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- Biochemistry; Donald Voet, Judith G. Voet, 4th Edition, John Wiley and sons (2010). PM, Plant Biochemistry, Harborne JB (1997) Academic Press.
- Introduction to Plant Biochemistry, Goodwin TW, Mercer EI (1983)
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BCS: 554: MICROBIAL BIOCHEMISTRY: SOFT CORE

Lecture hours: 42

Total Credits: 03

Course Objectives

- To give the students an advanced level knowledge about microbial biochemistry
- To understand the genetic constituents of bacteria with special emphasis on inheritance and mutations
- To understand the mechanism of genetic transfers in microbes.

Unit I

14 hrs

Nutrient Cycles: Microbes as components of the environment – nutrient cycles carbon, nitrogen (Symbiotic and non-symbiotic nitrogen fixation), sulphur and phosphorus cycles, chemolithotrophs. **Metabolism of autotrophs; Biosynthesis of Fatty acids; Biosynthesis of Phospholipids, Degradation of Lipids, Bacterial Quorum sensing,**

Unit II

14 hrs

Metabolism and Bioprocess technology: Metabolism of aromatic compounds, Fermentation pathways in specific group of microorganisms: Lactic acid, propionic acid, butyric acid producing fermentation; Characteristics and Degradation of industrial wastes, petroleum hydrocarbons, pesticides, biofouling and corrosion. **Fermentation - alcohol, propionic acid, butyric acid fermentation.**

Unit III

14 hrs

Microbial Genetics and Overexpression of recombinant proteins: Para sexual process in bacteria and its significance: Transformation, transfection, transduction and conjugation. Endospore formation (differentiation). **Genetic analysis of bacteria:** Importance and uses of mutation analysis. isolating mutants, selecting mutants, mutant enrichment. Reversions versus suppression. **Complementation tests, recombination tests** and gene replacements. Overexpression and tagging of recombinant proteins in E.coli, driven by lac, T7 and Tet-regulatable promoters. Overexpression systems in S.cerevisiae, P.pastoris. Baculovirus over expression system.

Course Outcome

- Student capable of explaining role of microbes in ecological balance.
- Use of microbes in synthesis of commercially important compounds and over expression of proteins

References

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3. Lodish, H., Berk A., Kaiser C. A., Krieger M., Scott M.P., Bretscher A., Ploegh H., and Matsudaira P., Molecular Cell Biology, 6th Edition, Freeman, W. H. and Co., 2008.
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**BCS 555: BIOINFORMATICS, BIOSTATISTICS & NANOBIO TECHNOLOGY:
SOFTCORE**

Lecture Hours: 42

Total Credits: 03