AMEV-10 ENVIRONMENTAL MICROBIOLOGY

OBJECTIVES:

The objective of the course is to study the basics of environmental microbiology involved in water, soil and air.

UNIT I MICROBIOLOGY: INTRODUCTION

Classification of living organisms with special emphasis on micro-organisms - characteristics - application in environmental engineering - DNA & RNA.

UNIT II METHODS OF STUDY

Culture of micro-organisms - media preparation - sterilization, pure culture - maintenance of cultures – stains and staining - estimation of bacterial numbers.

UNIT III GROWTH AND METABOLISM OF MICRO-ORGANISMS

Growth curves - factors affecting growth - nutritional requirements of micro-organisms - metabolism of micro-organisms - carbohydrates, proteins, fat metabolisms and the role of enzymes.

UNIT IV RESPIRATIONS

Aerobic and anaerobic - role of enzymes - bacterial respiration - fermentation and saprogenic action - basic concepts of molecular biology.

UNIT V BIODEGRADATION AND BIOLOGICAL TREATMENT

Microbiology of wastewater treatment (domestic and industrial), indicator microorganisms, biodegradation of xenobiotics, bioaugumentation, microbial leaching of heavy metals.

OUTCOMES:

The students completing the course will have

- an insight into type, growth metabolism and culturing techniques of micro organisms and their application to environmental engineering
- the ability to perform estimation of bacterial numbers
- the ability to apply micro morganisms for the treatment of wastes, bioleaching and bioaugmentation

TEXT BOOKS :

- McKinney R.E. and Gall M. "Microbiology for Sanitary Engineers", McGraw Hill Book Co.Inc. New York, 1-62
- Gainey and Lord, "Microbiology of Water and Sewage", Prentice Hall Inc., New York, 1-75

REFERENCES:

Raina, M.Maier, Ian L. Pepper, Charles P. Gerba. "Environmental Microbiology", Academic Press, 2000.

Bhatia, S.C., "Handbook of Environmental Microbiology", Vol. I, II & III, Atlantic Publ. & Dist. Ltd., 2008.