

**MMB102: MICROBIAL PHYSIOLOGY AND METABOLISM**

<b>Teaching Scheme</b> Lectures: 4 hrs/Week  Credits: 4	<b>Examination Scheme</b> Class Test -12Marks Teachers Assessment - 6Marks Attendance – 12 Marks End Semester Exam – 70 marks
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Prerequisite: - Knowledge of basic Biochemistry

**Course Objectives:**

1.To give an overview of biomolecules and their significance
2.To give basic knowledge of : properties of water, weak interaction in aqueous systems, Ionization of water
3.To have an overview of Protein: Amino acids, peptides and polypeptides
4.To explain about the different biosynthetic pathways.
5.To explain the translation and post translational modification of proteins
6.To explain about the different types of lipids

**Detailed Syllabus**

<b>UNIT I</b> <b>Growth and cell division:</b> Measurement of growth, growth physiology, cell division, growth yields, growth kinetics, steady state growth and continuous growth.
<b>UNIT II</b> <b>Solute Transport:</b> Primary and Secondary transport: Introduction, Kinetics, ABC transporters, Phosphotransferase system, Drug export systems, amino acid transport.
<b>UNIT III</b> <b>Central Metabolic Pathways and Regulation:</b> Glycolysis, PPP, ED pathway, Citric acid cycle: Branched TCA and Reverse TCA, glyoxylate cycle.Utilization of sugars other than glucose and complex polysaccharides
<b>UNIT IV</b> <b>Nitrogen metabolism:</b> Metabolism of amino acids: Amino acid biosynthesis and utilisation, lysine and glutamine overproduction, stringent response, polyamine biosynthesis and regulation. <b>Metabolism of lipids and hydrocarbons:</b> Lipid composition of microorganisms, biosynthesis and degradation of lipids, lipid accumulation in yeasts, hydrocarbon utilization, PHA synthesis and degradation. <b>Metabolism of nucleotides:</b> Purine and pyrimidine biosynthesis, regulation of purine and pyrimidine biosynthesis, inhibitors of nucleotide synthesis.
<b>UNIT V</b> <b>Physiological Adaptations and Intercellular signaling:</b> Introduction to two component system, regulatory systems during aerobic- anaerobic shifts: Arc, Fnr, Nar, FhlA regulon, response to phosphate supply: The Pho regulon Quorum sensing: A and C signaling system, sporulation in Bacillus subtilis, control of competence in Bacillus subtilis.Heat-Shock responses pH homeostasis, osmotic homeostasis.

Head

Dean

Registrar  
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Bareilly