

# SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

## B.Sc. Computer Science

### PEO, PO and CO Mappings

1. **Program Name:** B.Sc.( Computer Science)

2. **Program Educational Objectives:** After completion of this program, the graduates /students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in <b>Computer Science</b> based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

3. **Program Outcome(s):** Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems and applied use of banks.

PO2: Learn various custom software

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work

PO12: Research insights and conduct research in computing environment.

**4. Course Outcome(s):**Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

**5. Mapping of PEO& PO and CO**

<b>Program Educational Objectives</b>	<b>Thrust Area</b>	<b>Program Outcome</b>	<b>Course Outcome</b>
PEO I	Technical Expertise	PO1,PO2,PO3,PO6	All core courses
PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

# SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

## Bachelor of Computer Application

### PEO, PO and CO Mappings

1. **Program Name:** Bachelor of Computer Application

2. **Program Educational Objectives:** After completion of this program, the graduates /students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.	
PEO II : Successful Career	Deliver professional services with updated technologies in <b>Computer application</b> based career.	
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.	
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.	

3. **Program Outcome(s):** Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems and applied use of banks.

PO2: Learn various custom software

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

# SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

## B. Lib. & Inf. Sci.

### Course Objective:

- The courses will enhance the understanding of Library and Information Science Education and Library fields.
- To educate the students to respond to the changing information needs of society
- By studying the Subject Library and Information Science the student will be able to understand and appreciate the purpose of Libraries in changing circumstances.
- To impart training is basic principle of Library and information science. It is useful to understand the basic functions and principals of theory as well as practical work in Library and Information Science.
- To acquaint the candidates generally with the social, cultural education and communicational aspects of Library and Information Science.
- To create awareness among the students for acquiring the knowledge of specialized subjects.
- To provide understanding of IT application in information environment including Network and communication system.
- **PROGRAMME OUTCOMES:**  
**LIS Students:**
  - Will learn the skills of organizing information and recorded knowledge.
  - Will be able to provide traditional and modern Information and Referenc Services for users.
  - Will become competent for job opportunities in LIS and related field
  - Can apply the skills and attitudes of visioning, entrepreneurship, advocacy, planning and management of Libraries and Information Centers (LICs) and effective leadership in the LIS field.
  - Possess the skills to respect, engage and collaborate with a diverse community in order to advocate for and construct inclusive, meaningful, and participatory library services, programmes and resources.
  - Can perform and access research based practices through the application of information literacy, inquiry, and research methods including data discovery, analytics and qualitative measures

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work

PO12: Research insights and conduct research in computing environment.

**4. Course Outcome(s):**Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

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PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

# **Bachelor of Journalism**

## **Program Objectives:**

- To study different modes, structure and forms of communication
- To acquaint the students with theoretical trends in mass communication
- To develop multi-tasking skills.
- Students will be able to know various practices of Public Relations and Corporate Communications.
- After studying the course students will know the importance of Audio Communication.

## **Program Outcomes –After Completion of the course Students can work in the following fields**

- Reporter
- Correspondent
- Sub-Editor
- Video-Editor
- Feature Writer
- Photojournalist
- Video journalist
- One can Publish own News Papers
- Public Relations Specialist
- Create news suppliers agency
- Public Relations Officer
- T.V.Anchor

## **PSO :- (Program Specific Outcomes)**

1. Students should understand various forms of the Media.

2. Students should know about relation of journalism and Technology.
3. Students will be able to understand the functions and responsibilities of the media and about basic communication models.
4. Students will know about Indian Radio history.
5. Students should be able to write stories , news and articles.

# M.Sc. Biotechnology Program

## Programme Educational Objectives (PEOs)

The Program Educational Objectives (PEOs) for the M.Sc. Biotechnology program describe accomplishments that graduates are expected to attain within two years after graduation

**PEO-1:** To enable graduates to pursue research career in industry and academia by providing fundamental and practical knowledge in the field of Biotechnology.

**PEO-2:** To empower the students with analytical and research skills, enable them to critically analyze existing literature in an area of specialization and to nurture entrepreneurial endeavors.

**PEO-3:** To develop biotechnologists with professional ethics in order to address global and societal issues for sustainable development.

## Programme Outcomes (POs)

The Graduates of Masters programs M.Sc. Biotechnology will be able to:

**PO-1: Master of Science knowledge:** Apply the knowledge of biotechnology, microbiology, biochemistry fundamentals, and bioinformatics to the solution of complex biological problems.

**PO-2: Problem analysis:** Identify, formulate, review research literature, and analyze complex biological problems reaching substantiated conclusions using various principles of biotechnology, bioinformatics, microbiology, biochemistry, cell and molecular biology sciences.

**PO-3: Design/development of solutions:** Design solutions for complex biological problems and design protocols or processes that meet the specified needs with appropriate consideration for the public health and safety, conservation of biodiversity, better understanding of the microorganisms, and using bioinformatics tools for finding solutions of various crippling human/plant diseases with ethical, societal, and environmental considerations.

**PO-4: Conduct investigations of complex problems:** Use the various protocols developed through extensive research-based knowledge and methods including design of experiments, analysis and interpretation of data, and provide valid and reproducible conclusions.



**PO-5: Modern Molecular Biology and Bioinformatics tools usage:** Develop new technologies, protocols, resources, using modern molecular biology, biotechnology and bioinformatics tools and apply it to solve complex human health problems, plant stress tolerance and conserve floral biodiversity of Himalayan region focusing on medicinally important plants with an understanding of the limitations of this region.

**PO-6: Post Graduate Student and society:** Apply the classic and modern biological theoretical and practical knowledge gained to address societal, health, microbial and plant biodiversity studies, safety, ethical and cultural issues and the consequent responsibilities relevant to the professional up-gradation of the student and society as a whole.

**PO-7: Environment and sustainability:** Understand the impact of Himalayan hot spot of biodiversity. The professional PG students will have a better understanding of societal and environmental concerns, and demonstrate their knowledge, and need for sustainable development.

**PO-8: Ethics:** Apply ethical principles established by different government agencies and commit to research ethics, responsibilities and norms to undertake their current and future research and development.

**PO-9: Individual and team work:** Be an independent thinker and researcher effectively as an individual, and as a member or leader of different teams, and in multidisciplinary research Institutions and Universities.

**PO-10: Communication:** Communicate effectively on complex research activities with the scientific community and with society at large, as a scientist or a teacher, be well versed with scientific writing and write effective reports and design research projects, make effective presentations, and be able to defend it efficiently.

**PO-11: Project management and finance:** Write good research and development projects relevant to the needs of society and environment and attract extra mural funds for himself and his team in the Institute or University from various funding agencies and manage R&D projects effectively.

**PO-12: Life-long learning:** Apply the discipline, ethics and knowledge obtained to engage in independent and life-long learning in their respective fields of interest wherever they go for further higher studies or jobs.

### **Programme Specific Outcome (PSOs)**

After the successful completion of M.Sc. Biotechnology program, the students will able to:

**PSO-1:** Have basic and advanced understanding of Biotechnology in its various domains including, health, nutrition, agriculture, biodiversity conservation, Biosafety etc.

**PSO-2:** Address research questions related to all the above mentioned domains through carrying out specific experiments.

**PSO-3:** Appear and successfully qualify the higher level examinations of various agencies like DBT(Department of Biotechnology), CSIR (Council of Scientific and Industrial Research), ARS (Agriculture Research Services), ICAR(Indian Council of Agriculture Research),and many more, so as to get chance to do research from reputed institutes within country and abroad with sound fellowships

**PSO-4:** Have enough subject knowledge to move ahead in entrepreneurship endeavors in biotechnology.

### Course Outcomes (COs) :

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

Semester	Paper code & Title	Course Outcomes
I	BT-I Cell and Developmental Biology	Students will understand the basics of Cell Biology and developmental Biology and fundamentals of Cancer genetics. They will Identify the characteristics and basic needs of living organisms and ecosystems
I	BT-II Microbiology and Virology	Students will understand the development of Microbiology and Virology. Also will learn the growth pattern of Microorganisms. They will know the methods of cultivation of bacteria and Viruses for Industrial and Human use
I	BT-III Biochemistry	Students will understand the Structure, classification and the properties of Biomolecules. They will acquire the basic laboratory skills for the isolation and separation of biomolecules
	BT-IV (Elective)	
	(A) Techniques in Biotechnology	Students will learn the working principles of biological techniques like microscopy, electrophoresis, chromatography and spectroscopy. They will use these biological techniques in research and development.
I	(B) Plant Metabolism and Development	Students will learn the plant water relationship, mechanism of photosynthesis and respiration. They will explain the mechanism of plant reproduction.
II	BT-V Molecular	Students will acquire the laboratory skills for the

	Genetics	isolation of genetic material. They will learn the biochemistry of DNA and RNA. Students will analyze the gene interactions
II	BT-VI Immunotechnology	Students will learn the various components and working of immune system. They will acquire the techniques for the development of vaccines
II	BT-VII Process Biotechnology	Students will understand the various laboratory methods for the isolation and preservation of Microorganisms. They will learn the Industrial use of bioreactor and also become aware about the media optimization.
II	BT-VIII (Elective)	
	(A) Enzymology	Students will learn the role of enzyme in human health and their industrial applications. They will acquire the laboratory knowledge for the industrial enzyme products.
	(B) Nanobiotechnology	Students will understand the use of Nanobiotechnology in various areas like agriculture, medicine, cosmetics and environment. They will learn the rights of Intellectual properties
III	BT- IX Genetic Engineering	Students will become aware about rDNA technology, its advantages and disadvantages in addition to tools and techniques. It will help in avoiding spread of misconception about GMO in society.
III	BT- X Industrial Biotechnology	On completion of this course, the students shall: <ol style="list-style-type: none"> <li>1. Demonstrate the knowledge about the techniques of microbial productions and acquire comprehensive knowledge on quality control and quality assessment.</li> <li>2. Acquire knowledge in Production and purification of fungal enzymes Amylase Pectinase and other industrial products.</li> <li>3. Able to work in the section of quality control of Food industry.</li> <li>4. Shall develop scientific skills to work in Pharmaceutical and Research laboratories.</li> </ol>
III	BT- XI Plant Biotechnology	On completion of this course, the students shall: <ol style="list-style-type: none"> <li>1. Demonstrate the knowledge about the techniques of Plant Tissue Culture and acquire comprehensive knowledge on GM technology for quality characteristics and their role in crop improvement.</li> <li>2. Acquire knowledge in metabolic engineering and industrial products.</li> <li>3. Develop skills in molecular markers studies and their use in plant breeding.</li> </ol>

		4. Shall develop scientific skills to work in Plant tissue culture, Pharmaceutical and Research laboratories.
III	BT- XII English and Science Communication Skills	Students will be able to: <ol style="list-style-type: none"> <li>1. Understand and demonstrate the use proper writing techniques relevant to the present day technological demands, including anticipating audience reaction.</li> <li>2. Write effective and concise letters and memos, prepare informal and formal reports, proofread and edit copies of business correspondence.</li> <li>3. Develop interpersonal skills that contribute to effective personal social and professional relationships.</li> </ol>
III	BT- XIII (Elective) Intellectual Property Right	Students will be able to: <ol style="list-style-type: none"> <li>1. understand the procedure of patenting Of biological inventions.</li> <li>2. Thesis and Manuscript writing</li> <li>3. Plant breeder's right and Farmer's right.</li> </ol>
IV	BT- XIV Computational Biology	Students will be able to <ol style="list-style-type: none"> <li>1. Construct the phylogenetics of different sequences.</li> <li>2. Analyze sequence and structure of bio-macromolecule data</li> <li>3. Edit the three dimensional structure of protein using structural bioinformaticstools</li> <li>4. Explain the properties of genetic materials and storage and processing of genetic information.</li> <li>5. Analyze genomic data.</li> <li>6. Explain biological phenomena based on comparative genomics</li> </ol>
IV	BT- XV Pharmaceutical Biotechnology	Students will be able to <ol style="list-style-type: none"> <li>1. Explain the strategies and various steps of new drug discovery process.</li> <li>2. Explain the concept of pharmacodynamics and pharmacokinetics</li> <li>3. Apply the knowledge of pharmaceutical manufacturing in the production of biopharmaceuticals like antibiotics, vaccines, proteins and hormones</li> <li>4. Carry out the quality control procedures in the production of various biopharmaceuticals</li> </ol>

		5. Explain the regulatory aspects in the development of pharmaceuticals.
IV	BT- XVI Environmental Biotechnology	<p>Students will be able to</p> <ol style="list-style-type: none"> <li>1. comprehend environmental issues and role of biotechnology in the cleanup of contaminated environments</li> <li>1. Comprehend fundamentals of biodegradation, biotransformation and bioremediation of organic contaminants and toxic metals</li> <li>2. Apply biotechnological processes in waste water and solid waste management.</li> <li>3. Comprehend biofuels/bioenergy systems; attributes for biofuel / bioenergy production.</li> <li>4. Demonstrate innovative biotechnological interventions to combat environmental challenges.</li> </ol>
	BT- XVIII (Elective)	
IV	(A) Animal Biotechnology	<p>Students will be able to</p> <ol style="list-style-type: none"> <li>1. Explain the fundamental scientific principles that underlie cell culture</li> <li>2. Acquire knowledge for isolation, maintenance and growth of cells.</li> <li>3. Develop proficiency in establishing and maintaining of cell lines.</li> <li>4. Acquire knowledge in animal cloning and its applications</li> </ol>
	(B) Food Biotechnology	<p>Students will be able to</p> <ol style="list-style-type: none"> <li>1. Comprehend the different microorganisms roles involved in food biotechnology with different food items.</li> <li>2. Define and explain different preliminary steps before and after food fermentation.</li> <li>3. Comprehend phenomenon of food degradation and spoilage by microorganisms with change in the properties of food.</li> <li>4. To create awareness about different laws and standards in food biotechnology.</li> </ol>

IV	<b>Dissertation Course (Project Work)</b>	After successful completion of this course, students are expected to: <ol style="list-style-type: none"><li>1. Have research skills involved execution of biotechnological proposal</li><li>2. Make use of appropriate biotechnological methods and lab equipment</li><li>3. Abide by safe biotechnology, using appropriate protective, biosafety, and emergency procedures.</li><li>4. Create document and report on experimental protocols, results, and conclusions.</li></ol>
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## **M.Sc. Microbiology Program**

### **Programme Educational Objectives (PEOs):**

The Program Educational Objectives (PEOs) for the M.Sc. Microbiology program describe accomplishments that graduates are expected to attain within two years after graduation:

**PEO-1:** To train graduates in basic and advanced areas of microbiology, Industrial Microbiology, Applied Microbiology, Environmental Microbiology and other related subjects along with sensitizing them to the scope for research.

**PEO-2:** To empower the students with analytical and research skills, to nurture entrepreneurial endeavours and to prepare a competent generation of microbiologists, capable of excelling in careers of their choosing.

**PEO-3:** To develop microbiologists with skills to pursue careers both in academia as well as industry such as pharmaceutical, food and bioprocess industries.

### **Programme Outcomes (POs):**

The Graduates of Masters programs M.Sc. Microbiology will be able to:

**PO-1: Master of Science knowledge:** Apply the knowledge of biotechnology, microbiology, biochemistry fundamentals, and bioinformatics to the solution of complex biological problems.

**PO-2: Problem analysis:** Identify, formulate, review research literature, and analyze complex biological problems reaching substantiated conclusions using various principles of biotechnology, bioinformatics, microbiology, biochemistry, cell and molecular biology sciences.

**PO-3: Design/development of solutions:** Design solutions for complex biological problems and design protocols or processes that meet the specified needs with appropriate consideration for the public health and safety, conservation of biodiversity, better understanding of the microorganisms, and using bioinformatics tools for finding solutions of various crippling human/plant diseases with ethical, societal, and environmental considerations.

**PO-4: Conduct investigations of complex problems:** Use the various protocols developed through extensive research-based knowledge and methods including design of experiments, analysis and interpretation of data, and provide valid and reproducible conclusions.

**PO-5: Modern Molecular Biology and Bioinformatics tools usage:** Develop new technologies, protocols, resources, using modern molecular biology, biotechnology and bioinformatics tools and apply it to solve complex human health problems, plant stress tolerance and conserve floral biodiversity of Himalayan region focusing on medicinally important plants with an understanding of the limitations of this region.

**PO-6: Post Graduate Student and society:** Apply the classic and modern biological theoretical and practical knowledge gained to address societal, health, microbial and plant biodiversity studies, safety, ethical and cultural issues and the consequent responsibilities relevant to the professional upgradation of the student and society as a whole.

**PO-7: Environment and sustainability:** Understand the impact of Himalayan hot spot of biodiversity. The professional PG students will have a better understanding of societal and environmental concerns, and demonstrate their knowledge, and need for sustainable development.

**PO-8: Ethics:** Apply ethical principles established by different government agencies and commit to research ethics, responsibilities and norms to undertake their current and future research and development.

**PO-9: Individual and team work:** Be an independent thinker and researcher effectively as an individual, and as a member or leader of different teams, and in multidisciplinary research Institutions and Universities.

**PO-10: Life-long learning:** Apply the discipline, ethics and knowledge obtained to engage in independent and life-long learning in their respective fields of interest wherever they go for further higher studies or jobs.

### **Programme Specific Outcome (PSOs)**

Upon successful completion of M.Sc. Microbiology, the students will be able to:

**PSO-1:** Get equipped with a theoretical and practical understanding of microbiology and appreciate how microbiology is applied in manufacture of industrial products

**PSO-2:** Know how to source for microorganisms of industrial importance from the environment

**PSO-3:** Identify techniques applicable for Improvement of microorganisms based on known biochemical pathways and regulatory mechanisms.

**PSO-4:** Appreciate the diversity of microorganism and microbial communities inhabiting a multitude of habitats and occupying a wide range of ecological habitats.



**PSO-5:** Understand in depth the occurrence, abundance and distribution of microorganism in the environment and their role in the environment and also get expertise on different methods for their detection, characterization and industrial applications

**PSO-6:** To move ahead in entrepreneurship endeavors in microbiology

**PSO-7:** Appear and successfully qualify the higher level examinations of various agencies, so as to get chance to do research from reputed institutes within country and abroad with sound fellowships

### Course Outcomes (COs) :

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

Semester	Paper code & Title	Course Outcomes
I	Microbial Physiology	<ol style="list-style-type: none"> <li>1. Get well versed with various life process like photosynthesis, respiration and fermentation, anaerobic respiration, and bacterial sporulation</li> <li>2. Elucidate bacterial membrane transport</li> <li>3. Discuss the concept of chemolithotrophy and nitrogen metabolism</li> </ol>
I	MB-102 Advances in Virology	<ol style="list-style-type: none"> <li>1. Explicate the virus, classification, and their significance</li> <li>2. Comprehend the viral multiplication and pathogenic role of viruses</li> <li>3. Realize about control of virus and newly emerging virus.</li> </ol>
I	MB-103 Food and Dairy Microbiology	<ol style="list-style-type: none"> <li>1. Know the concepts related to popular milk products, milk Examination and spoilage.</li> <li>2. Comprehend knowledge regarding fermented food products, food spoilage and infection</li> <li>3. Understand diverse strategies for food preservation</li> </ol>
I	MB104 Bioinstrumentation	<ol style="list-style-type: none"> <li>1. Explain the principles, need and SOP of laboratory instruments</li> <li>2. Pertain the theory, principles of chromatographic, electrophoretic, spectrophotometric and radioisotope techniques</li> <li>3. Demonstrate various instruments and techniques</li> </ol>
II	MB201 Microbial Metabolism	<ol style="list-style-type: none"> <li>1. Detailed study of metabolic pathways</li> <li>2. Concept building related to thermodynamic considerations of biological reactions, fermentation specific to various microbes.</li> <li>3. Study of Fixation of molecular nitrogen and regulation, Biochemistry of methanogens and Regulation: enzyme synthesis and enzyme activity.</li> </ol>

II	MB-202 Modern Microbial Genetics	<ol style="list-style-type: none"> <li>1. Acquaint with concepts in prokaryotic, eukaryotic, and viral genetics</li> <li>2. Explain central dogma of molecular biology (replication, transcription, and translation)</li> <li>3. Enlist and explain types of mutation, gene regulation and transposable element</li> </ol>
II	MB203 Bioprocess Engineering	<ol style="list-style-type: none"> <li>1. Grasp the scope, Principle and types of various bioprocess engineering and techniques</li> <li>2. Demonstrate the features and types of bioreactor</li> <li>3. Explain the mass transfer, sterilization, upstream and downstream processes</li> </ol>
II	MB204 Enzyme Technology	<ol style="list-style-type: none"> <li>1. Demonstrate the enzyme extraction and purification methods</li> <li>2. Explain the enzyme inhibition kinetics</li> <li>3. Familiarize with concepts enzyme immobilization, enzyme engineering and clinical enzymology</li> </ol>
III	MB-301 Molecular Immunology	Student will be able to explain and categorize different types of lymphoid organs as primary and secondary lymphoid organs, immunogen and immunoglobulin, Organization and Expression of Immunoglobulin genes, and Major, Minor Histocompatibility Complexes and Clinical immunology.
III	MB-302 Recombinant DNA Technology	Acquire skills to perform practical by Comparing various parameters according to different immunological techniques.
III	MB-303 Microbial Diversity and Extremophiles	Student will be able to understand and explain the recombinant DNA technology, explain steps and tools in genetic engineering and apply recombinant DNA technology in medicine agriculture and veterinary sciences.
III	MB-304 Biostatistics, Computer Applications and Research Methodology	Acquire skills to perform practicals of isolation, restriction digestion, ligation, amplification, gene mapping and gene cloning required for recombinant DNA technology.
IV	MB-401 Fermentation Technology	Student will be able to understand and explain the microbial diversity present in different extreme environmental conditions in terms of their distribution, abundance, classification, structure and applications of their products.
IV	MB-402 Medical and Pharmaceutical Microbiology	<p>Students are enabled to isolate thermophiles, halophiles by studying different parameters. Isolation of thermophiles from hot water spring (Study at least one thermostable enzyme).</p> <ol style="list-style-type: none"> <li>1. Studies on halophiles isolated from high salt habitat. (Study its pigmentation and salt tolerance phenomenon).</li> <li>2. Studies on alkalophiles and its enzymes (any one) isolated form extreme alkaline environment.</li> <li>3. Biogenic methane production using different wastes.</li> </ol>

		4. Isolation of Thiobacillus ferrooxidans and Thiobacillus thiooxidans culture from metal sulfides, rock coal and acid mine water.
IV	MB-403 Environmental Microbiology	Student will be able to understand explain and apply the biostatistics, computer and research methodology during his further studies.
IV	MB-404 Microbial Bioinformatics, Genomics and Proteomics	Students develop skill to apply statistical knowledge and to correlate statistically extracted value by performing knowledge based practical. Also acquires skill to represent data by using the computer knowledge of MS Word, Excel and power point presentation.
IV	<b>Dissertation Course (Project Work)</b>	After successful completion of this course, students are expected to: <ol style="list-style-type: none"> <li>1. Have research skills involved execution of microbiological proposal</li> <li>2. Make use of appropriate microbiological methods and lab equipment</li> <li>3. Abide by safe microbiology, using appropriate protective, biosafety, and emergency procedures.</li> <li>4. Create document and report on experimental protocols, results, and conclusions.</li> </ol>

# SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

## M. Lib. & Inf. Sci.

### Course Objective:

- To provide an understanding of the vital and pervasive role of Information as an essential resource in all developmental activities.
- To provide a thorough insight in to all techniques of information handling with special emphasis on the application of information technology.
- By studying the Subject Library and Information Science the student will be able to understand and appreciate the purpose of Libraries in changing circumstances.
- To impart training is basic principle of Library and information science. It is useful to understand the basic functions and principals of theory as well as practical work in Library and Information Science.
- To create awareness among the students for acquiring the knowledge of specialized subjects.
- To provide necessary skills and ICT background for designing, implementing, operating and managing Libraries and Information Centers.
- To develop research skill in students and enable information science.

### PROGRAMME OUTCOMES:

LIS Students:

- Will be trained in Technological knowledge and professional skills.
- Will be able to effectively administer and manage Libraries and Information Centers.
- Will learn the skills of organizing information and recorded knowledge.
- Will become competent for job opportunities in LIS and related field.

### 6. PROGRAMME SPECIFIC OUTCOMES:

LIS Students:

- Can manage information resources and the information life-cycle through the processes of collection development, organization, preservation, conservation, access, and dissemination in accordance with physical, virtual, and technical infrastructure and needs.
- Can design and implement policies essential for creating and providing information services and resources guided by the values of patron privacy, equitable access, intellectual freedom, and ethical use of information.
- Can perform and access research based practices through the application of information literacy, inquiry, and research methods including data discovery, analytics and qualitative measures.

# SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

## M.Sc. Computer Management

### PEO, PO and CO Mappings

1. **Program Name:** M.Sc.( CM)

2. **Program Educational Objectives:** After completion of this program, the graduates /students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in software engineer based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

3. **Program Outcome(s):** Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems and applied use of banks.

PO2: Learn various custom software

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work

PO12: Research insights and conduct research in computing environment.

**4. Course Outcome(s):** Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

**5. Mapping of PEO& PO and CO**

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PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

# Swami Ramanand Teerth Marathwada University, Nanded

## M.Sc Clinical Research

### **Objectives of the course:**

This course is with the following objectives –

- To provide the students with the requisite knowledge that will enable them to pursue a career in the Clinical Research industry.
- Synthesize the highest academic standards with relevance to the need to present business & commercial policies.
- Encourage clinical research methodologies & start PhD programs in clinical research.
- Collaborate with organizations at national & international level in areas of research, training, seminars & conferences.
- Represent the interest of clinical research professionals in the country & ensure that India does not lag behind in maintaining the internationally prescribed standards of clinical Ethics.
- To give students in-depth training in both the theoretical and practical aspects of clinical research, regulatory affairs and clinical data management in the clinical research industry.



# SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

## M.Sc. Computer Science

### PEO, PO and CO Mappings

1. **Program Name:** M.Sc.(CS) Affiliated Colleges

2. **Program Educational Objectives:** After completion of this program, the graduates /students would

PEO I :Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II : Successful Career	Deliver professional services with updated technologies in computational science based career.
PEO III :Hands on Technology and Professional experience	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession.
PEO IV :Interdisciplinary and Life Long Learning	Undergo higher studies, certifications and research programs as per market needs.

3. **Program Outcome(s):** Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems and applied use of banks.

PO2: Learn various custom software

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in actual development work

PO12: Research insights and conduct research in computing environment.

**4. Course Outcome(s):** Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

**5. Mapping of PEO& PO and CO**

<b>Program Educational Objectives</b>	<b>Thrust Area</b>	<b>Program Outcome</b>	<b>Course Outcome</b>
PEO I	Technical Expertise	PO1,PO2,PO3,PO6	All core courses
PEO II	Successful Career	PO4,PO5,PO11,	All discipline specific electives courses
PEO III	Hands on Technology and Professional experience	PO8,PO10	All Lab courses
PEO IV	Interdisciplinary and Life Long Learning	PO7,PO9,PO12	All open electives and discipline specific electives

# **Master of Journalism & Media Science**

## **Program Objectives:**

- o To study different modes, structure and forms of communication
- o To acquaint the students with theoretical trends in mass communication
- o To sensitize the students with the need and issues of development
- o To situate communication within larger context of national-international issues
- o To help understand the media dynamics with the help of contemporary theory
- o To develop multi-tasking skills

## **Program Outcomes –After Completion of the course Students can work in the following fields**

- Reporter
- Correspondent
- Sub-Editor
- Video-Editor
- Feature Writer
- Photojournalist
- Video journalist
- One can Publish own News Papers
- Public Relations Specialist
- Create news suppliers agency
- Public Relations Officer
- T.V.Anchor

## **PSO :- (Program Specific Outcomes)**

1. Students should understand various forms of the Media.

2. Students should know about relation of journalism and Technology.
3. Students will be able to know various practices of Public Relations and Corporate Communications.
4. Students will understand various methods of research.
5. Students will be able to understand the functions and responsibilities of the media and about basic communication models.
6. After studying the course students will know the importance of Audio Communication.
7. Students will know about Indian Radio history.
8. Students should be able to write stories, news and articles
9. Gain the ability to compose visuals and visual narratives