**Syllabus (Ph.D. course work paper- III)**

**Title of the paper: Advanced Microbiology and Pharmacology**

**Paper code:**

**Credit: 3**

**Course Objective:**

The objectives of the course are:

* To introduce research scholars to important tools and techniques related to contemporary trends in the subject.
* To acquaint research scholars with important domains in Biotechnology and also inter disciplinary approachesin solving research problems.

**Detailed syllabus:**

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| **Module** | **Contents** | **Hr** |
| I | Introduction to bacteria, virus and fungi. Ultrastructure of bacteria, virus and fungi. Microbial growth, pure culture, nutrition, sterilization, disinfection and safety, nitrogen fixing microorganisms, Human diseases: TB, Cancer, AIDS, Microbes causing infections/diseases- MRSA, Mycobacterium tuberculosis, salmonella, cholera, Candida etc. Antibiotics- types and mode of action, mechanism of resistance. | 20 |
| II | Medicinal plants, drug discovery from plants, chemical constituents of plants, isolation, extraction and characterization of active compounds, qualitative and quantitative estimation, role of plant cell culture in drug discovery.  | 20 |
| III | Nature and source of drugs, drug nomenclature, dosage forms, LD50, IC50, toxicity studies, Lipinski’s rule of five, *In silico* drug discovery, docking, ADME- Toxicity, Pharmacokinetics, animal models, animal cell lines, drug delivery, Nanotechnology in drug discovery, drug release kinetics.  | 20 |
| IV | Theories and working principle of UV-Vis spectrophotometer, Colorimeter, Nano-spectrophotometer, ELISA, FT-IR, NMR, Mass spectroscopy, sonicator, PCR, Real-Time PCR, Rotary evaporator, Gel electrophoresis: Horizontal and Vertical, SEM, TEM, Confocal microscopy, sequencing techniques, Chromatography- TLC, HPLC, GC, autoclave, gel documentation system.  | 20 |

**Further readings:**

* Microbiology: A Text Book of Microorganisms, General and Applied, Charles Edward

Marshall, F.TBioletti Published P.P.Blakiston’s son & co.

* Microbiology, M.J Pelczer and R.D Reid.
* Modern Analytical Chemistry, David Harvey, McGraw-Hill, 1sted, 2000, ISBN: 0-07-237547-7
* Chemical Analysis: Modern Instrumentation Methods and Techniques, Francis Rouessac, AnnickRouessac, John Wiley & Sons, 2nded, 2007.ISBN: 0470859040,9780470859049.
* “Principles of Instrumentation Analysis”, D.A. Skoog, F.J. Holler, S.R.Crouch,Brooks cole:6th edition(Dec 6 2006), ISBN: 0495012017, 978-0495012016.