## PRACTICALS (HARD CORE COURSES)

### INDUSTRIAL BIOTECHNOLOGY

**Course outcomes:**

*After successful completion of the course, students will be able to:*

CO 1. Develop hands-on and practical skills in fermentation
CO 2. Perform microbial assays,
CO 3. Develop pilot scale production of beverages
CO 4. Analyse microbial uses in agriculture

Submerged and solid state fermentation
Estimation of microbial biomass
Estimation of microbial enzymes, mycotoxins, organic acids and antibiotics
Microbiological assays (antibiotics, amino acids and vitamins)
Properties of microbial exopolysaccharides (e.g. cell immobilization)
Uses of Chitin and its derivatives
Pilot scale production of alcoholic beverages
Microbial interactions with plants (rhizobia, mycorrhizas) and plant production
Assessment of nitrogen fixation (acetylene reduction test)
Phosphate solubilization in bacteria, fungi and actinomycetes
Qualities of biofuels (e.g. biodiesel, biogas)

### AGRIBIOTECHNOLOGY

**Course outcomes:**

*After successful completion of the course, students will be able to:*

CO 1. Set-up a plant tissue culture lab
CO 2. Develop hand-on practical skills in plant tissue culture methods
CO 3. Differentiate and use different media, hormones etc,
CO 4. Develop skills in *in-vitro* development of plants, protoplast culture etc.

Estimation of plant hormones (e.g. auxins, gibberellins)
Plant tissue culture methods
Callus culture (compact and friable)
Ovule and anther culture
Cell suspension cultures
Embryogenesis
Synthetic seeds
Protoplast preparation
Protoplast fusion techniques
Plant cell immobilization
Methods of inducing resistance through tissue culture

## PRACTICALS (SOFT CORE COURSES)

### NANOBIOTECHNOLOGY

**Course outcomes:**

*After successful completion of the course, students will be able to:*

CO 1. Characterize nanoparticles
CO 2. Carry out various methods of green synthesis
CO 3. Test biological activity of nanoparticles
CO 4. Develop nanomaterials of biological use