

**LS 641 Ph.D. Course: General and Applied Microbiology (2 Credits).**

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| <b>S No</b> | <b>Topics</b>  | <b>Contact hours</b> | <b>Teaching faculty</b> |
|-------------|--|----------------------|-------------------------|
| 1           | Introduction to microbial diseases, e.g., bacterial, viral, fungal and protozoan (respiratory tract infections, gastrointestinal tract infections, sexually transmitted diseases, infections in the compromised host).   | 4                    | ASK                     |
| 2           | Host-microbe, interactions. General Secretion systems Bacteria employ for pathogenesis. Diversity observed in secretion mechanisms, Mechanism of survival of Mycobacterium. Enteric Infections: Crosstalk between the pathogen and the intestinal epithelium and how it modulates hosts function for its survival. | 5                    | ASK                     |
| 3           | Quorum Sensing circuits of Bacteria. How can this mechanism be exploited for biotechnological applications.  | 3                    | AB                      |
| 4           | Use of nanotechnology in medical microbiology for diagnosis, treatment of infectious diseases etc.   | 3                    | AB                      |
| 5           | Microbial nutrition, growth kinetics and control. Antibiotics, types, Mechanism of action, antimicrobial Resistance, Transporters in microbes.   | 4                    | AKJ                     |
| 6           | Microbiology of food, products of industrial microbiology, use of microbes for crop production improvement. Microbiome and human health  | 4                    | AKJ                     |
| 7           | Environmental Microbiology: Microbial degradation/detoxification of xenobiotics, Genetic manipulations of microbes, Biofuels   | 4                    | AKJ                     |
| 8           | Bioinformatics, proteomics and genomics and its use in vaccine development of infectious disease and emerging infections. Mechanisms of Pathogenesis, Immune responses.  | 5                    | AKJ                     |

- **Course coordinator**

**Suggested readings:**

1. Essential Microbiology, Stuart Hogg, John Wiley and Sons Limited
2. Microbiology: A Human Perspective, E.W. Nester, D.G. Anderson, C.E. Roberts,
3. Culture of Animal Cells, A Manual of Basic Technique. R. I. Freshney, Wiley

4. Manual of Environmental Microbiology, C. J. Hurst, R.L.Crawford, G.R.Knudsen, M.J. McInerney, L.D. Stetzenbach,, ASM Press USA.
5. Microbiology, L.M. Prescott, J. P. Harley, D.A., Klein
6. Microbiology, by M. J. Pelczar, Jr., E.C.S. Chan , Noel R. Kreig
7. Anantnarayan and Panikar's Text Book of Microbiology10th Edition, Editor, Reba Kanugo.
8. Major Infectious Diseases, Disease control Properties, 3<sup>rd</sup> edition, by King K. Holmes, Stefano Bertozzi, Barry R. Bloom and Prabhat Jha
9. Recent research papers (suggested by the concern faculty member) published in high impact factor journals related to above mentioned topics.