

**SCHOOL OF ARTS AND SCIENCE
DEPARTMENT OF MICROBIOLOGY**

2018-2019

2.6.1.a The institution has stated learning outcomes (Program and Course outcomes)/graduate attributes which are integrated into the assessment process and widely publicized through the website and other documents and the attainment of the same are evaluated by the institution



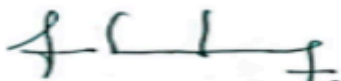
School of Arts and Science
Department of Microbiology
2018-2019

17UGMBGEC

Program Outcomes and Course outcomes of
B.Sc., Mapping of COs and POs - 2017 Regulation

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO1	To gain and apply knowledge of microorganisms concept to solve the problems.
PEO2	To identify, analyze and understand the problems related to microbes.
PEO3	Ability to design and develop solutions to the environment using the microbes.
PEO4	Ability to design, perform experiments, analyze, and interpret data for investigating complex problems.
PEO5	To decide and apply appropriate tools and techniques for manipulations.

PROGRAM SPECIFIC OUTCOME (PSO)	
PSO1	Expose input practical skills/competencies in working through microbes for study and use in the laboratory as well as outside, with the use of good microbiological practices.


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PSO2	Obtain information and understanding of the microbiology perception as appropriate to various areas such as medical, industrial, environment, genetics, agriculture, food and others.
PSO3	Proficient enough to use microbiology knowledge and skills to study problems involving microbes, clear these with peers/ team members/ other stake holders, and undertake remedial measures/ studies etc.
PSO4	Developed a broader standpoint of the regulation of Microbiology to facilitate individual to identify challenging societal troubles and plan them professional career to build up novel decision for such problems.

PROGRAMME OUTCOMES (POS)

PO1	Vital Thinking: Acquire knowledgeable actions after identifying the hypothesis that frame our idea and dealings, read-through out the degree to which these hypothesis are precise and suitable, and give the impression of being at our thoughts and assessments (academic, organizational and individual) from diverse perception.
PO2	Precious communication: Study about speak, read, write and listen noticeably in person and throughout electronic media in English and in one Indian language and build meaning of the globe by connecting people, thoughts books, media and technology.
PO3	Effectual citizenship: Reveal empathetic social concern and fairness centred national progress and the capability to act with and take part in civic life through volunteering.
PO4	Ethics: Be aware of diverse value systems including the individual, under the ethical dimensions of personal choice, and believe responsibility for them.
PO5	Environment and Sustainability: Analyze the importance of microbes for environmental clean-up and sustainable development.

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PO6	Self directed and life-long learning: To gain the talent to employ self-determining and life-long learning in the broadest circumstance socio technological transforms.
PO7	Economic liberty and employability potential: Attain the ability to be concerned in economically sustainable opening and pound entrepreneurial skill.

B.Sc., CURRICULUM MAPPING

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives – PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*	*	*	*	
PEO2	*		*		*
PEO3		*		*	
PEO4	*	*	*		*
PEO5	*		*	*	

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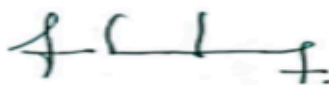
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2017 Regulation
Program Outcomes and Course outcomes of
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Semester	Course Code	Title of the Course	Cos	POS						
				PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	17110AEC11	Language-I (Tamil-I)	Learn the changes that have occurred in literature since the classical period.	1	2	1	0	1	2	1
			Make use of vocabulary systematically.	1	2	1	1	1	2	0
			Understand how to lead one's life realizing the modernity and its environment/atmosphere.	1	2	1	0	1	2	1
I	17111AEC11	Advanced English-I	Develop vocabulary	1	2	0	1	1	2	2
			Learn to edit and do proof reading	1	2	1	1	0	2	1
			Read and comprehend literature	1	2	0	0	1	0	0
I	17111AEC12	English-I	Read and comprehend literature	1	2	1	1	0	2	2


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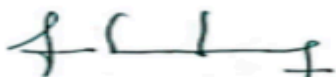
			Appreciate poetry and prose	1	2	0	1	1	0	0
			Familiarize students with fiction.	1	3	1	1	1	2	1
I	17116AEC13	Fundamentals of Microbiology	Describe the characteristics of microorganisms and classification of biological system	3	1	1	0	0	0	2
			Understand concepts of growth and reproduction of microbes	2	0	0	2	0	2	0
			Able to explain the beneficial and detrimental effects of microorganisms	2	1	3	0	3	0	3
			Gather theoretical background of microbial cultivation	3	1	0	2	3	0	2
I	17116AEC14L	Fundamentals of Microbiology Lab	Develop basic skills in aseptic techniques for microbiology practical.	2	1	1	1	3	2	3
			Hands-on experience in handling various important instruments.	2	0	1	1	0	1	2
			Able to perform basic experiments to grow and study microorganism in laboratory	2	1	1	1	1	1	3
			Develop knowledge on identification of microorganisms	2	0	1	1	1	2	3
I	17115AEC15	Bio Chemistry I	Develop fundamental knowledge about various biomolecules	3	1	1	1	1	0	3
			Understand the basic concepts related to enzymes	2	0	1	1	1	0	3
			Know various biochemical pathway	2	1	2	1	1	0	3
			Understand the concept of microbial metabolism	3	0	1	0	1	0	3
I	17115AEC16L	Bio Chemistry I Lab	Practical knowledge about various techniques used in Biochemistry	0	1	2	1	1	3	3

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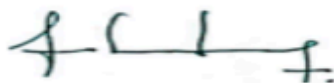
			Exhibit the well practical knowledge about estimation of carbohydrates, protein.	0	0	1	0	0	2	3
			Learn the quantitative and qualitative estimation biochemical analysis	2	1	2	1	1	0	3
I	17120SEC01A	Skill Based Elective-I	Recognize when to use each of the Microsoft Office programs to create professional and academic documents.	2	2	0	0	1	2	3
			Use Microsoft Office programs to create personal, academic and business documents following current professional and/or industry standards.	2	2	1	0	1	2	3
			Apply skills and concepts for basic use of computer hardware, software, networks, and the Internet in the workplace and in future coursework as identified by the internationally accepted Internet and Computing Core (IC3) standards.	2	3	1	1	2	2	3
I	17111SEC01L	Communicative English Lab-I	Learn grammar.	2	2	1	1	0	2	2
			Enrich vocabulary	2	2	0	0	0	0	0
			Understand the process of communication	2	3	0	0	1	0	0
			Develop listening skill	2	2	1	0	1	1	0
I	1711INDCONS	Indian Constitution	Democratic values and citizenship Training and gained	2	1	1	1	0	2	1
			Awareness on fundamental Rights are established	2	0	1	1	1	1	1
			The functions of union Government and State Government are learnt	2	0	0	3	1	1	1
			The Power and functions of the Judiciary learnt thoroughly	2	1	2	2	1	1	1
			Appreciation of Democratic Parliamentary Rule is learnt	1	1	2	2	1	2	1


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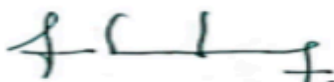
II	17110AEC21	Language-II (Tamil-II)	Know what devotion really is.	1	2	0	1	2	2	1
			Know the fruitfulness obtained through devotion	1	2	1	0	2	2	0
			Perceive the progress achieved in the society through devotion.	2	2	1	1	0	2	2
II	17111AEC21	Advanced English-II	Develop technological skills.	1	2	0	1	1	2	2
			Able to write in a variety of formats	0	2	0	1	0	2	0
			Read biographies and develop personality	2	2	1	1	1	2	1
II	17111AEC22	English-II	Appreciate different forms of literature	1	2	1	1	0	2	1
			Acquire language skills through literature	1	2	0	0	2	2	0
			Broadens the horizon of knowledge	1	2	0	0	0	2	0
II	17116AEC23	Microbial Physiology	Determining the growth features of the microbes with various environmental factors.	3	0	0	0	2	2	1
			Analysis of essential nutrients ensuring microbial growth.	3	0	1	1	2	2	0
			The significance of microbial surveillance like autotrophs, heterotrophs, etc...	3	1	1	1	1	1	1
			Electron transport and metabolic pathway of living systems	2	1	0	1	1	0	1
II	17116AEC24L	Microbial Physiology Lab	Understand and predict the various metabolic reactions in microbial cell.	0	1	1	1	2	1	1
			Predict the intermediate products which can be employed in industrial production.	3	1	1	1	1	3	1
			Environmental growth kinetics of microorganism	2	0	0	1	2	2	1
II	17115AEC25	Bio.Chemistry II	Developed a very good understanding of various biomolecules	3	0	1	0	0	2	1

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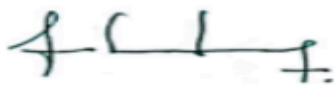
			knowledge about lipids and fatty acids	2	0	0	1	1	1	1
			Well knowledge about multifarious function of proteins	2	1	1	0	1	2	1
			Gain knowledge about metabolism.	3	1	1	1	1	2	1
II	17115AEC26L	Bio Chemistry II Lab	To demonstrate an understanding of fundamental biochemical principles	2	1	1	1	1	1	1
			To learn the structure/function of biomolecules, metabolic pathways, and regulation	2	0	1	1	1	2	2
			Students are able to make buffers, study enzyme kinetics	2	0	1	0	1	2	2
II	17116RLC27	Research LED Seminar	Exposure to various research domains	3	0	1	1	0	0	2
			Acquaintance with languages of research	3	1	1	1	1	1	1
			Development of research aptitude	3	1	0	0	0	2	2
II	17120SEC02A	Skill Based Elective –II	Identify the names and functions of the PowerPoint interface.	2	2	0	1	2	2	2
			Create, edit, save, and print presentations.	2	2	0	0	2	2	3
			Format presentations.	2	2	0	0	1	2	3
			Add a graphic to a presentation.	2	2	0	0	1	2	3
			Create and manipulate a simple slideshow with outlines and notes.	3	3	0	0	1	2	2
			Create slide presentations that include text, graphics, animation, and transitions.	3	3	1	1	2	2	3
II	17111SEC02L	Communicative English Lab-II	Learn grammar.	1	1	0	2	2	2	2


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			Use a variety of reading strategies	0	0	0	0	0	2	0
			Enhance the skill of making grammatically correct sentences.	1	2	0	1	2	2	1
III	17110AEC31	Language-III (Tamil-III)	Achieve one's goal by following the ancestral path	1	2	1	0	1	2	1
			Learn to lead life of perfection by realizing the uncertainty in the life	1	2	0	1	2	2	2
			Attain happiness through honesty	1	2	1	0	1	2	2
III	17111AEC31	Advanced English-III	Understand phonetics.	2	2	0	2	2	2	1
			Develop writing skill	0	0	0	0	0	0	0
			Able to develop creative writing	2	2	1	1	1	2	2
III	17111AEC32	English-III	Enable to appreciate different types of prose	1	2	0	1	1	2	1
			Develop the conversational skills through one-act plays	0	3	0	0	0	2	0
			Enhance the skill of making grammatically correct sentences.	1	3	0	0	0	2	0
III	17116AEC33	Soil and Agriculture Microbiology	To acquire the information about microbes	3	0	1	1	1	2	2
			To Know about microbes and its role in the environment.	2	0	1	1	1	3	2
			Able to understand about microbes in agriculture and environmental practice.	2	1	1	1	1	3	2
III	17116AEC34L	Soil and Agriculture Microbiology Lab	To Analyze the microbes in food and dairy industry products	3	0	1	1	1	2	2
			To understand the Production methods of Food and dairy products using microbes	3	1	0	0	1	1	3
			To gain Knowledge about Molecular Genome analysis and quantification	2	1	1	0	1	1	2

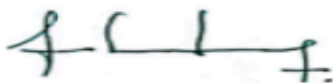
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			To understand the Isolation of DNA and amplification using PCR technique.	2	0	1	1	1	1	2
			To know about Protein and DNA separation technique	2	2	1	1	1	2	2
III	17112AEC35	Biostatistics	Basic knowledge of mathematics as applied to biological phenomenon.	2	2	1	0	1	2	2
			Improve the concepts of statistics and their importance	2	2	0	0	1	2	2
			Communicate the results of statistical analyses- accurately and effectively	2	2	0	1	1	1	2
III	17112AEC36L	Biostatistics Lab	Read and learn statistical measures individually.	2	1	1	1	1	1	1
			Collection and analysis of data from experiments and interpretation of the results	1	1	0	0	1	1	1
			study the multivariate analysis in biostatistics	3	2	1	0	1	3	1
III	17116RMC37	Research Methodology	Understanding research questions and tools	3	2	2	1		3	1
			Experience in scientific writings	3	2	1	1	1	3	3
			Practice in various aspects of scientific publications	3	2	0	1	1	2	2
			Inculcation of research ethics	1	3	1	1	2	2	3
III	17120SEC03A	Skill based Elective- III	Indicate the names and functions of the Excel interface components.	2	3	0	0	1	2	3
			Enter and edit data.	2	3	0	0	2	2	1
			Format data and cells.	2	3	1	0	1	2	2


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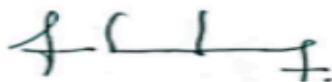
			Construct formulas, including the use of built-in functions, and relative and absolute references.	2	2	0	0	2	2	2
			Create and modify charts.	2	2	0	0	1	2	1
			Preview and print worksheets	2	2	0	1	1	2	0
III	17111SEC03L	Communicative English Lab-III	Learn grammar.	2	2	1	0	1	2	0
			Enhance their fluency in English	2	2	0	1	0	2	0
			Develop speaking and writing skills	0	2	0	0	1	1	0
			Develop individual perspectives that demonstrate critical thinking skills	2	3	1	0	1	1	1
IV	17110AEC41	Language-IV (Tamil-IV)	Realize how the ancient people changed their lifestyle according to the ages	2	3	0	0	1	1	2
			Learn how to change one's lifestyle according to the needs of the future	2	3	1	0	1	1	1
			Accept the modern trends and its uses	2	3	0	0	2	2	1
IV	17111AEC41	Advanced English-IV	Develop writing skill.	2	0	1	0	2	2	1
			Comprehend and describe poems	0	3	0	0	0	2	0
			Learn interviewing skills	2	2	0	1	1	2	1
IV	17111AEC42	English-IV	Improve their ability to read and understand them	0	2	0	0	0	2	0
			Know the genius of Shakespeare	2	2	0	0	1	2	0
			Express in writing their views.	3	1	1	1	1	2	1
IV	17116AEC43	Virology	Understanding the characteristic features of viruses.	3	1	0	1	1	2	2

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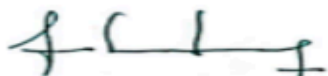

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			Gain the knowledge about the biology of bacteriophages.	2	1	1	1	0	2	2
			Learn the range of plant viruses and animal viruses.	3	0	1	1	0	2	2
			To know the role of viruses in causing of cancer	2	1	1	0	1	2	3
IV	17116AEC44L	Soil Microbiology and Virology Lab	Upon paper completion, students will have knowledge on the structure of plants, animals, bacteria and viruses.	2	1	1	0	1	2	3
			This paper also enables the student on isolation, propagation of various viruses.	1	0	0	0	0	2	1
IV	17116AEC45	Bioinformatics	Developed skills to use computers for analysis of biological data.	3	1	1	0	1	2	1
			Gained the biological databases and compares the data of the biological macromolecules.	3	2	1	1	1	2	2
			Analysis of data retrieval, representation, analysis and interpretation	3	1	1	1	1	2	2
IV	17116AEC46L	Bioinformatics Lab	Investigate the literature data of the given protein using PubMed.	2	1	1	2	0	1	3
			Explore the nucleotide sequence data of the given species using NCBI / EMBL / DDBJ.	3	1	0	2	0	1	3
			Investigate the protein sequence of the species using PIR and Swissprot / UniProt	1	2	0	2	1	1	3
IV	17120SEC04A	Skill based Elective- IV	Examine database concepts and explore the Microsoft Office Access environment.	2	3	0	0	2	2	3
			Design a simple database.	2	3	0	1	0	2	2
			Build a new database with related tables.	2	3	0	0	2	2	2
			Manage the data in a table.	2	3	0	0	0	2	2
			Query a database using different methods.	2	2	2	0	2	2	3


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			Design a form.	2	2	0	0	0	2	3
			Generate a report.	2	2	1	1	2	2	3
			Import and export data.	2	3	0	1	0	2	1
IV	17111SEC04L	Communicative English Lab-IV	Learn grammar.	1	2	0	1	1	2	1
			Enable to express their views in conversation	1	2	0	0	2	2	1
			Develop soft skills	1	2	1	0	2	2	1
			Enhance presentation skills	2	3	0	0	1	2	0
IV	171ENVTSTU	Environmental Studies	Understand ecosystem	3	1	1	0	2	1	2
			Know social issues and the environment	2	1	2	1	2	1	2
			Learn keep the environment eco-friendly	2	1	2	1	2	2	2
V	17116AEC51	Food and Dairy Microbiology	Better understanding of cause of microbes in food spoilage	2	0	1	0	1	1	2
			Get information regarding food preservation	3	1	1	0	1	2	3
			Enable them to work food fermentation industries	2	1	0	1	2	2	3
V	17116AEC52	Molecular Biology	It will elaborate the central dogma of the cell i.e., gene expression viz. transcription and translation in both prokaryotes and eukaryotes.	2	1	1	0	1	1	
V	17116AEC53	Environmental Microbiology	Students acquire the information about microbes	3	3	1	0	1	3	2
			Know about microbes and its role in the environment.	3	2	1	3	1	3	3
			Able to understand about microbes in agriculture and environmental practice	3	2	1	2	1	3	3


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V	17116AEC54L	Food and Dairy Microbiology and Molecular Biology Lab	Analyze the microbes in food and dairy industry products	2	1	0	0	3	1	2
			Production of Food and dairy products using microbes	2	1	0	0	3	1	1
			Knowledge about Molecular Genome analysis and quantification	3	1	0	0	3	2	2
			Isolation of DNA and amplification using PCR technique.	3	0	1	0	1	2	3
			Protein and DNA separation technique	2	0	1	1	1	2	2
V	17116AEC55L	Environmental Microbiology Lab	Students acquire the information about microbes role in agriculture	2	0	1	1	1	1	3
			Learn about Biofertilizer production	2	1	1	1	1	1	2
			Know about microbes and its role in environment	2	1	2	0	1	1	2
V	17116DSC56A	Discipline Specific Elective -I Proteomics	Students acquire knowledge in protein functional and expressions.	2	1	2	1	2	1	2
			Knowledge about 3-D structural prediction of proteins	3	1	1	1	2	2	3
			Study the protein purification with various chromatographic techniques.	2	0	1	1	3	2	3
			Knowledge about MALDI-TOF (Matrix assisted laser Desorption and Ionization)	2	0	0	1	0	0	2
V	17116DSC56B	Bioinoculants	Students acquire knowledge in microbial products	3	2	1	1	1	1	2
			Separation of primary and secondary metabolites	2	2	1	0	1	1	2
			Applications of value added products	1	2	1	0	1	1	2
			Scope of microbial inoculants in agricultural practices	3	1	1	1	1	1	3


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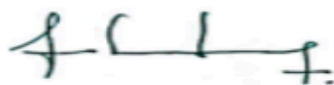
V	17116BRC57	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	2	2	1	1	1	1	2
			Evolution of research intuitiveness and orientation	2	0	0	1	1	1	2
			Familiarity with cutting edge research trends	3	0	0	0	1	1	3
V	17120SEC05A	Skill based Elective- V	Work with the Photoshop workspace	3	0	1	0	1	2	2
			Navigate images	2	2	1	1	1	2	1
			Resize and crop images	2	2	1	0	1	2	1
			Make and work with selections	2	3	1	1	1	2	2
			Create new layers and perform other basic layer functions	2	3	0	0	0	2	2
V	17111SEC05L	Communicative English Lab-V	Transform images	2	2	0	0	0	2	1
			Develop corporate skills.	2	2	1	0	2	2	2
			Handle their day to day affairs well with their knowledge of language skills.	2	2	0	1	0	2	2
VI	17116AEC61	Industrial Microbiology	Get a Job.	2	3	0	0	0	2	1
			Learning of different types of reactors or fermenters functions	2	3	0	1	1	1	1
			Capable of understanding the vital role of various substrates used in fermentation.	1	2	0	1	2	1	2
			Learn about Industrial Product production	2	2	0	0	1	2	2
	17116SEC62	Clinical Microbiology	knowledge about upstream and downstream processing	3	0	1	0	1	2	3
			Understood the basic and general concepts of Normal flora of the human body	2	0	1	1	1	2	3
			Understand the sources of infectious diseases and transmission	2	0	1	2	1	2	2

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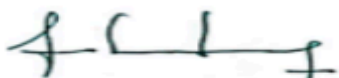
			Study the pathogenicity of bacterial, fungal, protozoa and viral diseases	2	1	0	2	1	3	2
			Understand the preventive measures of Hospital acquired infections.	3	1	1	1	1	2	1
VI	17116AEC63L	Industrial Microbiology Lab	Students acquire hands on training various microbes for industrial practices	2	1	1	1	1	2	1
			Screening of desired microbes	2	0	1	1	1	2	1
			Learn the optimization process for scale up process	3	0	0	1	1	1	1
			Well technical knowledge on upstream and downstream processing	1	1	0	0	1	2	3
VI	17116SEC64L	Clinical Microbiology Lab	Get practical knowledge in specimen collection and processing	2	1	1	0	1	2	3
			Knowledge about cyst and protozoa identification.	1	2	1	2	1	1	2
			Technical practice on diagnosis of pathogenic infection	1	2	1	2	1	1	2
			Determine antimicrobial activity of microorganisms	1	1	0	1	1	1	2
VI	17116DSC65A	Discipline Specific Elective - II Recombinant DNA Technnology	Students have acquired knowledge in desired DNA and protein separation.	2	1	0	0	1	1	3
			Learn the gene and operon concept	2	0	0	0	1	2	3
			Knowledge about gene cloning and cDNA library	1	0	1	0	1	2	2
			Learn the blotting techniques	2	1	1	1	1	2	2
VI	17116DSC65B	Bioethics	Students will identify ethical issues in a research proposal	3	1	1	1	1	2	2
			Understand the Intellectual property Rights (IPR) and patent filing.	3	0	0	1	1	1	2


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			Knowledge about to ensure ethical conduct of biomedical research	3	0	0	1	1	1	1
			Describe the basic concepts of legal, ethical, economic, and regulatory measurements	3	2	1	2	1	1	1
VI	17116PRW67	Project Work	Understand basic concepts of research and its methodologies	1	1	1	3	1	1	1
			Identify appropriate research problem and parameters	2	1	3	3	1	2	1
			Prepare a research report	3	3		3	1	2	1
VI	17120SEC06A	Skill Based Elective –VI	Learn to create animated graphics, add sound and interactivity.	2	2	1	0	2	2	3
			Can develop Website	2	2	1	0	2	2	2
			CD based presentations	2	1	0	0	1	1	3
VI	17111SEC06L	Communicative English Lab-VI	Apply study skills	2	3	0	1	1	2	3
			Widen creative thinking	2	3	0	0	0	2	3
			Be a good team worker	2	3	0	0	1	2	3
			Make them proficient in English	2	2	0	1	1	1	1

1- Low, 2-Medium, 3- Higher, 0 No correlation

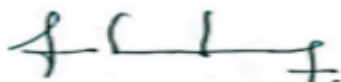

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Department of Microbiology
17PGMBGEC
2017 Regulation
Program Outcomes and Course outcomes of
M.Sc., Mapping of COs and POs**

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	
PEO1	To provide detailed knowledge of Microbiology and their application fields. To understand the beneficial and harmful role of microorganisms in the environment and in the industries.
PEO2	To understand the fundamentals of physiological reactions including metabolic pathways and biochemical reactions in microorganisms. To understand the fundamental concepts of immunology, biochemistry, biotechnology and genetics etc.
PEO3	To develop human resource and entrepreneurs in microbiology with the ability to independently start their own ventures or small biotech units in the field of biotechnology.
PEO4	Understand modern microbiology - practices and approaches with an emphasis in technology application in pharmaceutical, medical, industrial, environmental and agricultural areas.
PEO5	Gain experience with standard molecular tools and approaches utilized: manipulate genes, gene products and organisms. Become familiar with handling of Laboratory animals for the research purpose. Interpret differences in data distributions via visual displays.


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PROGRAM SPECIFIC OUTCOME (PSo)	
PSO1	Upon master graduation, Microbiology majors will master a set of advanced skills, which would be useful to function effectively as professionals and to their continued development and learning within the field of Microbiology.
PSO2	Able to explain why microorganisms are ubiquitous in nature, inhabiting a multitude of habitats and occupying a wide range of ecological habitats.
PSO3	Able to cite examples of the vital role of microorganisms in biotechnology, fermentation, medicine and other industries important to human well-being.
PSO4	Able to demonstrate that microorganisms have an indispensable role in the environment, including elemental cycles, biodegradation etc
PSO5	Able to systematically collect, record and analyze data, identify sources of error, interpret the result and reach logical conclusion.

PROGRAMME OUTCOMES (POS)	
PO1	Vital Thinking: Acquire knowledgeable actions after identifying the hypothesis that frame our idea and dealings, read-through out the degree to which these hypothesis are precise and suitable, and give the impression of being at our thoughts and assessments (academic, organizational and individual) from diverse perception.
PO2	Precious communication: Study about speak, read, write and listen noticeably in person and throughout electronic media in English and in one Indian language and build meaning of the globe by connecting people, thoughts books, media and technology.
PO3	Effectual citizenship: Reveal empathetic social concern and fairness centered national progress and the capability to act with and take part in civic life through volunteering

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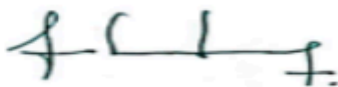
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PO4	Ethics: Be aware of diverse value systems including the individual, under the ethical dimensions of personal choice, and believe responsibility for them.
PO5	Environment and Sustainability: Analyse the importance of microbes for environmental clean-up and sustainable development.
PO6	Self-directed and life-long learning: To gain the talent to employ self-determining and life-long learning in the broadest circumstance socio technological transforms.

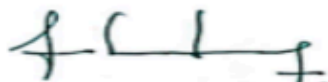
Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*	*	*	*	
PEO2	*		*		*
PEO3		*		*	
PEO4	*	*	*		*
PEO5	*		*	*	


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Semester	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO 4	PO5	PO6
I	17216SEC11	Prokaryotic Microbiology	Scope and historical importance of microbiology	3	1	0	1	2	2
			Understanding the features and classification of prokaryotes.	2	0	0	1	2	2
			study about isolation and identification of microbes	3	0	0	3	2	2
			Economic value of beneficial bacteria	2	2	1	0	1	2
	17216SEC12	Eukaryotic Microbiology	General Features and taxonomy of eukaryotes	2	1	1	0	0	1
			Knowledge about advanced research in mycology, phycology.	3	1	1	2	2	1
			Scope of Algae used as a food	3	2	1	0	2	2
			Economic importance of Lichens and algae	3	2	2	0	0	1
	17216SEC13	Microbial Physiology	Understand the factors influencing the growth of microbes in ecosystem	2	1	1	2	2	1
			Learn about Bioluminescence and their advantages.	2	1	1	1	1	1
			Learn about microorganisms to assimilate the nutrients for growth.	2	1	1	2	1	1
			Study about metabolic pathway	2	1	0	1	1	1
	17216SEC14L	Fundamentals of Microbiology Lab	practical knowledge about isolation and purification of microbes from various sources.	2	1	0	0	1	2
			Training about staining experiments	1	2	0	1	1	3
			Handling on light and compound microscope.	2	2	1	1	2	2
			Learn essential biochemical analysis	1	2	1	1	2	2
	17216DSC15A	Immunotechnology	Learn scope and history of immunology.	3	1	1	0	2	1
			Study about immune system and lymphatic organs.	3	1	1	0	2	1
			Learn tumor immunology	3	1	1	1	2	1
			gain knowledge about various immunological techniques (RIA, ELISA, etc...)	3	0	0	2	1	2


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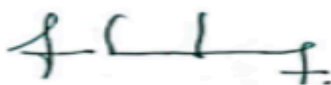

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	17216DSC15B	Bioremediation and Waste Management	Understanding on the management of solid and liquid wastes	3	1	0	3	1	1
			Learn the principles of remedial measures of recycling, reuse and recover from the wastes.	2	1	0	3	1	1
			Understand the mechanism and role of microbes in the degradation of various pollutants	2	2	0	3	2	1
	17216RLC16	Research Led Seminar	Exposure to various research domains	1	1	0	1	1	1
			Acquaintance with languages of research	1	1	1	1	1	1
			Development of research aptitude	2	1	1	1	1	1
II	17216SEC21	Industrial Microbiology	Students will get knowledge on strain improvement.	3	0	2	2	2	1
			Enable them to work in the fermentation industry.	2	1	1	1	2	2
			Students will get idea on upstream and downstream fermentation process	2	1	2	1	1	2
			Economic importance of Bio products	2	2	2	1	1	2
	17216SEC22	Environmental and Agricultural Microbiology	Huge Insights into these precious areas of Environmental microbiology.	2	0	0	1	1	2
			Students are able to know detailed ideas about biofertilizer production and plant disease.	2	0	0	1	1	2
			Role of Microbes in marine and freshwater environment	2	1	1	1	1	2
			Scope of Recycling of Liquid and Solid wastes	3	0	1	1	1	2
	17216SEC23	Clinical Microbiology	Learn normal flora of human body	2	1	1	1	1	1
			Get information about various sources of infection and transmission	3	0	1	0	2	1
			Epidemiology, pathogenesis and treatment of bacterial, fungal and viral diseases	2	1	1	0	1	1
			Learn Strategy of antimicrobial therapy	3	1	2	0	2	1
	17216SEC24L	Industrial, Clinical, Environmental and	Get practical knowledge in specimen collection and processing	2	1	0	1	2	1
			Become technically expert which will helpful to work in clinical laboratory	2	0	0	1	2	2


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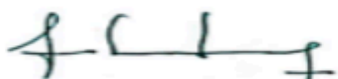

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III	Agricultural Microbiology Lab	Learn practical understanding of diagnosis of pathogens.	1		0	1	2	2	
		Acquire knowledge on fermentation process	1	1	1	1	1	2	
		Learn bio fertilizer and inoculants production	1		0	1	1	2	
	17216DSC25A	Food and Diary Microbiology	Better understanding of cause of microbes in food spoilage	2	0	0	1	2	1
			Get information regarding food preservation	2	1	1	3	1	1
			Enable them to work food fermentation industries	2	2	1	1	1	1
	17216DSC2B	Bioreactor	Students acquire hands on training various microbes of industrial importance	3	1		1	1	2
	17216RMC26	Research Methodology	Understanding research questions and tools	1	0	2	0	1	1
			Experience in scientific writings	3	0	2	0	1	3
			Practice in various aspects of scientific publications	3	0	2	1	2	3
			Inculcation of research ethics	2	1	1	2	2	2
	17216BRC27	Participation in Bounded Research	Hands on exposure to problem solving tools in contemporary research	2	1	1	1	1	2
			Evolution of research intuitiveness and orientation	2	1	1	1	1	2
			Familiarity with cutting edge research trends	1	2	0	1	1	1
	17216SEC31	Microbial Genetics	Understood genome organization of model organisms.	2	0	0	0	1	2
Learn molecular mechanisms that underlie mutations.			2	0	0	0	1	2	
Study about transformation, transduction and conjugation.			2	0	0	2	1	2	
Are able to describe the nature of the transposable elements			2	1	1	1	1	2	
17216SEC32	Molecular Biology and Microbial Biotechnology	Developed an understanding in recombinant DNA technology.	2	1	1	1	1	2	
		candidate to recollect the basics of Molecular Genetics and apply cognitive thinking.	3	1	1	1	1	1	
		Possibilities ranging from the treatment of human diseases to develop novel medicines	2	1	1	2	2	2	


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	17216SEC33	Biostatistics and Bioinformatics	To understand the importance of principal concepts about biostatistics	2	2	3	2	2	1
			To know the knowledge about statistics and its relation with other science and research aspects	2	1	1	2	1	1
			To obtain the knowledge on bioinformatics databases, perform text-and sequence-based searches	2	2	3	1	2	1
			To become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems.	2	0	1	1	2	2
	17216SEC34L	Microbial Biotechnology Lab	Has acquired a fairly good knowledge of the tools and the methods for genetic engineering	1	0	1	1	2	2
			Separation of DNA and Protein by gel electrophoresis.	2	0	1	1	1	2
			Students can perform isolation of DNA, amplification of any gene by PCR	2	1	1	1	1	2
	17216DSC35A	Pharmaceutical Microbiology	Acquired detailed knowledge of antimicrobial agents, their mechanism of action.	3	1	0	2	2	2
			Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions	3	2	3	2	2	2
			Regulatory practices, biosensors and applications in Pharmaceuticals.	2	2	0	1	1	2
	17216DSC35B	Genetics and Genetic Engineering	To understand Concept of central dogma of the cell and gene regulation.	2	0	0	1	1	2
			To know the Principles and applications of various molecular mechanisms	2	0	2	1	2	2
To grasp the significance of Concept of replication, transcription and translation.			2	0	0	1	1	2	
III	17216SRC37	Participation in Scaffold Research	Acquired detailed knowledge of antimicrobial agents, their mechanism of action	3	2	1	3	3	2
			Developed understanding of different types of disinfectants/antiseptics bactericidal and bacteriostatic actions	3	2	1	3	2	1


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			Regulatory practices, biosensors and applications in Pharmaceuticals	3	2	1	2	1	1
			Quality Assurance and Validation	1	1	2	2	2	1
IV	17216PRW41	Project work	Experience from a master's project and international literature.	2	0	0	1	2	3
			Develop ability to independently carry out a complete scientific process.	2	1	1	2	2	3
			Learn about how to write dissertations and proposals for the scientific community.	2	1	1	2	2	3

1- Low, 2-Medium, 3- Higher, 0 No correlation

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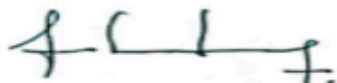
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**School of Arts and Science
Department of Microbiology
17MPMBGEC
2017 Regulation
Program Outcomes and Course outcomes of
M.Phil., Mapping of COs and POs**

PROGRAM SPECIFIC OUTCOME (PSO)	
PSO1	critically evaluate the basic information and ideas from various fields of microbiology.
PSO2	Developing skilled persons in the sector of Disease diagnosis, treatment and prevention.
PSO3	To integrate the knowledge of microbes and improve the quality of life through sustainable microbiological applications.
PSO4	To train the students to develop, design and apply research projects independently to accommodate them in research.
PSO5	To encourage the students to do original research that ends up in new technological or process applications.
PSO6	To enrich the Graduates with solid fundamentals of microbiology and advanced technologies.
PSO7	To equip the students to identify, define and solve the emerging problem

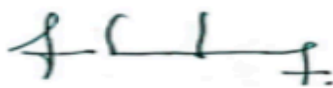
PROGRAMME OUTCOMES (POS)


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PO1	Recognize and think critically towards the science curricula with sound knowledge and theoretical skills by questioning and plausible explanations.
PO2	Motivate themselves and develop an interest in planning and implementation of research
PO3	Handle equipment needed for material preparation, characterization and to analyze and interpret the data with theoretical background and software.
PO4	Practice the teaching-learning process by being the proponent in classroom and laboratory experience

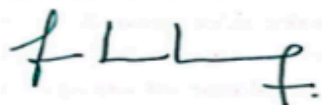
Semester	Course Code	Title of the Course	COs	POS					
				PO1	PO2	PO3	PO4	PO5	PO6
I	173MBC11	Research Methodology	CO1-Understanding research questions and tools	1	1	0	1	2	2
			CO2- Experience in scientific writings	2	1	1	1	2	3
			CO3- Practice in various aspects of scientific publications	3	2	2	1	1	3
			CO4- Inculcation of research ethics	3	1	2	2	1	3
I	173MBC12	Advanced Microbiology	CO1: this paper provide the complete knowledge about microbial taxonomy	2	2	2	1	0	2
			CO2: Learn about molecular characterization of microbes.	2	3	1	1	0	2
			CO3: Gain the knowledge about biodegradation of oils and petroleum products.	3	1	2	1	0	2
			CO4: Learn completely immunology and immune system mechanism	3	3	1	1	1	1
I			CO5: Knowledge about nanotechnology and synthesis of nano-particles from microbes.	1	1	0	1	1	1
	173MBC13A	Microbial	CO1: Knowledge about isolation, purification and preservation	2	1	2	1	2	2


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		Biotechnology	of microorganisms.						
			CO2: Learn about the molecular tools of genetic engineering	3	0	2	3	2	2
			CO3: Know about the production of value added products	3	1	0	2	2	2
			CO4: gain knowledge about antibiotic, vinegar and alcohol production from microbes.	2	0	0	1	2	3
			CO5: Learn biofertilizer and biofuels production (Azospirillum, Azolla, hydrogen, etc...)	2	3	1	2	2	3
I	173MBC13B	Bioprocess and Enzyme Engineering	CO1- Learn about enzymes technology	2	1	3	2	2	3
			CO2- Learn essential biochemical analysis of enzymes	3	0	2	3	2	2
II	173MBC21	Project Work	CO1- Learn scope and history of immunology.	3	1	0	2	2	2
			CO2- Study about the immune system and lymphatic organs.	2	0	0	1	2	3
			CO3- Learn tumor immunology	2	3	1	2	2	3
			CO4- gain knowledge about various immunological techniques (RIA, ELISA, etc...)	3	0	2	3	2	2

1- Low, 2-Medium, 3- Higher, 0 No correlation


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