

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE – PILANI, HYDERABAD CAMPUS

INSTRUCTION DIVISION, FIRST SEMESTER 2010-2011

COURSE HANDOUT (PART II)

Date: 03.09.2010

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 C111**

Course title : **General Biology**

Instructor-in-charge : **P. SANKAR GANESH**

Team of instructors : Vidya Rajesh, Kumar Pranav Narayan, Suman Kapur,
P.Sankar Ganesh

Course description :

Living System and their properties, major biological compounds, basic biochemical and physiological processes, introduction to genetics and recombinant DNA technology.

Scope and objectives :

The course is aimed at providing the introduction of biological system with respect to nature, behavior and functioning of the cell. The intricate relationship of the living organism with its environment at the molecular level is highlighted so that the impact of the modern biological researches can be understood and appreciated.

Text book :

T1: Enger, E.D., Ross, F.C. and Bailey, D.B., ***Concepts in Biology***, 13th Edition, BITS-Pilani Custom Edition, Tata McGraw Hill Publishing Company Ltd., 2010.

Reference books :

R1: Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R., ***Biology***, 7th Edition, Tata McGraw-Hill Publishing Company Limited, 2005.

R2: Starr, C., ***Biology: Concepts and Applications***, 6th Ed Thomson Learning, First Indian Reprint 2007.

Suggested reading :

S1: Campbell, N.A., Reece, J.B., ***Biology***, 7th Edition, Pearson Education, First Impression, 2009.

S2: Campbell, N.A., *et. al.* ***Essential Biology with Physiology*** (2nd edition). New Delhi: Pearson Education Inc., 2009.

Course plan:

Lecture number	Learning objectives	Topics to be covered	Reference Chap/Sec (Books)
1-2	Getting introduced to the subject and the course	Orientation to BIO C111. Brief introduction to all aspects of biology (Section 1.4 onwards of T-1)	1 (T1) 1 (R2)
3	Organic chemistry of living things	Carbohydrate and lipids	3 (T1)
4		Proteins and nucleic acids	3 (T1)
5	Cell structure and functions	Cell theory, cell membrane and transport	4 (T1)
6		Membranous organelles	4 (T1)
7		Non-membranous organelles	4 (T1)
8-9		Nuclear components and major cell types and viruses	4, 20 (T1)
10	Enzymes and coenzymes	Nomenclature Bio-catalysis: Hypotheses	5 (T1)
11		Environmental factors, co-enzymes, enzyme activation and inhibition	5 (T1)
12	Biochemical pathways: Cellular respiration and photosynthesis	Introduction Cellular respiration: Glycolysis	6 (T1)
13		TCA cycle, ETS, ATP calculation and fermentation	6 (T1)
14		Protein and fat metabolism, Photosynthesis	6, 7 (T1)
15		Photosynthesis continued: C ₄ Pathway	7 (T1)
16	DNA & RNA: Molecular basis of heredity	Central Dogma, molecular structures, duplex DNA and DNA replication	8 (T1)
17		Gene expression: Transcription and translation	8 (T1)
18		Mutation and mutagenesis, Introduction to r-DNA	8 (T1)
19	Recombinant DNA technology and applications of biotechnology	Introduction Tools: Vectors and endonucleases	16 (R1)
20		Gene cloning and expression: Illustration (Dolly)	16, 19 (R1)
21		Applications: Healthcare, agriculture and industry	16 (R1)

Lecture number	Learning objectives	Topics to be covered	Reference Chapter (Books)
22	Cell division: Mitosis (Cell copying process)	Cell cycle: The stages of mitosis	9 (T1)
23		Abnormal cell division: Basis of oncology	9 (T1)
24	Cell division: Meiosis (Sex cell formation)	Introduction Mechanisms I & II and crossing over	9 (T1)
25		Nondisjunction, sex determination and comparison of mitosis & meiosis	9 (T1)
26	Mendelian genetics (Concepts and problems)	Introduction Inheritance patterns and laws	10 (T1)
27		Multiple allelism and Sex linked inheritance	10 (T1)
28		Pleiotropy, polygenic inheritance and Environmental Influence	10 (T1)
29-30	Genetic diversity within species	Speciation, gene pool concept, Hardy-Weinberg equilibrium and its applications	12, 13 (T1)
31	Material exchange in the body	Basic principle Blood circulation: Pulmonary & Systemic Nature of blood and role of heart	24 (T1)
32		Gas exchange: Respiratory anatomy and lung function Mechanical processing of food	24 (T1)
		Chemical processing of food and waste disposal: Digestive system Kidney structure & function	24 (T1)
33-34	Nutrition (Food and diet)	Kinds of nutrients & their functions, dietary reference intakes, basal metabolic rate, eating disorders and deficiency diseases, nutrition for fitness and sports	25 (T1)
35	Body's control mechanism	Nervous system: Nerve impulse, events at the synapse and CNS organization	26 (T1)
36-37		Endocrine system, sensory input (Chem & Ear), sensory input (Eye & skin) and output coordination	26 (T1)
38-39	Sex, reproduction and development	Chromosomal determination of sex, male and female foetal development, hormonal control of fertility, fertilization, pregnancy and contraception	27 (T1)
40	Body's protection mechanism	Immune system and defense mechanisms	26 (T1)
41		Humoral and cell-mediated immune responses	26 (T1)
42		Blood typing and AIDS	26 (T1)

Self study : Ecology – Ecosystem organization and energy flow:
Chapter 15.1 to 15.3 (T1)

Evaluation scheme:

EC No.	Evaluation component	Duration	Weightage, % (Marks)	Date and time	Remarks*
1.	Test – 1	50 min	20% (60)	27.09.2010 8.00 – 8.50 AM	OB
2.	Test – 2	50 min	20% (60)	01.11.2010 8.00 – 8.50 AM	CB
3.	Quiz	Diverse	20% (60)	In tutorial classes	CB
4.	Comprehensive examination	3 Hrs	40% (120)	01.12.2010 9:00 AM – 12:00 Noon	Partly CB and partly OB

* OB: Open book, CB: Closed book

Chamber consultation hour: To be announced by the section instructor.

Grading policy: Award of grades will be guided in general by the histogram of marks. Decision on border line cases will be taken based on individual's sincerity, student's regularity in attending classes, and the section instructor's assessment of the student.

Make-up policy: If any of the two tests or quiz is missed due to medical emergency, make-up applications are accepted. Also refer to Clause 4.07 of *BITS Academic Regulations* for more details.

Notices: All notices/ announcements regarding this course will be displayed on the notice board of biological sciences group, located at the 1st floor of A-Block.

**Instructor-in-charge
BIO C111**