



Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopergaon,
Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

Course Outcome MSc-I (Microbiology) (CBCS 2019-20)

Semester	Course Title	Course Outcome
1	Microbial Systematics MBCT 111	<ul style="list-style-type: none">• CO-1: Students will be able to apply mathematical tools for estimation of the total number of species and for measuring indices of diversity.• CO-2: Students will be able to identify, classify fungi into 6 classes based on morphological characterization.• CO-3: Students will be able to conceptualize, understand and use molecular methods for identifying unculturable bacteria• CO-4: Students will be able to execute the methods of extraction of total bacterial DNA.• CO-5: Students will be able to understand Neo-Darwinism and its importance in prokaryote evolution.• CO-6: Students will be able to learn the spontaneous mutation controversies, know the types and levels of mutations and molecular clocks.
1	Quantitative Biology MBCT 112	<ul style="list-style-type: none">• CO-1: Students will be able to determine Mean, mode, median, percentile and standard deviation• CO-2: Students will understand the concepts of null hypothesis, alternate hypothesis, significance level, type I and type II errors.• CO-3: Students will learn to apply statistical tools for calculating degrees of freedom, two population means, t-tests and z test.• CO-4: Students will be able to learn non-parametric tests (Run test, Sign test, Wilcoxon's signed rank test, Mann-Whitney test).


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopergaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

		<ul style="list-style-type: none">• CO-5: Students will be able to examine measures of skewness; measures of kurtosis and able to calculate regression and correlation.• CO-6: Students will learn to implement and interpret F-test, ANOVA, Survey design, Factorial design (Plackett Burman method, DOE).
1	Biochemistry and Metabolism MBCT 113	<ul style="list-style-type: none">• CO-1: Students will be able to describe protein chemistry, structural features of amino acids and classify amino acids• CO-2: Students will be able to demonstrate PCR and sequencing methods of DNA & RNA.• CO-3: Students will recite the organization of Cytoskeleton, Endoplasmic reticulum, Golgi complex and other organelles with their functions.• CO-4: Students will conceptualize principles of developmental biology, conserved nature of development, concepts of commitment and morphological gradient.• CO-5: Students will learn life cycle of <i>Drosophila</i>, <i>Arabidopsis</i> and <i>Xenopus</i> to understand the Molecular mechanisms• CO-6: Students will be able to determine the mechanisms of protein trafficking in cell compartment.
1	Biochemical Technique Practical MBCP 114	<ul style="list-style-type: none">• CO-1: Students will learn the laboratory safety and hazards from chemicals, handling of chemicals and disposal of chemicals and cultures.• CO-2: Students will be able to prepare buffers• CO-3: Students will be able to plot and interpret different graphs


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopergaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

		<p>using Microsoft excel.</p> <ul style="list-style-type: none">• CO-4: Students will isolate alkaliphiles, and thermophiles• CO-5: Students will examine the stages of mitosis from the growing tips of onion root cells.• CO-6: Students will be able to separate sugars and amino acids by paper and thin layer chromatography and estimate them.• C)-7: Students will be able to perform SDS-PAGE
1	Fungal Systematics and extremophiles MBET 115	<ul style="list-style-type: none">• CO-1: Students will learn and recite the classes of fungi• CO-2: Students will learn enrichment techniques to isolate extremophiles
1	Practical based on Fungal Systematics and extremophiles MBEP 115	<ul style="list-style-type: none">• CO-1: Students will be able to isolate and identify yeast and molds.• CO-2: Students will be able to isolate acidophiles and halophiles.
2	Instrumentation and Molecular Biophysics MBCT 121	<ul style="list-style-type: none">• CO-1: Students will understand the concepts of Instrumentation and Molecular Biophysics• CO-2: Students will be able to understand both fundamentals and applications of the instruments that are routinely used for the characterization of biomolecules.• CO-3: Students will understand the concept and applications of instruments
2	Molecular	<ul style="list-style-type: none">• CO-1: Students will learn RNA processing &Molecular


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopergaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

	Biology MBCT 122	<p>Techniques</p> <ul style="list-style-type: none">• CO-2: Students will understand the process of Eukaryotic RNA Processing, Nuclear export of mRNA, types of regulatory, noncoding RNA and Pi RNA• CO-3: Students will be able to describe different tools for Genetic engineering• CO-4: Students will understand the concept of Genome projects, deciphering genetic code, construction of genomes• CO-5: Students will learn the Molecular diagnostics like protein arrays, microarrays, immunoassays and applications
2	Enzymology, Bioenergetics and Metabolism MBCT123	<ul style="list-style-type: none">• CO-1: Students will learn about the enzyme reactions with respect purifications methods of purification chart, kinetics and coupled reactions.• CO-2: Students will be able to recite the Laws of thermodynamics, free energy, coupled reactions, high energy compounds and numerical problems.• CO-3: Students will understand classification, structure of lipids with regulation in their metabolism• CO-4: Students will know the synthesis of sugars, regulation of sugar metabolism, TCA cycle, glyoxalate cycle with their regulation mechanisms
2	Molecular biology, Enzymology and Instrumentation	<ul style="list-style-type: none">• CO-1: Students will attain awareness about enzymology, molecular biology and instrumentation techniques• CO-2: Students will learn through experiments about concept of lac-operon; Glucose Repression; Diauxic growth


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopergaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

	Techniques Practical MBCP 124	<ul style="list-style-type: none">• CO-3: Students will be able to purify enzymes (Amylase/Invertase) by various methods and learn kinetics of enzymes• CO-4: Students will be acquainted with Aflatoxin, lipase/cellulase/chitinase extraction and estimation• CO-5: Students will study the methods of molecular techniques and gene annotation using bioinformatics tools• CO-6: Students will learn scientific communication modes like literature review, Experiment planning, experimentation and presenting the thesis. Use of reference management tools and data mining tools.
2	Bio-informatics and Bio- nanotechnology MBTE 125	<ul style="list-style-type: none">• CO-1: Students will possess the knowledge of Bioinformatics• CO-2: Students will know steps in the process of gene or protein sequencing, annotations, comparative analysis.• CO-3: Students will understand Bio-nanotechnology• CO-4: Students will be able to discuss the methods of synthesis, characterization and application of nanoparticles• CO-5: Students will be acquainted with the concepts of Bionanotechnology and Bioinformatics
2	Practical based on Bio- informatics and Bio- nanotechnology MBEP 125	<ul style="list-style-type: none">• CO-1: Students will be able to perform DNA isolation and purity checking.• CO-2: Students can perform PCR• CO-3: Students will learn to Draw phylogenetic tree using related sequences• CO-4: Students will be able to synthesize nanoparticles and characterize by UV-VIS spectroscopy


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingapur, Tal: Kopergaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

2	Nitrogen Metabolism, respiration and Photosynthesis MBET 127	<ul style="list-style-type: none">• CO1: Students will learn about the biochemistry of biological nitrogen fixation and regulation• CO2: Students will understand biosynthesis of amino acids, purines and pyrimidines• CO3: Students will be able to describe the biochemistry of anaerobic respiration, methanogenes and photosynthesis with various steps involved
2	Nitrogen Metabolism, respiration and Photosynthesis MBEP 127	<ul style="list-style-type: none">• CO1: Students will be able to isolate microorganisms for production of IAA and siderophores• CO2: Students will perform enrichment techniques for nitrogen fixing; lignin degrading; xylan degrading microbes as well as methanogenes ;cyanobacteria and further• isolate and characterize the isolated microorganisms .• CO3: Students will be able to isolate and characterize the respective microorganisms from the enriched samples• CO4: Students will perform suitable method for Detection of chlorophyll-a activity of Cyanobacteria


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopargaon,
Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

Course Outcome MSc-II(Microbiology) (CBCS 2019-20)

Semester	Course Title	Expected Course Specific Learning Outcome
3	Immunology MBCT -231	<ul style="list-style-type: none">• CO-1: Students will understand the concepts of Immunology• CO-2: They will be able to understand the different effector mechanisms of host immune response• CO-3: This course will elucidate the concepts of signal transduction pathways to students
3	Molecular Biology MBCT -232	<ul style="list-style-type: none">• CO-1: The concepts of Molecular Biology will be familiar to students• CO-2: Students will be able to understand the concept of Metabolomics.• CO-3: Detail knowledge about the concept and applications of transgenic plants and transgenic animals will be gained
3	Clinical Microbiology MBCT -233	<ul style="list-style-type: none">• CO-1: The concepts of medical microbiology and medically important microorganisms will add on to students knowledge.• CO-2: Pupil will get to know about knowledge of morphology, cultural characteristics, biochemical tests, epidemiology, laboratory diagnosis etc of bacterial pathogens• CO-3: They will also understand the basics and applications of various chemotherapeutic agents and their mode of action
3	Practicals based on Immunology, Molecular Biology and Clinical Microbiology MBCP -234	<ul style="list-style-type: none">• CO-1: Familiarity about techniques Immunology will be increased among students• CO-2: They will learn about Molecular Biology techniques• CO-3: Students will be acquainted with techniques in Clinical Microbiology


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopargaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingapur, Tal: Kopergaon,
Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

3	Bioremediation and Biomass Utilization MBET: 236	<ul style="list-style-type: none">• CO1: Students will develop an interest in the field of bioremediation• CO-2: They understand the concepts of biomass utilization• CO-3: The ideology behind concepts and use of microbial degradation will be clear to them
3	Practical based on Bioremediation and Biomass Utilization MBEP: 236	<ul style="list-style-type: none">• CO-1: An interest will be developed in the field of bioremediation• CO-2: They will understand the concepts of biomass utilization• CO-3: Students will understand the concepts and use of microbial degradation
4	Pharmaceutical Microbiology MBCT 241	<ul style="list-style-type: none">• CO-1: In addition to drug development students will also understand the concepts of drug discovery• CO-2: They will be able to know pharmacokinetics and pharmacodynamics.• CO-3: Besides this students will know the recent trends for MDR therapy also.
4	Microbial Technology MBCT 242	<ul style="list-style-type: none">• CO-1: Students will learn about microbial technology and its applications• CO-2: They shall acquire knowledge about various process control methods in fermentation.• CO-3: Students will be acquainted with the applications. of microorganisms in different industries.
4	Dissertation MBCP: 243	<ul style="list-style-type: none">• CO-1: Students will be able to choose a dissertation topic of research or application orientation• CO-2: They will get an experience for gathering literature survey and apply it into practical dissertation work .


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingnapur, Tal: Kopargaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

		<ul style="list-style-type: none">• CO-3: They shall also be educated for use of statistical analysis and graphical presentations• CO-4: Besides this they will also be able to analyze qualitative and quantitative data with evidence based explanation gathered supports the initial hypothesis.• CO-5: This course will help students to craft an extensive and comprehensive piece of dissertation work with research or application orientation
4	Quality Assurance and Validation in Pharmaceutical Industry and Development of Anti- infectives MBET 244	<ul style="list-style-type: none">• CO-1: Students. will have knowledge of Good Manufacturing Practices (GMP) and Good• CO-2: Laboratory Practices (GLP) in pharmaceutical industry.• CO-3: They will be accustomed with ISO, WHO and US certification and also Safety in microbiology laboratory.• CO-4:The knowledge of Therapeutic ratio, MIC and MBC Susceptibility Testing will be obtained by students
4	Practical based Quality Assurance and Validation in Pharmaceutical Industry and Development of Anti- infectives MBEP 244	<ul style="list-style-type: none">• CO-1: Students will have knowledge of Quality Assurance in the Pharmaceutical Industry.• CO-2: Understanding about validation processes in the Pharmaceutical Industry will become easy.• CO-3: They will be acquainted with the knowledge of development of anti- infectives from plants
4	Industrial waste	<ul style="list-style-type: none">• CO-1: Students w i l l g e t t o k n o w the concepts of Industrial


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopargaon





Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE

At: Sahajanandnagar, Post: Shingapur, Tal: Kopergaon,

Dist: Ahmednagar (M.S.) Pin:423603

Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012



SANJIVANI
GROUP OF INSTITUTES

	Water Treatment and Industrial Production of Vaccines MBET 246	Waste Water Treatment <ul style="list-style-type: none">• CO-2: They will also learn about sludge treatment• CO-3: The concept of Industrial Production of Vaccines will also be clear to them
4	Practical based on Industrial waste Water Treatment and Industrial Production of Vaccines MBEP 246	<ul style="list-style-type: none">• CO-1: The concepts of Industrial Waste Water Treatment will be familiar to students• CO-2: They will learn about sludge treatment• CO-3: Students get acquainted with the concepts of Industrial Production of Vaccines


PRINCIPAL
Sanjivani Arts, Commerce &
Science College, Kopergaon

