Birla Institute of Technology & Science, Pilani
Hyderabad Campus

FIRST SEMESTER 2021-2022

Course Handout Part - II

30-9-2021

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: VIVEK SHARMA
Instructors: Lecture- Dr. Kirtimaan Syal, Dr. Piyush Khandelia, Dr. Gireesha T Mohannath, Vivek Sharma
Tutorial- Prof. Vidya Rajesh, Prof. Jayati Ray Dutta, Prof. Sanker Ganesh, Prof. Ramakrishna Vadrevu, Dr. Gireesha T Mohannath, Prof. Sridev Mohapatra, Dr. Kirtimaan Syal, Dr. Piyush Khandelia, Vivek Sharma

Course Description: This is an introductory/ foundation level course, where students are expected to learn about living systems and their properties, major biological compounds, basic biochemical and physiological processes. Students will also get introduced to genetics and recombinant DNA technology and their applications in daily life. While designing the course, care has been taken to relate the principles of biology with other science and engineering disciplines, wherever possible.

Scope and Objective: Some students question the need for a course in biology, especially when their area of study is not related to biology (or science). However, it is becoming increasingly important to understand the nature of science and fundamental biological concepts for any person, regardless of his or her occupation. In this context, through this course it has been intended to impart knowledge on biological system with respect to nature, behavior and functioning of the cell. Further, this course has also been designed to make the student understand intricate relationship that living organisms have with their environment, at the molecular level, so that impact of modern biological research can be understood and appreciated by them. It is expected that at the end of this course, students would become aware of the influence of biology in almost every aspect of their lives.

Intended Learning Outcomes: After successful completion of this course, students will be able to but not limited to:

•Comprehend various aspects of biology
•Understand biomolecules, and enzymes
•Outline cell structure and function
•Appreciate biochemical pathways
•Explain molecular basis of heredity and genetic diversity
•Apply biotechnology to some aspects of daily life
•Compare and contrast material exchanges in human body
•Examine human body's control mechanism including reproduction

Text Book : T: Eldon D. Enger, Frederick C. Ross and David B. Bailey, Concepts in Biology, 14th Edition (BITS Pilani, Custom Edition) Tata McGraw Hill Publishing Company Limited, 2012.

Note: textbook is available for purchase from the Book Syndicate as well as from other online vendors and the information is given below: http://booksonweb.net/book_detail.php?bid=2795
Reference Books: R1: Peter H. Raven, George B. Johnson, Jonathan B. Losos, Susan R. Singer Biology, 7th Edition. WBC McGraw Hill, 2005.
R2: C. Starr, Biology: Concept and application, 6th Edition, Thomson Learning.
Textbook and reference books are available for purchase from online vendors
Suggested Reading: S1: Campbell, N.A., Reece J.B., Biology, 7th Edition, Pearson Education Inc, 2009.
S2: Campbell, N.A., et. al. Essential Biology with Physiology, 2nd Edition, Pearson Education Inc, 2009.

Course Plan:

Lecture Number	***Learning objectives***	***Topics to be covered***	***Chapter in the Text Book***
1	Introduction	Introduction to biology and its importance to daily life	Chapter 1 (section1.4 onwards
2	Chemistry of life: Organic molecules Molecules of life	Carbohydrates, and lipids	3
3		Proteins and nucleic acids	
4	Cell structure and function	Cell theory, cell membrane and transport in cells	4
5		Membranous organelles	
6		Non-membranous organelles Nuclear components Major cell types	
7	Enzymes Coenzymes Energy	Nomenclature Bio-catalysis: Hypotheses	5
8		Environmental factors Co-enzymes Enzyme activation and inhibition	

9	Biochemical pathways	Glycolysis TCA cycle	6
10		Electron Transport System ATP calculation	
11		Fermentation Protein and fat metabolism	
12		Photosynthesis	7
13	Taxonomy	Classification and evolution of organisms	20
14		Brief survey of domains Acellular infectious particles	
15	DNA & RNA: The molecular basis of heredity	Central Dogma Molecular structure Duplex DNA and its replication	8
16		Gene expression: Transcription and translation	
17		Mutation and mutagenesis	
18	Applications of biotechnology	Polymerase chain reaction DNA fingerprinting	11
19		DNA sequencing Human genome project	
20		Genetic modification of organisms Cloning of organisms: Illustration (Dolly), Stem cells, Biotechnology & Ethics	
21	Cell division: Mitosis: Body cell division	Cell cycle: Stages of mitosis	9

	Meiosis: Sex cell formation		9
22		Abnormal cell division: Basis of oncology	
23		Introduction to Meiosis I and II & crossing over	
24		Nondisjunction Sex determination Comparison of mitosis and meiosis	

25	Mendelian genetics: Concepts and problems	Inheritance patterns and laws	10
26		Multiple allelism	
27		Sex-linked inheritance Pleiotropy	
28		Polygenic inheritance and environmental influences	
29	Genetic diversity within species	Speciation Gene pool concept	12.1 - 12.4 13.1 - 13.5 & 13.9
30		Hardy-Weinberg equilibrium and its applications	
31	Material exchanges in the human body	Cardiovascular system: Blood, blood vessels, heart and lymphatic system	24
32		Respiratory system	
33		Obtaining nutrition: Mechanical and Chemical processing of food	
			24

34		Waste Disposal: Kidney structure & function	
35	Body's control mechanism	Nervous system: Nerve impulse, events at the synapse and organization of nervous system	26
36		Endocrine system Sensory input (taste, smell, vision, hearing & touch)	
37		Output coordination (muscle contraction) Immune system and defense mechanisms	
38		Acquired and cell-mediated immune responses Blood typing and AIDS	
39	Sex and reproduction	Chromosomal determination of sex Male and female fetal development	27
40		Hormonal control of fertility Fertilization, pregnancy and contraception	

Self-study: Nutrition – Food and Diet: Chapter 25 in the textbook. These portions will be included in evaluation components such as Midsemester and Comprehensive exams etc.

Lecture Hours: Section 1 -MWF (Dr.Kirtiman and Dr. Piyush) (5th hour)
Section 2-TThS (Dr. Gireesha and Vivek) (2nd hour)
Tutorial Hour (Tuesday- 8th hour)

Online Lecture links are psoted in CMS

Evaluation Scheme:

Evaluation component	*Duration*	*% (Marks)*	*Date and time*	*Nature of the Component*
Announced Quiz 1 Announced Quiz 2 Announced Quiz 3 Announced Quiz 4 (Best 3 out of 4 quizzes will be considered)	20 min each	30% (60M)	*	OB
Mid-Sem	90 min	30% (60M)	9.12.21 -(9.00am-10.30am)	OB
Compre	120 min	40% (80M)	21.01.22, FN	OB

*Announced Tests will be conducted during Tutorial hours.

Chamber Consultation Hour: To be announced by the respective lecture/tutorial 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: No make-up for Quizzes under any circumstances. Make-up for other evaluation components may be given only in genuine (medical emergency) cases of absence and only after consulting the team of faculty members in the course. If the absence is anticipated, before the examination, prior permission of the Instructor-in-charge is necessary. Request for make-up should reach the Instructor-in-charge at the earliest. Also, refer to Clause 4.07 of BITS *Academic Regulations* for more details.

Notices: All notices/ announcements regarding this course shall be displayed in Course Management System (CMS).

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Important Note: It is expected that each student registered in a course shall acquire a computer with the desired hardware, software along with an Internet connection. High-speed broadband access is highly recommended for the optimal learning experience. It is the responsibility of the student to maintain their electronic devices including Internet on backup for the uninterrupted operation of the course lectures, tutorials and the evaluation.
Google Meet Links for lecture hour as well as the tutorial hours will be shared via CMS

VIVEK SHARMA
Instructor In-charge
BIO F111 GENERAL BIOLOGY