Semester: II

Core Course

7. Course Code & Title: MPC 52 03 & Infectious Disease Epidemiology

Credits: 2

Learning Objectives

At the end of the course the student will be able to

1. Understand the basic concepts in infectious disease epidemiology and apply them.
2. Appreciate vaccination as a strategy for disease prevention and control and understand the concepts of vaccine efficacy and effectiveness.
3. Discuss the ecology of emergence, progression and remission of infectious diseases in the community.
4. List the various infectious disease control modalities including investigation of an outbreak.
5. Develop basic deterministic models for infectious disease outbreaks in a population.
6. Develop an aptitude to alert to emergence of and developments in infectious disease epidemiology.

Sl.No	Module	Topic	Readings
1	Introduction	History of Infectious Disease Epidemiology	Kramer et al, (2010)

		Global Burden of Infectious Diseases Principles of Infectious Disease Epidemiology Key Terminologies used in IDE	
		Natural History of Disease Spectrum of Disease	Kramer et al, (2010)
		Transmission of Disease - Chain of Transmission - Modes of Transmission	Kramer et al, (2010)
		Epidemiological Triad in the context of Infectious diseases	Kramer et al, (2010)
		Classification of Infectious Diseases - Type of Agent - Type of Disease - Type of Transmission	Park (2011)
		Notifiable Diseases	
2	**Prevention and Management of Infectious Diseases**	Basic concepts of Immunity - Active immunity - Passive immunity - Heard Immunity	Kramer et al, (2010)
		Vaccination Basic concepts - Development of Vaccination - Vaccine trails - Critical Vaccination coverage	http://www.ph.ucla.edu/EPI/41508/415cmat/lect14_41508.pdf Zodpey (1998), Wierzba et al (2015), Powell & Begue (2019)

		- Vaccine effectiveness - Community effectiveness of vaccines	
		Disease outbreaks - Types of disease outbreak - Outbreak investigation - Post outbreak interventions	Park (2011)
3	**Mathematical Modelling of Infectious Diseases**	Types of mathematical models used in mathematical modelling of ID - Statistical Models - Deterministic Models - Stochastic Models	Kramer et al, (2010)
		Deterministic Models - Basic SIR Models	Kramer et al, (2010)
		Dynamics in SIR models (influence of Birth, Death, Migration etc.)	Kramer et al, (2010)
		Basic Reproductive Number (R_0) Importance of R_0 in predicting Disease Dynamics	Kramer et al, (2010)
4	**Contemporary Ideas in Infectious Disease Epidemiology**	Emerging and Remerging Diseases	Kramer et al, (2010)
		Economic Evaluation of Infectious Disease Interventions	Kramer et al, (2010)
		Globalization and Infectious Diseases	Kramer et al, (2010)

		Climate Change and Infectious Diseases	Kramer et al, (2010)
		Social Risk factors for Infectious Diseases	Kramer et al, (2010)
		Applying GIS in Infectious Disease Mapping	Kramer et al, (2010)

Readings:

1. School of Public Health, University of California (undated) Measuring Effectiveness of Immunization Programs. Available at http://www.ph.ucla.edu/EPI/41508/415cmat/lect14_41508.pdf
2. Zodpey, S. P., Shrikhande, S. N., Maldhure, B. R., Vasudeo, N. D., & Kulkarni, S. W. (1998). Effectiveness of Bacillus Calmette Guerin (BCG) vaccination in the prevention of childhood pulmonary tuberculosis: a case control study in Nagpur, India. *The Southeast Asian journal of tropical medicine and public health*, *29*(2), 285-288.
3. Wierzba, T. F., Kar, S. K., Mogasale, V. V., Kerketta, A. S., You, Y. A., Baral, P., ... & Bhattachan, A. (2015). Effectiveness of an oral cholera vaccine campaign to prevent clinically-significant cholera in Odisha State, India. *Vaccine*, *33*(21), 2463-2469.
4. Powell, L. N., & Bégué, R. E. (2019). Influenza Vaccine Effectiveness Among Children for the 2017–2018 Season. *Journal of the Pediatric Infectious Diseases Society*.
5. Krämer, A., Kretzschmar, M., & Krickeberg, K. (Eds.). (2010). *Modern infectious disease epidemiology: Concepts, methods, mathematical models, and public health*. Springer Science & Business Media.
6. Park, K. (2011). Park's textbook of preventive and social medicine. Jabalpur. *Banarasidas Bhanot*, *463*.