03-Aug-2015

COURSE HANDOUT (PART II)

First Semester 2015-2016

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 : **INTEGRATED BIOLOGY**

Instructor-in-Charge : **PANKAJ KUMAR SHARMA**

1. Course Description:

The course intends to bridge the gap and open 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 the 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 (5th edition). New Delhi: Pearson Education Inc., 2016.

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

5. Lecture Plan:

Lect #	Learning Objectives	Topics to be covered	TB Chap. #
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
11-12	Systematics and the phylogenetic revolution	Systematics; cladistics; systematics and classification; phylogenetics and comparative biology; phylogenetics and disease evolution	23
13-14	Genome evolution	Comparative genomics; evolution of whole genomes; disease prevention and treatment; crop improvement through genome analysis	24
15	Evolution of Development	Brief overview of evolutionary developmental biology	25
16	The Tree of Life	Brief overview on classification of organisms	26
17-19	Protists	Introduction to protists; origin and endosymbiosis; protist groups and their economic importance	29
20-27	Green plants and economic botany	Introduction to green algae, bryophytes, tracheophytes, lycophytes, pteridophytes and angiosperms; evolution of seed plants; application of botanical knowledge for benefit of mankind	30; class notes
28-30	Fungi	Introduction to fungi; ecology, fungal parasites and pathogens; fungal groups and their economic importance	31
31-38	Animal Diversity and economic zoology	General features of animals; evolution of the animal body plan; the classification of animals; specific examples of invertebrates and vertebrates; application of zoological knowledge for benefit of mankind	32; 33, 34, 35; class notes

6. Evaluation Scheme:

#	Evaluation component	Duration	Weightage	Date and Time	Remarks
1	Mid-semester test	90 min.	25%	6/10 8:00 - 9:30 AM	CB
2	Class quizzes and Assignments	Variable	35%	To be announced	CB/OB
3	Comprehensive Examination	180 min.	40%	3/12 FN	CB/OB

7. Grading Policy:

Award of grades would be guided by the histogram of marks and course average. If a student happens to be in the borderline of two grades, the decision on the final grade will be based on his/her regularity in attending classes, participation in discussions, and an assessment whether the student has shown an upward trend in scoring in the course.

8. Make-up Policy:

If a student misses any of the evaluation components due to genuine reason, there exists a provision to apply for make-up. For a foreseen absence, the student should meet the Instructor-in-Charge personally to request for a make-up, ahead of the scheduled evaluation component. In extreme emergency, the student should contact the Instructor-in-Charge as soon as practically possible. No make-up will be granted for class quiz component.

9. Instructor Consultation:

Will be announced in the class.

10. Course Announcements:

They will be displayed on the notice board of the Biological Sciences department.

INSTRUCTOR-IN-CHARGE

(BIO F214)