BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI

INSTRUCTION DIVISION

First Semester 2016-2017

01-Aug-2016

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 F214
Course Title : INTEGRATIVE BIOLOGY
Instructor-in-Charge : JAYATI RAY DUTTA
Other Instructors : JAYATI RAY DUTTA

1. Course Description:

The course intends to bridge the gap as well as opens new vistas to students taking up biology. The course covers two tracks, essentially. The first track introduces the student to the ordering that helps biologists to actually study the vast diversity of the living world. This track would encompass questions related to the origin and evolutionary pathways followed in nature, as well as the methods followed by biologists to systematically categorize and document them. The second track highlights the uses and applications of biology in everyday life – whether in the economic or in the social realms. Together, the course projects the subject in a way from which the student can choose and implement his biological knowledge vis-à-vis his/her interests.

2. Scope and Objectives:

Being the second course on general biology, the course exposes the students to those foundational aspects as described above. At the end of the course, the student will have developed a basic understanding of the evolutionary processes, rationale for taxonomic arrangements and familiarity of selected, representative members of the major kingdoms of living organisms. Further, the student will also become aware of how knowledge of biology is applied for creating opportunities for livelihood.

3. Textbook:

Raven P.H. and George B. Johnson. Systematics and Evolutionary Biology (BITS-Pilani Custom Edition 2012). New Delhi: Tata McGraw-Hill Publishing Company Ltd., 2012.

4. Reference Books:

RB1: Campbell, N.A., *et. al.* Essential Biology with Physiology (2nd edition). New Delhi: Pearson Education Inc., 2009.

RB2: Starr, Cecie. Biology: Concepts and Applications (6th edition). India: Thomson Brooks/Cole, 2007.

5. Lecture Plan:

Lect. No.	Learning Objectives	Topics to be covered	Chap. No.
1-3	Genes within populations	Genetic variation and evolution, Hardy-Weinberg principle; agents of evolutionary change; fitness; interaction among evolutionary forces; maintenance of variation; selection acting on traits; experimental studies on natural selection; limits of selection	20
4-7	Evidence for evolution	Evidence of natural selection; artificial selection; fossil and anatomical evidence for evolution; convergent evolution; Darwin's critics	21
8-10	Origin of species	The nature of species; the biological species concept; reproductive isolation; genetic drift and natural selection in speciation; geography of speciation; species clusters; pace of evolution; speciation and extinction	22
11-14	Systematics and the phylogenetic revolution	Systematics; cladistics; systematics and classification; phylogenetics and comparative biology; phylogenetics and disease evolution	23
15-16	Genome evolution	Comparative genomics; evolution of whole genomes	24
17-19	Protists	Introduction to protists; origin and endosymbiosis; economic importance of, and diseases associated with protists	29
20-23	Green plants	Introduction to green algae, bryophytes, tracheophytes, lycophytes, pteridophytes and angiosperms; evolution of seed plants and their economic importance	30
24-26	Fungi	Introduction to fungi; ecology, fungal parasites and pathogens; economic importance of fungi	31
27-29	Overview of Animal Diversity	General features of animals; evolution of the animal body plan; the classification of animals	32
30-35	Noncoelomate and Coelomate invertebrates	Some important features of noncoelomate and specific features of coelomate invertebrates	33,34
36-42	Vertebrates	Description of characteristics of fish, amphibians, reptiles, birds and mammals; evolution of the primates	35

6. Evaluation Scheme:

No.	Evaluation component	Duration	Weight	Date and Time	Remarks
1	Test I	60 min.	20%	10/9, 4.00--5.00 PM	CB
2	Test II	60 min.	20%	22/10, 4.00--5.00 PM	CB
3	Presentations		20%		OB
4	Comprehensive Examination	180 min.	40%	01/12 AN	CB

Chamber consultation hour: To be announced in the class.

Notices: All notices will be displayed on the Biological Sciences Group notice board.

Make-up policy: Make-up decisions will be made on a case-by-case basis and only genuine cases as determined by the team and validated by Wardens and/or Medical Officer will be considered. No make-up for Lab component and Quizzes.

Instructor-in-Charge
BIO F214