Gujarat University, Ahmedabad 380 009, Gujarat, India.
M.Sc. Post Graduate Diploma in Microbial Biotechnology Syllabus
From June 2019

❖ There shall be four theory papers each of four hours (3+1) duration and two practicals each of eight hours' duration.

❖ Each theory paper shall carry hundred marks and each practical shall carry hundred marks.

❖ The candidate is required to show article to faculty in/before interpreting his/her experimental work.

❖ Two typed/computerised bound copies of the dissertation shall be submitted to the University during the final M.Sc. at least fifteen days before the commencement of the final examination.

❖ Each theory paper is divided into four units. Each unit will have equal weightage while setting question paper. Question or its sub question including the options will be set from the same unit.

❖ There shall be one microbiological study tour / field work during fourth or any semester of P.G. study. It will pertain to different microbiological / environmental industries / research institute / various ecosystems even outside Gujarat State. The microbiological tour is highly essential for studying microbiological process and technology.

❖ Assignments and group discussions / industrial training accomplished with the bound copy of report are necessary for evaluation.

❖ At least two seminars should be delivered during fourth semester.

❖ Practical batch will be consisting of maximum 10 students.

❖ Student can select any one paper from the three elective papers given in semester III.

PGDMBT-401 History and Scope of Microbiology

Unit 1: History of Microbiology

- Discovery of Microorganisms
- Spontaneous generation versus Biogenesis.
- Fermentation
- Germ theory of disease
- Laboratory techniques and pure cultures
- Immunity
- Widening horizons:
  Medical microbiology
  Agricultural and Industrial microbiology
  Molecular biology

Unit 2: Bacteriology

- Prokaryotic forms (bacteria and archaea) and function
- Prokaryotic shapes, arrangement and sizes
- The cell Envelope: The boundary layer of bacteria
- Bacterial internal structure
- Introduction to Bergey's manual of systematic bacteriology

Unit 3: Methods of studying Microorganisms

- Methods of culturing microorganisms
- Inoculation: producing a culture
- Isolation: Separating one species from another
- Media: providing nutrients in the laboratory

Unit 4: Microscopy, Staining and Preservation of Microorganisms

- Magnification and microscope design
- Variations on the light microscope
- Steps in staining process
- (Fixatives, mordants, decolorizer and intensifier)
- Simple staining
- Differential staining (gram's staining)
- Preservation of Microorganisms

PGDMBT-402 Techniques of Microbial Biochemistry

Unit 1: Biomolecules

- Specific biomolecules their structure and function
- Carbohydrates: simple and complex
- Glycoconjugates- glycoproteins, proteoglycans and glycolipids
- Central metabolic pathways and feeder pathways
- Metabolism of fatty acids
- Metabolism of C1 compounds
- Fate of pyruvate under anaerobic condition

Unit 2: Catabolism of Biomolecules

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Unit 3: Biosynthesis and regulation

- Biosynthesis and regulation of amino acids
- Biosynthesis and regulation of nucleotides
- Nitrogen metabolism: Nitrate and ammonia assimilation, their control and regulation of Nitrogenase

Unit 4: Tools and Techniques

Principle, protocol and applications of:

- Atomic Absorption Spectrophotometer
- Mass Spectrophotometer
- High Performance Liquid Chromatography
- Gas Liquid Chromatography
- Nuclear Magnetic Resonance
- Fourier Transformed Infrared Spectroscopy