Title of the Course: EXTREMOPHILIC MICROORGANISMS [P]

Course Code: MIC-604

Number of Credits: 1

Contact hours: 30

Effective from Academic Year: 2022-2023

Prerequisites	The student should be familiar with handling of microorganisms in the laboratory.	
Objective:	• To develop skills involved in handling extremophilic microorganisms. • To illustrate adaptations strategies of extremophilic microorganisms and their biotechnological potentials.	
Content:		**(30)**
1.	Isolation of halophiles, alkaliphiles, and anaerobes.	
2.	Tolerance of bacterial culture to temperature, pH and salinity.	
3.	Buffering capacity of alkaliphiles.	
4.	Study extremozymes and pigments from extremophilic microorganisms.	
Pedagogy:	Experiments in the laboratory	
References/ Readings	Blum, P., Archaea: New models for prokaryotic biology. Academic press. (2008)	
	Brock, T. D. Thermophilic microorganisms and life at high temperatures. Springer. (2011)	
	Cavicchioli, R., Archaea: Molecular and cellular biology. ASM Press. (2007)	
	Durvasula, R.V., Subba Rao, D.B. Extremophiles from biology to biotechnology. CRC Press. (2018)	
	Gerday, C., Glansdorff, N., Physiology and biochemistry of extremophiles. ASM Press. (2007)	
	Horikoshi, K. and Grant, W.D. Extremophiles-microbial life in Extreme Environments, Wiley. New York. (1998)	
	Kannan, P., Ignacimuthu, S., Paulraj, MG.Buffering capacity and membrane H^+ conductance of protease producing facultative alkaliphilic bacterium *Bacillus flexus* from mangrove soil. Indian J of Biochemistry and Biophysics. 46:261-265. (2009)	
	Medigan, M.T., Bender, K. S., Bukley, D.H., Sattley, W. M., & Stahl, D.A. Brock biology of microorganisms. Pearson. (2019)	
	Munn, C. Marine microbiology: Ecology and applications. Garland Science, Taylor and Francis Group. (2011)	
	Rainey, F.A. and Oren, A. Extremophile microorganisms and the methods to handle them. In: Extremophiles, methods in microbiology. Elsevier. (2006)	
	Satyanarayana, T., Raghukumar, C., Shivaji, S. Extremophilic microbes: diversity and perspectives. Current Science, 89(1): 78-90. (2005)	
	Ventosa, A., Nieto, J.J. and Oren, A. Biology of moderately halophilic aerobic bacteria. Microbiology and molecular biology	

	Reviews, 62, 504–544. (1998)	
	Willey, J.M., Sherwood, L.M., and Woolverton, C.J. Prescott's Microbiology. McGraw-hill education. (2019)	
Course Outcomes	● Identify the extremophilic microorganisms from different econiches. ● Select novel industrially useful biomolecules from extremophilic microorganisms. ● Analyse adaptation strategies of extremophiles in different physiological conditions. ● Produce various biomolecules from extremophiles and study their unique properties.	