BITS PILANI, K K BIRLA GOA CAMPUS
INSTRUCTION DIVISION
First Semester 2017-2018
COURSE HANDOUT (PART II)

02-August-2017

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 No. : **BIO F111**
Course Title : **GENERAL BIOLOGY**
Instructor-in-charge : **Meenal Kowshik**
Team of Instructors : **Arnab Banerjee, Raviprasad Aduri, Vijayashree Nayak, Malabika Biswas, Sukanta Mondal, Kundan Kumar, Indrani Talukdar**

1. Course Description:

Living systems and their properties; classification of organisms; biochemistry; biochemical pathways operative in organisms; introductory genetics, evolution, ecology and environmental sciences; basic plant and 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. Effort would be made to relate what is being taught in the classroom with real-world applications, so that the student can appreciate the relevance and interdisciplinary nature of biology. The course offers an opportunity to the students in all disciplines to understand the beautiful working of Nature – *undoubtedly the best architect till date* – and to apply the knowledge gained to solve challenging problems in science and/or engineering.

3. Text Book:

T1: Enger, E.D., Ross, F.C. and David B. Bailey. Concepts in Biology. New Delhi: Tata McGraw-Hill Publishing Company Ltd.

4. Reference Books:

R1: Raven, P H.,Johnson, GB., Losos, J.B.,Singer, SR., Biology , 7th Edition Tata McGraw Hill Ppublishing Company Limited, 2005.
R2: Starr, Cecie. Biology: Concepts and Applications (6th edition). India: Thomson Brooks/Cole, 2007.

5. Suggested Reading

S1: Campbell, N.A., *et. al.* Essential Biology with Physiology (2nd edition). New Delhi: Pearson Education Inc., 2009.
S2: Campbell, N.A., et. al. Essential Biology with Physiology (2nd edition). New Delhi: Pearson Education, 2009

6. Lecture Plan:

Lect. #	Learning Objectives	Topics to be covered	Chap. #*	Instructor
1-2	Introduction to the study of life	Science and the scientific method; the science of biology, levels of biological organization	1(T1)	Raviprasad Aduri
3-5	Organic chemistry of living things	Building blocks; carbohydrates; proteins, nucleic acids; lipids	3(T1)	
6	Enzymes, co-enzymes and energy	How enzymes speed chemical reactions, co-factors,	5(T1)	
7		co-enzymes, enzymatic competitions, inhibition		
8	DNA and RNA – The Molecular Basis of	Central Dogma; Molecular Structures; Duplex DNA & DNA Replication.	8(T1)	

9-10	Heredity	Gene Expression: Transcription & Translation, Mutation & Mutagenesis		
11-13	Techniques and Applications of Biotechnology	Introduction; Tools: Vectors & Endonucleases, Gene Cloning & Expression: Illustration (Dolly); Applications :Healthcare; Agriculture & Industry	11(T1) 16 (R1)	
14-15	Cell Structure and Function	Cell theory; prokaryotic and eukaryotic cells; cell membrane and membrane-bound organelles; non-membranous organelles;	4(T1)	Meenal Kowshik
16-18	Biochemical Pathways – Cellular Respiration	Cellular respiration – three stages of generating ATPs; process of fermentation, Protein and fat metabolism	6(T1)	
19-20	Biochemical Pathways – Photosynthesis	Basics of Photosynthesis; light reactions; Calvin cycle; autotrophs and heterotrophs	7(T1)	
21-22	Cell Division – Proliferation and Reproduction	Cell Cycle; The Stages of Mitosis, Abnormal Cell Division: Basis of Oncology	9(T1)	
23		Introduction; Mechanisms I & II; Crossing over, Nondisjunction; Significance		
24-26	Patterns of Inheritance	Mendelian genetics – laws of heredity; extensions to Mendel's laws; linkage; other influences on phenotype	10(T1)	
27	Diversity within species and Natural selection	Gene pool concept; Genetic Variety;	12 (T1) 13(T1)	
28		Factors influencing natural Selection; Hardy-Weinberg Equilibrium Concept & Applications		
29	Human Physiology: Material exchange in the body	Role of heart in blood circulation, Pulmonary and Systemic	24(T1)	Arnab Banerjee
30		Gas Exchange: Respiratory Anatomy, Lung Function;		
32		Mechanical and Chemical processing of food & Waste disposal: Digestive System;		
33		Kidney structure & function		
34-35	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)	
36	Body's control mechanisms	Nervous system: Nerve impulse; Events at the synapse & CNS organization.	26(T1)	
37-38		Endocrine System; Sensory input (Chem.+ Ear), Sensory input (Eye, Skin); Output Coordination		
39	Body's protection mechanism	Immune System; Defense Mechanisms	26(T1)	
40		Humoral & Cell-mediated Immunity		
41		Vaccines, Blood typing, AIDS		

42-43	Human Reproduction, Sex and Sexuality; Human development	Human sexuality and determinants; gametogenesis; male and female reproductive systems – hormonal controls; pregnancy and early human development; contraception; abortion; changes in sexual function with age	27(T1)	Arnab Banerjee

7. Portions for self-study:

Will be announced in class and Moodle.

8. Evaluation Scheme:

#	Evaluation component	Duration	Weight	Date and Time	Remarks
1	Mid Term Test	90 min	30%	11/10/17 11:00-12:30	Closed book
2	Quiz/Assignment/Attendance	Variable	30%	Will be announced in class	
4	Comprehensive Examination	3 hrs	40%	06/12/17 (AN)	Closed book/Open book

9. Chamber consultation hours:

Will be announced in the class.

10. Make-up Policy:

You may apply for make-up only if you miss any of the evaluation components due to serious medical emergency for which a valid proof would have to be produced. However, the final decision would rest with the instructor. Make-up for quizzes and assignments will not be given. Refer to Clause 4.07 of BITS *Academic Regulations* for more details.

11. Notices: All course announcements will be through Moodle/in class.

Instructor-in-charge,
BIO F111