SECOND SEMESTER 2020-21
COURSE HANDOUT

Date: 16/01/2021

In addition to part -I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. Course Title Instructor-in-charge : **BIO G545**
: **Molecular Parasitology & Vector Biology**
: **VISHAL SAXENA**

1. **Course Description:** The course explores in detail the biology of various parasitic diseases and their transmission in human and animal population by vectors (carriers). This course will give insight to the students into some frontier areas in molecular aspects of parasite and vector biology, modes of infection, life cycles of parasite and vector, host - parasite interactions, infectivity pattern, mechanisms of drug resistance and immune evasion, methods of diagnosis, prophylaxis, treatments to parasitic diseases and vector control measures.

2. **Scope and Objective of the Course**: This course is ideal for students willing to gain additional training prior to embarking on a research career in medical or molecular biology of parasites and their corresponding vectors, their immunology and host-pathogen interactions. The course also helps enhance knowledge of students who foresee their future career in medical sciences and related administrative services.

3. **Text Book (**TB)**:** Cox, F. E. G., "Modern Parasitology", 2nd Edition, Blackwell Science, 2004.

4. **Reference Books:**
R1: Bogitsh, B.J., Carter, C.E., Oeltmann, T.N., "Human Parasitology", Elsevier, 3rd Ed., 2005.
R2: Thomas C. Cheng. General Parasitology, Elsevier, IInd Ed., 2010.

5. **Course Plan:**

Module No.	Learning Objectives	Topics to be covered	Ref. Chap./ Sec.# (Book)	Learning Outcome
1	**Parasites & their vectors**	**Lectures 1 – 3:** Introduction to Infectious diseases and causative organisms, Classification of various disease causing parasites and their transmission vectors	TB1: 1, 2, 3; Ref. Material	Knowledge of animal classification
2	**Biology of protozoan and helminth parasites**	**Lectures 4 – 11:** Life cycles of *Plasmodium*, *Leishmania*, *Trypanosoma*, Nematodes and their mode of infection. Life cycle and mode of infection of *Dengue*. Physiology and nutrition of parasites. Diseases progressions and its signs and symptoms.	TB1: 1, 2; Ref. Material	Understanding of Life cycles and living habitat conditions of parasites and their disease
3	**Biology of parasite vectors**	**Lectures 12 – 16:** Life cycles of Mosquitoes (*Anopheles*, *Aedes* & *Culex*) Tsetse fly, Sandfly. Indigenous flora of the vector & its effect on pathogen development and transmission	TB1: 3	Understanding of Life cycles and living habitat conditions of vectors/ hosts

4	**Host – parasite interactions**	**Lectures 17 – 24:** Molecular biology of host – parasite interactions Host immune response to protozoan and helminthes parasites and viruses – antigenic variations, parasitic diseases and virulence, and immuno-pathology	R2:1, 2; Review articles	Knowledge about molecules involved in host-parasite interactions
5	**Methods of diagnostics and research**	**Lectures 25 – 28:** Identification of parasites, clinical and molecular diagnostics, techniques used for study of host-parasite interactions, molecular research techniques.	Review articles and Lecture notes	Understanding of Diagnostic techniques
6	**Parasite chemotherapy and vector control**	**Lectures 29 – 36:** Drugs against various parasitic diseases, their modes of action and limitations, drug resistance, vaccinations; vector control measures, health education; discovery and development of new drugs	TB1: 9, 10	Knowledge on Therapeutic aspects and disease prevention measures
7	**Advances in parasite biology research**	**Lectures 37– 41:** Parasite Genomics, advances in parasite genome databases, systems biology, techniques to parasite in-vitro and in-vivo studies.	Research and Review Articles	Knowledge about recent advancements in research

Additional references will be given from time to time. The course has Lab components which will be planned as per time and chemical availability.

6. Evaluation Scheme:

Component	Duration	Wtg. (%)	Date & Time	Remarks
Mid-term test	90 minutes	30		Partly Closed & Open Book
Quizzes	Variable	10		Closed Book
Seminar/ Assignments	Variable	10+5		Open Book
Comprehensive Examination	3 hrs.	45		Partly CB & OB

7. **Chamber Consultation Hours:** To be announced in the class.

8. **Notice:** Notices for tests will be displayed on Biological Sciences Notice Board. Quizzes will be unannounced.

9. **Makeup Policy:** Makeups for quizzes, seminar or assignment will not be granted. Make-ups for Tests will be granted only in case of severe medical urgency or hospitalization.

Instructor-in-charge
BIO G545