

Microbial Biochemistry

A Value-Added Course



Course Duration : 30 hours

Year: 2018-19

Offering Department: PG Biochemistry

Course Outcome

Specify in detail with examples the microorganism staining techniques

Deliberate on the regulation of genes in bacteria

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| M.Sc. Degree Programme in Biochemistry | | |
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| VALUE ADDED COURSE - I | | |
| Programme Code | Title of the Course | Total Hours |
| BIC | MICROBIAL BIOCHEMISTRY | 30 |
| Course Outcome(s): | | No. of Lectures |
| CO1 Specify in details with examples staining techniques used for the identification of microbes | | |
| CO2 Write down in depth Molecular biology of prokaryotes | | |
| CO3 Learn in details with application, if applicable, Operon systems in gene regulation of bacteria | | |
| Unit I: | | 10 |
| 1.1 | Pure Culture, Staining Technique and Growth | |
| 1.1.1 | Principles of microbial nutrition: Nutritional requirements, different kinds of media, factors affecting growth. Enrichment culture techniques for isolation of chemoautotroph's, chemoheterotroph's and photosynthetic microorganisms. Modes of reproduction, Biosynthesis of cell wall components, enumeration, growth curve, generation time, synchronous growth, Chemostat. Adaptation to stationary phase, heat and cold shock, osmolarity and salinity, oxidative stress. Gram, Acid fast & flagellar staining. Mechanism of bacterial motility. | |
| 1.1.2 | | |
| 1.1.3 | | |
| 1.1.4 | | |
| Unit II: | | 10 |
| 2.1 | Regulation of Genes in Bacteria | |
| 2.1.1 | Nucleic Acids as Carriers of Genetics Information, Arrangement and Organization of Gene in Prokaryotes: Operon Concept, Catabolite Repression, Instability of Bacterial RNA, Inducers and Co repressors <i>E. coli</i> Lac Operon: Negative Regulation and Positive Regulation, <i>E. Coli</i> Arabinose Operon: Regulation by Attenuation, His and Trp Operons: Anti-termination, Genetic Transfer: Conjugation, Transformation and Transduction. | |
| 2.1.2 | | |
| 2.1.3 | | |
| Unit III: | | 10 |
| 3.1 | Virology and Biological Nitrogen Fixation | |
| 3.1.1 | Introduction to Virus, Classification, Assay Methods, Properties and Characteristic of Bacterial, Plant and Animal Viruses | |
| 3.1.2 | | |
| | Virus Host Interaction, Acute Virus Infections, Persistent of Virus Infection, Influenza, Herpes, | |

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| 3.1.3 | Hepatitis A and B. Nitrogen Metabolism: Mechanism and Regulation of Utilization of Ammonia, Nitrate and other Nitrogen Source | |
| 3.1.4 | Nitrogen Fixation: Mechanism and Regulation of Nitrogen Fixation, Symbiotic and Asymbiotic Nitrogen Fixation and Biochemistry of Nitrogenase. | |

References

- [1] Microbial physiology, 2nd Edn. I.W. Dawes and I.W. Sutherland (1991) Blackwell Scientific.
- [2] Microbial physiology, 4th Edn. Albert G. Moat, John W. Foster and Michael P. Spector, Wiley-Liss (2002).
- [3] Biology of Microorganisms, Brock Prentice Hall (1996).
- [4] Microbiology: Lansing M. Prescott, Hartley and Klein, 5th Edn. McGraw Hill (2002).
- [5] General Microbiology, Stainer *et al.*, 4th Edn. McMillan (1975).
- [6] Microbiology, Pelczer, Reid and Kreig Tata McGraw Hill (1996).