

**Title of the Course:** ARCHAEA - ECOLOGY, PHYSIOLOGY, BIOCHEMISTRY AND GENETICS [P]

**Course Code:** MIC-515

**Number of Credits:** 1, Practical

**Contact hours:** 30

**Effective from Academic Year:** 2022-23

<b>Prerequisites</b>	It is assumed that students have basic knowledge of 3 domains of life and basic microbiology techniques.	
<b>Objective:</b>	To introduce the methods in sampling and isolation of archaea from different niches; identification of archaea and study of archaeal bio-molecules.	
<b>Content:</b>		<b>(30)</b>
1.	Isolation and culturing of halophilic archaea.	
2.	Identification of the isolates	
2.1	Biochemical tests for characterization of the halophilic archaea.	
2.2	Extraction of archaeal pigment and characterization using UV-Vis spectroscopy.	
2.3	Cellular lipids - Extraction and chromatographic resolution of lipids.	
3.	Screening for hydrolytic enzymes.	
<b>Pedagogy:</b>	Hands-on experiments in the laboratory, video, online data	
<b>References/Readings</b>	Barker, D. M., Archaea: Salt-lovers, Methane-makers, Thermophiles and Other Archaeans, Crabtree Publishing Company. (2010)	
	Blum, P., Archaea: New Models for Prokaryotic Biology, Academic Press. (2008)	
	Boone, D. R. and Castenholz, R. W., Bergey's Manual of Systematic Bacteriology: The Archaea and The Deeply Branching and Phototrophic Bacteria, Springer Science and Business Media. (2011)	
	Cavicchioli, R., Archaea: Molecular and Cellular Biology, ASM Press. (2007)	
	Corcelli, A. and Lobasso, S., Characterization of Lipids of Halophilic Archaea. Methods in Microbiology, 35: 585-613. (2006)	
	Garrett, R. A. and Hans-Peter, K., Archaea: Evolution, Physiology and Molecular Biology, John Wiley and Sons. (2008)	
	Howland, J. L., The Surprising Archaea: Discovering Another Domain of Life, Oxford University Press. (2000)	
	Munn, C., Marine Microbiology: Ecology and Applications, Garland Science, Taylor and Francis Group, N.Y. (2011)	
	Rothe, O. and Thomm, M., A simplified method for the cultivation of extreme anaerobic archaea based on the use of sodium sulfite as reducing agent, Extremophiles. 4: 247-252. (2000)	
	Woese, C. R., Fox, G. E., Phylogenetic structure of the prokaryotic domain: the primary kingdoms. Proc Natl Acad Sci USA. 74: 5088-5090. (1977)	
<b>Course Outcomes</b>	<ul style="list-style-type: none"><li>● Define the conditions for isolation and maintenance of Archaea.</li><li>● Classify the archaea using chemotaxonomy.</li><li>● Identify the archaeal isolates.</li><li>● Analyse the archaea for bioactive molecules.</li></ul>	