

# Centre for the Environment

**Time slot F (Monday, Tuesday 12-1 pm , Friday 11-12 pm)**

**Room 4005**

1. Course Number & Title: EV 702 Applied Environmental Microbiology
2. L-T-P-C: 2-0-2-6
<b>Course Content/ Syllabus:</b> Introduction, Laboratory safety and documentation, Principles of light and electron microscopy, Scanning Electron Microscope, Confocal Microscope, Transmission Electron Microscope, sterilization methods, microbial culture medium, Chemical and Biological Oxygen demand; Laboratory Components: Collection of environmental samples from field (industrial sites, dump yard, water bodies, soil); Bacterial strain isolation using plate streaking; Gram staining and environmental strain isolation; Bacterial growth curve determination by spectroscopic method; Extraction of bacterial genomic DNA and estimation; Polymerase Chain Reaction amplification of bacterial 16s rRNA; Gel electrophoresis, purification of 16s rRNA genes, Bioinformatics analysis of 16s rRNA sequencing data.

Texts and REFERENCES : (Format: Authors, Book Title in Italics font, Volume/Series, Edition Number, Publisher, Year.)

1.	Joanne Willey and Kathleen Sandman and Dorothy Wood. Prescott's Microbiology 12th Edition. McGraw-Hill. ISBN13: 9781264088393
2.	James G. Cappuccino, Chad T. Welsh, Microbiology: A Laboratory Manual, 11th Edition. Pearson
3	Gerard J. Tortora, Berdell R. Funke and Christine L. Case. Microbiology: An Introduction, 13th Edition. Pearson. ISBN-13: 978-0134605180, ISBN-10: 0134605187
4	Michael J. Leboffe, Burton E. Pierce. Microbiology: Laboratory Theory and Application 4th Edition. Morton Pub Co. ISBN-10: 0895826127 ISBN-13: 978-0895826121

### Details of Groups of Experiments

GR.NO	NAME OF PRACTICALS	SITE	No. of Classes
1	Introduction, Laboratory safety and documentation, sterilization methods, microbial culture medium,	Classroom Activity	2 Classes 1 week
2	Principles of light and electron microscopy, Scanning Electron Microscope, Confocal Microscope, Transmission Electron Microscope,	Classroom Activity Centre Lab + Visit to CIF	2 Classes 1 week
3	Chemical and Biological Oxygen demand,	Classroom Activity	2 Classes 1 week
4	Collection of environmental samples from polluted sites (industrial sites, dump yard, water bodies, soil);	Field Activity: Entire course include only  2 days visit on weekend to following site listed below (for example); i. Bharalu river and/or Dipar Beel, ii. Municipal Dump Site/ Boragaon /Brahmaputra Industrial Park or EPIP	Field Visit Expenditure will be borne by the Centre
5	Bacterial strain isolation using plate streaking; Gram staining and environmental strain isolation; Bacterial growth curve determination by spectroscopic method;	Classroom Activity	6 Classes 3 weeks
6	Extraction of bacterial genomic DNA and estimation; Polymerase Chain Reaction amplification of bacterial 16s rRNA; Gel electrophoresis, purification of 16s rRNA genes.	Classroom Activity	6 Classes 3 weeks
7	Bioinformatics analysis of 16s rRNA sequencing data.	Classroom Activity	2 Classes 1 week