Department of Biological Sciences.

Instructor-in-Charge
BIO F111

