



SYLLABUS

Course Title	PHARMACEUTICAL MICROBIOLOGY	
Course Code	PH402	
Course Credit	Lecture	: 2
	Practical	: 2
	Tutorial	: 0
	Total	: 4
Course Objectives		
<p>On the completion of the course, students will be able to:</p> <ul style="list-style-type: none">▪ To study the microbial growth including microscopy and staining techniques for identification of microorganisms.▪ To study the various microbial growth controlling techniques and various other tests used for detection of microorganisms.		
Detailed Syllabus		
Sr. No.	Name of Chapter & Details	Hours Allotted
	Section-I	
1	Introduction to Scope of Microbiology	02
2	General microbiology:	05

	Structure and Bacterial Cell, Classification and taxonomy of Actinomycetes, Bacteria, Spirochetes, Rickettsia and Viruses.	
3	Identification, Electron microscopy and Staining Technique, Nutrition, Cultivation and Isolation of Microbes	08
	Section-II	
4	Control of microbes: Disinfection, factor affecting disinfection, dynamics of disinfection, evaluation of disinfection. Sterilization: methods of sterilization, validation of sterilization methods and equipments.	09
5	Analytical microbiology: Bacterial counts, sterility of pharmaceuticals, microbiological assay of vitamins and antibiotics.	06
Pharmaceutical Microbiology (Practical)		
<ol style="list-style-type: none"> 1. Preparation of Various Media. 2. To cultivate the given microbial culture by Inoculation in Nutrient Broth. 3. To cultivate the given culture by streaking method on Agar Slant. 4. To cultivate the given microbial culture by streaking on plate. 5. To Study the Cultivation of Microbes by Quadrant Streaking on a Plate. 6. To Cultivate Microbe from Soil Culture by Stab method. 7. Preparation and fixation of bacterial smear. 8. Observation of microbes by simple staining or monochrome staining. 9. To Carry out Grams staining of given culture. 10. Staining of Microorganism. 11. Methods of Isolation. 		

12. Study of effect of UV light on growth of micro-organisms.
13. To Perform sterility testing of absorbent cotton gauze.
14. To Perform sterility testing of ampoules and vials having water for injection.
15. To Perform sterility testing of soluble powders.
16. Study of Sterilization and Their Validation.
17. Sterility Testing of Pharmaceuticals as per IP.
18. Bacterial Counts,
19. Other practicals covering syllabus aspects.

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regular interval.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- The course includes language practices such as Group Discussion, Interviews etc to develop the communication skills of the students.

Students Learning Outcomes:

- Students will be understand various tests for detection of presence of microorganisms in sterile and non-sterile dosage forms.
- Students will be able to to know the various methods used for controlling the growth of microorganisms in pharmaceutical industries.
- Student have a good understanding about the growth cycle of microorganisms including effects of various chemical agents on their growth and various staining techniques used for identification of microorganisms by using microscope.

Text Books:

1. Foundations in Microbiology by Patil Ulhas.
2. Hugo & Russell's Pharmaceutical Microbiology by Denyar S.P ,Editor.
3. Pharmaceutical Microbiology : Experiments and Techniques by Kokare Chandrakant R.
4. A Text Book of Pharmaceutical Microbiology by Shah. Dushyant and Shah Yamini.
5. Pharmaceutical Microbiology by Kar Ashutosh.
6. Microbiology Fundamentals and Application by Purohit S.S .

Reference Books:

1. Textbook of Microbiology by Tortora.
2. Bergeys manual of Systematic Bacteriology, Williams and Wilkins- A Waverly company.
3. Disinfection, Sterilization and Preservation. Fourth edn, Seymour S. Black. Lea and Febiger Philadelphia, London.
4. Microbiology, Pelczar/Chan Kreig Tata McGraw Hill edn.

Additional Resources

- Soft copies pharmaceutical microbiology books are available on <http://www.pharmatext.org>
- Latest information regarding to pharmaceutical microbiology are available on <http://www.pharmainfo.net>