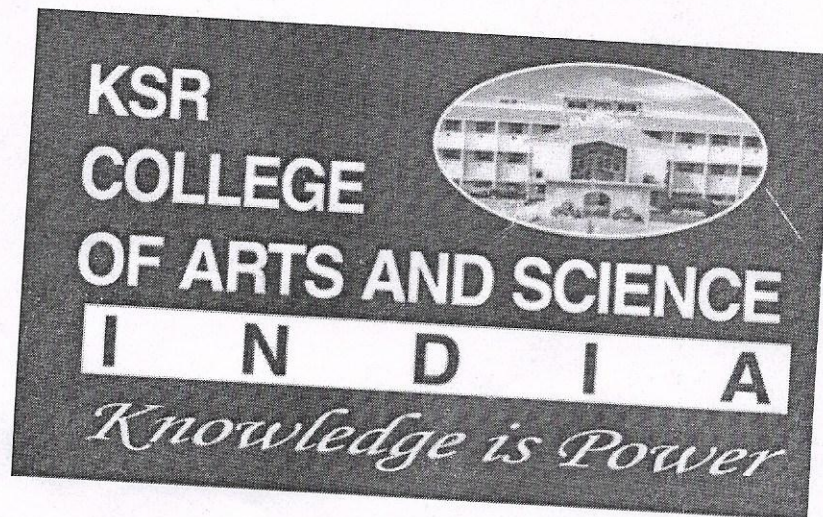


**K.S.Rangasamy College of Arts and Science,
(Autonomous), Tiruchengode-637 215
Department of Microbiology**



BACHELOR OF SCIENCE (MICROBIOLOGY)

PROGRAMME OUTCOMES (PO)

After completion of the programme, the graduates will be able to


- PO1:** Apply the knowledge of domain and fundamental science to solve problems relevant to the needs of the society.
- PO2:** Identify, formulate and review research literature for providing substantial conclusion for complex problems.
- PO3:** Function effectively as an individual and as a member or leader in diverse team and in multidisciplinary settings.
- PO4:** Demonstrate knowledge and understand the principles and apply these to one's own work as a member in a team to manage projects and come with solutions for multidisciplinary environment.
- PO5:** Apply the ethical principles and commit to professional ethics and responsibilities in multidisciplinary practices.

PROGRAMME SPECIFIC OUTCOMES (PSO)

After completion of the programme, the graduates will be able to

- PSO1:** Design and execute industry oriented experiments in microbiology using standard techniques.
- PSO2:** Apply the domain knowledge and technology to develop research skill for commercialization of microbial products.
- PSO3:** Evaluate the need and impact of scientific solutions for sustainable development of society.
- PSO4:** Analyze the conceptual domain knowledge for innovative research and lifelong learning.
- PSO5:** Create and develop the employable, entrepreneur and socially responsible citizens.


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SEMESTER I - COURSE OUTCOMES (CO)
After completion of the course, the students will be able to

| 18UMBM101 | CORE I: BASICS IN MICROBIOLOGY |
|-----------|--|
| CO1 | Recall the origin of Microbiology. |
| CO2 | Understand the principles of Microscopy and staining techniques. |
| CO3 | Assess growth parameters for the cultivation and preservation of microbes in the laboratory. |
| CO4 | Apply aseptic condition for maintenance of pure culture and control of contaminants. |
| CO5 | Assess the use of antibiotics to control pathogens and treatment of microbial diseases. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | M | M | H | M | M | M | M | H | M | M |
| CO2 | H | H | H | H | M | H | H | H | H | M |
| CO3 | H | H | H | H | M | H | H | H | H | M |
| CO4 | M | H | M | H | H | M | H | M | H | H |
| CO5 | H | H | H | H | H | H | H | H | H | H |

H-High; M-Medium; L-Low

| 18UMBMP101 | CORE PRACTICAL I: BASICS IN MICROBIOLOGY |
|------------|---|
| CO1 | Identify microbes through staining with microscopy. |
| CO2 | Design different media for cultivation of microorganisms. |
| CO3 | Evaluate the isolation and purification of microorganisms. |
| CO4 | Demonstrate the maintenance of bacterial cultures. |
| CO5 | Evaluate control measures of microorganisms using chemotherapy. |

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| 18UVE101 | VALUE EDUCATION I: YOGA |
|----------|--|
| CO1 | Understand the physical structure and simplified physical exercises. |
| CO2 | Nurture the life force and mind. |
| CO3 | Introspect and improve the moral values. |
| CO4 | Realize the importance of human resources development. |
| CO5 | Enhance purity of thought and deed. |

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SEMESTER II - COURSE OUTCOMES (CO)
After completion of the course, the students will be able to


| 18UMBM201 | CORE II: MICROBIAL TAXONOMY AND PHYSIOLOGY |
|-----------|--|
| CO1 | Identify the group of microorganisms based on taxonomical character. |
| CO2 | Analyze microorganisms based on their molecular features. |
| CO3 | Assess the growth factors for cultivation of microorganisms in the laboratory. |
| CO4 | Formulate suitable media for microbial growth. |
| CO5 | Outline metabolic pathways and standardize culture conditions for industrially important microorganisms. |

| MAPPING | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO | | | | | | | | | | |
| CO1 | M | M | M | H | H | M | M | M | H | H |
| CO2 | H | H | H | H | H | H | H | H | H | H |
| CO3 | H | M | H | M | M | H | M | H | M | M |
| CO4 | H | H | H | H | H | H | H | H | H | H |
| CO5 | M | H | M | H | H | M | H | M | H | H |

H-High; M-Medium; L-Low

| 18UMBMP201 | CORE PRACTICAL II : MICROBIAL TAXONOMY AND PHYSIOLOGY |
|------------|---|
| CO1 | Identify the motility of bacteria and determine the size of bacteria. |
| CO2 | Discriminate the structures of Algae and Fungi. |
| CO3 | Analyze the different phases of bacterial growth. |
| CO4 | Outline the characterization of bacteria based on biochemical activities. |
| CO5 | Assess the bacterial growth based on environmental factors. |



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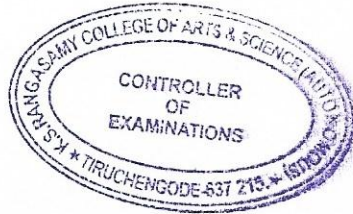

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| 18UVE201 | VALUE EDUCATION II: ENVIRONMENTAL STUDIES |
|----------|--|
| CO1 | Describe the types of ecosystem and concepts in sustainable development. |
| CO2 | Explain the importance of natural resources and environmental problems. |
| CO3 | Recite about the biodiversity, hot spots of biodiversity and its conservation. |
| CO4 | Be conscious on the effects of pollution and population explosion. |
| CO5 | Implement the preventive measures for environmental issues. |


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SEMESTER III - COURSE OUTCOMES (CO)
After completion of the course, the students will be able to

| 18UMBM301 | CORE III: MOLECULAR BIOLOGY |
|-----------|--|
| CO1 | Recall the basics of molecular mechanisms. |
| CO2 | Assess gene expression in prokaryotes. |
| CO3 | Analyze the desired protein products. |
| CO4 | Apply the knowledge of gene regulation into product launching. |
| CO5 | Apply the molecular techniques for disease diagnosis. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | H | H | H | H | H | H | H |
| CO2 | H | H | H | H | H | H | H | H | H | H |
| CO3 | H | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | H | H | H | H | H | H | H |
| CO5 | H | M | H | M | M | H | M | H | M | M |

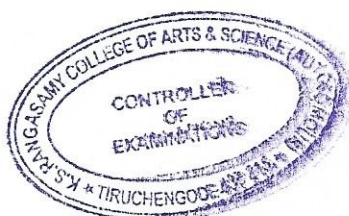
H-High; M-Medium; L-Low

| 18UMBMP301 | CORE PRACTICAL III : MOLECULAR BIOLOGY |
|------------|---|
| CO1 | Analyze the bacterial genomic DNA and RNA. |
| CO2 | Assess the quantification of nucleic acids and proteins. |
| CO3 | Determine the killing effect of UVC on microorganisms. |
| CO4 | Demonstrate rDNA technology through gene transfer in prokaryotes. |

| 18UMBSB301 | SBC I: BIOINSTRUMENTATION |
|------------|---|
| CO1 | Discuss the importance of bioinstruments in research and industry. |
| CO2 | Analyze microbial by products and end products by analytical and preparative methods. |
| CO3 | Evaluate molecular characterization and profiling of proteins. |
| CO4 | Assess the separation and characterization of biomolecules. |
| CO5 | Evaluate the respective biomolecules through radio isotopes. |

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| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | H | H | H | H | H | H | H |
| CO2 | M | M | M | H | H | M | M | M | H | H |
| CO3 | H | H | H | H | M | H | H | H | H | M |
| CO4 | M | H | H | H | M | M | H | H | H | M |
| CO5 | M | M | M | M | M | M | M | M | M | M |

H-High; M-Medium; L-Low


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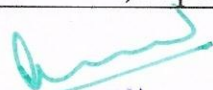
SEMESTER IV - COURSE OUTCOMES (CO)
After completion of the course, the students will be able to

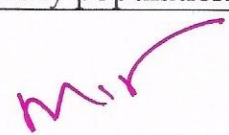
| 18UMBM401 | CORE VI: IMMUNOLOGY |
|-----------|--|
| CO1 | Understand the importance of immunity. |
| CO2 | Discuss the cells and organs of immune system. |
| CO3 | Analyze the importance of immunity and to develop new monoclonal antibodies. |
| CO4 | Demonstrate the nature of antigens and antibodies and to develop vaccines. |
| CO5 | Analyze merits and demerits of transplantation. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | M | M | M | M | M | M | M | M | M | M |
| CO2 | H | H | H | H | H | H | H | H | H | H |
| CO3 | H | H | H | H | H | H | H | H | H | H |
| CO4 | M | M | M | M | M | M | M | M | M | M |
| CO5 | H | H | H | H | H | H | H | H | H | H |

H-High; M-Medium; L-Low

| 18UMBMP401 | CORE PRACTICAL IV: IMMUNOLOGY |
|------------|--|
| CO1 | Identify viral infections by serological method diagnosis. |
| CO2 | Analyze the blood group of individuals and also analyze the enteric fever and their causative agent. |
| CO3 | Utilize immunotechniques for qualitative analysis of antigens. |
| CO4 | Evaluate Streptococcal infections by serological methods and determine the infection status based on CRP level. |
| CO5 | Identify the presence of rheumatoid factor among suspected patients and diagnose HIV, hepatitis viral infection among risky populations. |


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| | |
|-------------|--|
| 18UMBSBP401 | SBC II: PRACTICAL I |
| CO1 | Discuss the calibration of basic microbiological instrument. |
| CO2 | Apply the technique for the separation of biomolecules. |
| CO3 | Evaluate the characteristic features of biopigments. |

| | |
|------------|---|
| 18UMBAC401 | ADD ON COURSE II: MICROBIOLOGY FOR SOCIAL WELFARE |
| CO1 | Discuss the valuable products of microbes |
| CO2 | Understand the various government schemes and banking systems |
| CO3 | Apply the microbes and its products as biofertilizers |
| CO4 | Demonstrate the patenting methods for novel products |
| CO5 | Outline the production of SCP and its marketing strategies |

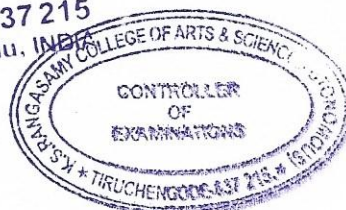
| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | M | H | H | H | H | M | H | H |
| CO2 | L | M | M | M | H | L | M | M | M | H |
| CO3 | H | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | H | M | H | H | H | H | M |
| CO5 | H | M | H | M | H | H | M | H | M | H |

H-High; M-Medium; L-Low

| | |
|------------|---|
| 18UMBNM301 | NMEC I : PERSONAL HYGIENE |
| CO1 | Create awareness of personal hygiene and healthy living. |
| CO2 | Practice hygienic methods to protect the skin, hair, oral and nail. |
| CO3 | Follow positive hygienic practice for healthy life. |
| CO4 | Plan for periodic examination of body against common infection. |
| CO5 | Explain proper disposal of waste and maintain hygiene at home. |

| | |
|------------|---|
| 18UMBNM401 | NMEC II : MICROBES IN HUMAN HEALTH |
| CO1 | Discuss aware of harmful disease causing microorganisms. |
| CO2 | Evaluate the beneficial role of normal microflora in human body. |
| CO3 | Assess the protection, prevention of spread of bacterial and viral disease. |
| CO4 | Discuss prevention of fungal and protozoan diseases. |
| CO5 | Critique proper use of antimicrobial drugs. |

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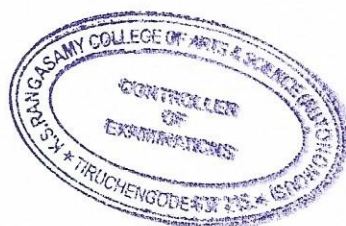
| | |
|-------------------|---|
| 18UMBAL401 | ADVANCED LEARNERS COURSE I: BIOFERTILIZER TECHNOLOGY |
| CO1 | Discuss the economic importance of biofertilizers. |
| CO2 | Understand the nitrogen fixation process. |
| CO3 | Apply the various formulation and cultivation methods for biofertilizer production. |
| CO4 | Demonstrate the cyanobacterial biofertilizer production. |
| CO5 | Outline the field application of mycorrhizal bioinoculants. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | M | H | H | H | H | M | H |
| CO2 | H | H | H | H | H | H | H | H | H | H |
| CO3 | H | M | H | H | H | H | M | H | H | H |
| CO4 | H | M | H | H | H | H | M | H | H | H |
| CO5 | H | H | H | H | H | H | H | H | H | H |

H-High; M-Medium; L-Low


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SEMESTER V - COURSE OUTCOMES (CO)
After completion of the course, the students will be able to

| 18UMBM501 | CORE V: FUNDAMENTALS OF VIROLOGY |
|-----------|---|
| CO1 | Recall the general properties of viruses. |
| CO2 | Understand the mode of expansion of viruses. |
| CO3 | Compute the life cycles of phages. |
| CO4 | Apply Anti viral drugs for controlling the viral infections. |
| CO5 | Assess the importance of prevention and control of plant viruses. |


| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | L | M | H | M | M | L | M | H | M | M |
| CO2 | M | H | M | M | H | M | H | M | M | H |
| CO3 | H | H | H | M | M | H | H | H | M | M |
| CO4 | M | H | M | H | M | M | H | M | H | M |
| CO5 | L | H | H | H | M | L | H | H | H | M |

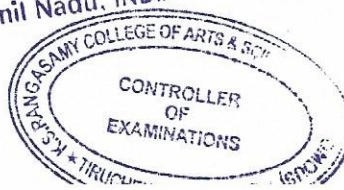
H-High; M-Medium; L-Low


| 18UMBM502 | CORE VI: ENVIRONMENTAL MICROBIOLOGY |
|-----------|--|
| CO1 | Understand the importance of immunity. |
| CO2 | Discuss the cells and organs of immune system. |
| CO3 | Analyze the importance of immunity and to develop new monoclonal antibodies. |
| CO4 | Demonstrate the nature of antigens and antibodies and to develop vaccines. |
| CO5 | Analyze merits and demerits of transplantation. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | L | L | M | M | M | L | L | M | M | M |
| CO2 | H | H | H | M | L | H | H | H | M | L |
| CO3 | H | H | M | M | M | H | H | M | M | M |
| CO4 | M | M | M | L | L | M | M | M | L | L |
| CO5 | H | H | H | M | M | H | H | H | M | M |

H-High; M-Medium; L-Low


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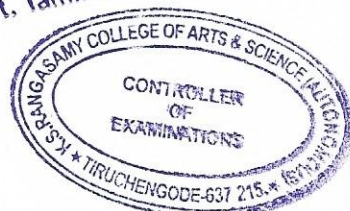
| | |
|------------------|--|
| 18UMBM503 | CORE VII: SOIL AND AGRICULTURAL MICROBIOLOGY |
| CO1 | Analyze the soil profile and its properties. |
| CO2 | Understand biogeochemical cycles and biological nitrogen fixation mechanism. |
| CO3 | Compute interactions with soil microbes and plants. |
| CO4 | Assess the disease established by phytopathogens. |
| CO5 | Prepare effective biofertilizers for improving soil health. |

| MAPPING | | | | | | | | | | |
|-------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | M | H | H | H | H | M | H |
| CO2 | M | H | H | H | H | M | H | H | H | H |
| CO3 | M | H | H | H | H | M | H | H | H | H |
| CO4 | H | H | H | H | H | H | H | H | H | H |
| CO5 | M | H | H | H | H | M | H | H | H | H |
| H-High; M-Medium; L-Low | | | | | | | | | | |

| | |
|------------------|---|
| 18UMBM504 | CORE VIII: MEDICAL BACTERIOLOGY |
| CO1 | Analyze microbial diseases and normal flora. |
| CO2 | Understand the proper processing of clinical samples. |
| CO3 | Analyze and diagnose the infections caused by Gram positive pathogens |
| CO4 | Analyze and diagnose the infections caused by Gram negative pathogens |
| CO5 | Create awareness for parasitical infestation |

| MAPPING | | | | | | | | | | |
|-------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | M | H | H | H | H | M | H | H |
| CO2 | H | H | M | H | H | H | H | M | H | H |
| CO3 | M | H | H | H | M | M | H | H | H | M |
| CO4 | M | H | H | H | H | M | H | H | H | H |
| CO5 | M | H | H | H | H | M | H | H | H | H |
| H-High; M-Medium; L-Low | | | | | | | | | | |

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| 18UMBEL501 | ELECTIVE I: MEDICAL MYCOLOGY AND PARASITOLOGY |
|------------|--|
| CO1 | Analyze proper processing of fungal infected clinical samples. |
| CO2 | Understand the superficial, cutaneous, subcutaneous and opportunistic fungal pathogens. |
| CO3 | Analyze and diagnose the infections caused by intestinal and free-living <i>Amoeba</i> . |
| CO4 | Analyze and diagnose Helminths Infection of Helminthes. |
| CO5 | Develop laboratory techniques in Parasitology. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | M | H | H | H | H | M | H | H |
| CO2 | H | M | M | H | H | H | M | M | H | H |
| CO3 | M | H | H | M | M | M | H | H | M | M |
| CO4 | M | H | M | M | H | M | H | M | M | H |
| CO5 | M | H | H | H | H | M | H | H | H | H |

H-High; M-Medium; L-Low

| 18UMBEL502 | ELECTIVE I: NANO MICROBIOLOGY |
|------------|--|
| CO1 | Understand the basic concepts of bio-nanoparticles. |
| CO2 | Analyze antimicrobial properties of metal nanoparticles. |
| CO3 | Compute the bimolecular nanostructures by AFM, Scanning Probe Electron Microcopy and FTIR. |
| CO4 | Assess the various methods for susceptibility testing of nanoparticles. |
| CO5 | Prepare effective nano based drug delivery systems for infectious disease. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | M | H | M | H | H | M | H | M |
| CO2 | M | M | H | H | H | M | M | H | H | H |
| CO3 | H | H | M | M | M | H | H | M | M | M |
| CO4 | M | M | H | H | N | M | M | H | H | N |
| CO5 | M | H | H | H | H | M | H | H | H | H |

H-High; M-Medium; L-Low

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| 18UMBMP501 | CORE PRACTICAL V (Fundamentals of Virology, Environmental Microbiology, Soil and Agricultural Microbiology and Medical Bacteriology) |
|------------|--|
| CO1 | Evaluate the purity of the water and analyze the pollutants present in water bodies. |
| CO2 | Develop sustainable agriculture through study of agriculturally important microorganisms. |
| CO3 | Apply the diagnosis knowledge to detect the unknown pathogens from clinical samples. |

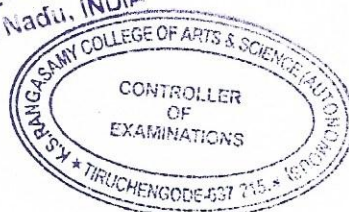
| 18UMBSB501 | SBC III: MICROBIAL TECHNOLOGY |
|------------|---|
| CO1 | Analyze the advancements in microbial technology |
| CO2 | Prepare effective biofertilizers for improving soil health. |
| CO3 | Assess the microbial production of Enzymes. |
| CO4 | Demonstrate the microbial production of fermented foods. |
| CO5 | Develop methods for sewage treatment and biodegradation technology. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | M | H | M | M | H | M | H | M | M |
| CO2 | M | H | H | H | H | M | H | H | H | H |
| CO3 | H | M | H | H | M | H | M | H | H | M |
| CO4 | H | H | H | M | H | H | H | H | M | H |
| CO5 | M | H | H | H | H | M | H | H | H | H |

H-High; M-Medium; L-Low

| 18UMBAL501 | ADVANCED LEARNERS COURSE II: MARINE MICROBIOLOGY |
|------------|--|
| CO1 | Discuss Marine Environment and its diversity |
| CO2 | Be aware of marine microbes isolation, preservation and biogeochemical cycle |
| CO3 | Demonstrate marine extremophiles and their importance |
| CO4 | Apply the marine microbes for biodegradations of various pollutant |
| CO5 | Create and develop the employable and entrepreneur opportunity in marine microbiology. |

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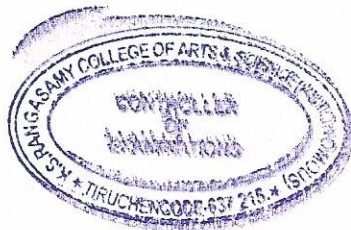
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| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | M | M | H | H | H | M | M |
| CO2 | H | H | M | H | M | H | H | M | H | M |
| CO3 | M | M | H | M | H | M | M | H | M | H |
| CO4 | M | M | M | H | M | M | M | M | H | M |
| CO5 | M | H | M | H | H | M | H | M | H | H |

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SEMESTER VI - COURSE OUTCOMES (CO)
After completion of the course, the students will be able to

| 18UMBM601 | CORE IX: FERMENTATION TECHNOLOGY |
|-----------|---|
| CO1 | Analyze the strain improvement techniques for potent strain preparation. |
| CO2 | Prepare basic techniques for fermentor design. |
| CO3 | Demonstrate the upstream and downstream techniques. |
| CO4 | Assess the techniques used in Industrial production of Alcoholic beverages and enzymes. |
| CO5 | Create improved technology for antibiotics production. |

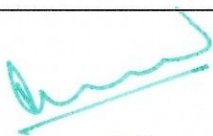
| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | M | H | H | H | H | M | H |
| CO2 | H | M | M | H | M | H | M | M | H | M |
| CO3 | M | H | H | H | H | M | H | H | H | H |
| CO4 | M | M | H | M | M | M | M | H | M | M |
| CO5 | H | H | M | H | H | H | H | M | H | H |

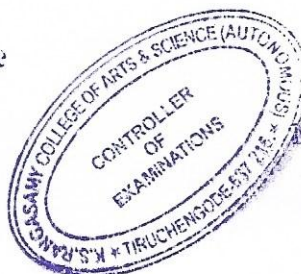
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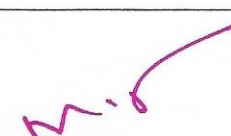
| 18UMBM602 | CORE X: GENETIC ENGINEERING |
|-----------|--|
| CO1 | Analyze the preparation of gene of interest for cloning. |
| CO2 | Prepare effective technique for achieving transformants. |
| CO3 | Demonstrate the techniques for screening the recombinants. |
| CO4 | Assess the techniques used in creating the stable transformants. |
| CO5 | Create novel transgenic animals and plants. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | M | H | H | H | H | M | H |
| CO2 | M | H | H | H | H | M | H | H | H | H |
| CO3 | M | H | H | H | H | M | H | H | H | H |
| CO4 | H | H | H | H | H | H | H | H | H | H |
| CO5 | M | H | H | H | H | M | H | H | H | H |

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| 18UMBM603 | CORE XI: FOOD AND DAIRY MICROBIOLOGY |
|-----------|---|
| CO1 | Discuss importance of food in dairy microbiology. |
| CO2 | Understand the spoilage of food products for product development. |
| CO3 | Analyze food borne infections and intoxications for product preservation. |
| CO4 | Evaluate different kinds of food preservation methods for product safety. |
| CO5 | Demonstrate various fermented food products. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | H | H | H | H | H | H | H |
| CO2 | H | H | H | H | H | H | H | H | H | H |
| CO3 | M | M | H | M | H | M | M | H | M | H |
| CO4 | H | H | H | H | H | H | H | H | H | H |
| CO5 | M | H | H | M | H | M | H | H | M | H |

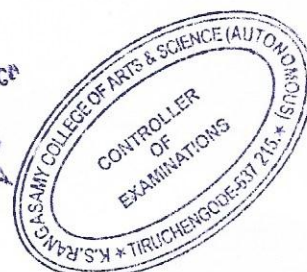
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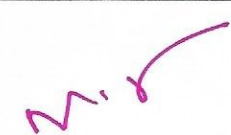
| 18UMB MEL601 | ELECTIVE II: PHARMACEUTICAL MICROBIOLOGY |
|--------------|--|
| CO1 | Recall the basics and working mechanism of antibiotics against infectious diseases |
| CO2 | Optimize the production of pharmaceutical products |
| CO3 | Develop the pharmaceutical products without contamination and spoilage |
| CO4 | Apply the technology in drug delivery systems |
| CO5 | Follow the protocols and regulations to validate pharmaceutical products. |

| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | H | H | M | H | H | H | H | M | H |
| CO2 | M | M | H | M | M | M | M | H | M | M |
| CO3 | H | M | H | H | M | H | M | H | H | M |
| CO4 | H | M | H | M | H | H | M | H | M | H |
| CO5 | M | H | H | H | H | M | H | H | H | H |

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| 18UMBEL602 | ELECTIVE II: BASIC AND APPLIED BOTANY |
|------------|---|
| CO1 | Discuss the valuable products of algae. |
| CO2 | Understand the various classes of fungi and its applications. |
| CO3 | Assess the lichens and various plant groups for plant identification and better classification. |
| CO4 | Apply the advanced botany techniques in agriculture system. |
| CO5 | Create and develop the employable and entrepreneur opportunity in botany. |

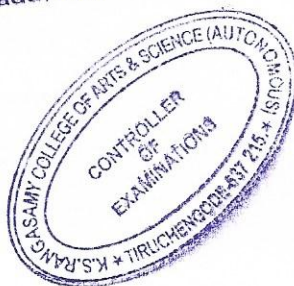
| MAPPING | | | | | | | | | | |
|----------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| PO & PSO CO | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
| CO1 | H | M | H | M | M | H | M | H | M | M |
| CO2 | M | M | H | H | H | M | M | H | H | H |
| CO3 | M | M | M | M | M | M | M | M | M | M |
| CO4 | H | H | H | H | H | H | H | H | H | H |
| CO5 | M | H | H | H | M | M | H | H | H | M |

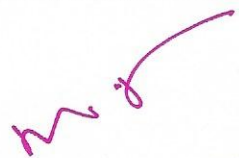
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| 18UMBMP601 | CORE PRACTICAL VI (Fermentation Technology, Genetic Engineering and Food and Dairy Microbiology) |
|------------|---|
| CO1 | Apply the molecular techniques for protein analysis |
| CO2 | Evaluate and analyze the purity of milk. |
| CO3 | Demonstration of clinically important pathogens |

| 18UMBSBP601 | SBC IV: PRACTICAL II: MICROBIAL TECHNOLOGY |
|-------------|---|
| CO1 | Discuss the estimation and quantification of ethanol. |
| CO2 | Apply the immobilization method for biomedical benefits. |
| CO3 | Evaluate the production of industrial important enzymes for industrial application. |


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