DR.MGR JANAKI COLLEGE OF ARTS AND SCIENCE FOR WOMEN

DEPARTMENT OF MICROBIOLOGY

B.Sc. Microbiology

(With effect from the Academic Year 2023-24)

TANSCHE REGULATIONS ON LEARNING OUTCOMES- BASED CURRICULUM FRAME WORK FOR UNDER GRADUATE EDUCATION	
Programme :	B.Sc. MICROBIOLOGY
Programme code :	22UGMB
Duration :	3 years [UG]
Programme Outcomes	**PO1: Disciplinary Knowledge:** Acquire detailed knowledge and expertise in all thedisciplines of the subject. **PO2: Communication skills:** Able to communicate scientific information,concepts, experiments and significance. **PO3: Ethical value:** Apply knowledge on ethical and legal based issues **PO4: Analytical reasoning:** Familiarize to collect, analyze and interpret scientificdata. **PO5: Contribution to society:** Solve public issues concerned with public health andsafety for the welfare of the society. **PO6: Scientific reasoning** Solve problems understanding the issues, and findsolutions, in day to day life. **PO7 : Employability skill** Equip with skills, based on current trends and futureexpectations for career development and placements. **PO8: Entrepreneurial skill** Equip with skills and competency to become a successful entrepreneur. **PO9:Research related skill** Proficient skills and competence to make

	aprospective career in Research & Development.
Programme Specific Outcome	PO10: Life long learning Identify the need for skills necessary to be successful in future. PO11: Instrumentation skill Handlelaboratory experiments following safety precautions and standards. **PSO-1: Placement** Prepare the students in all disciplines like agriculture, industry- medical, pharma, dairy, hotel, food and food processing, immunologicals, cosmetics, vermitechnology and water treatment for effective and respectful placement. **PSO-2: Entrepreneur** To create effective entrepreneur by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations. **PSO-3:Research and Development** Design and implement HR systems that comply with good laboratory practices, following ethical values, leading the organization towards growth and development. . **PSO-4: Contribution to society** To contribute to the development of society and produce microbiological products, by collaborating with stake holders, related to the betterment of environment and mankind at the national and global level.

FIRST SEMESTER

Course Category	Course Code	Course	Hours Distribution				Credits	Hours/wee	Marks		
			L	T	P	S			CIA	ESE	Total
Part –I	----	Language-I	L				3	6	25	75	100
Part –II	100L1Z	English Paper-I	L				3	6	25	75	100
Part -III	136C1A	Core-I: Fundamentals of Microbiology and Microbial Diversity	L				5	5	25	75	100
	136C11	Core-II: Practical I - Fundamentals Of Microbiology And Microbial Diversity			P		5	5	40	60	100
	136E1A	Elective-I: Basic And Clinical Biochemistry	L				3	4	25	75	100
Part –IV	136S1A	SEC-1 (NME): Social and Preventive Medicine *	L				2	2	25	75	100
	100L1L	Basic Tamil-I (Other Language Students) *									
	100L1M	Advanced Tamil-I (Other Language Students) *									
	136B1A	Foundation Course	L				2	2	25	75	100
Total							23	30			

*** PART-IV: SEC-1 / Basic Tamil / Advanced Tamil (Any one)**

1. Students who have studied Tamil upto XII STD and also have taken Tamil in Part I shall takeSEC-I.
2. Students who have **not** studied Tamil upto XII STD and have taken any Language other thanTamil in Part-I shall take **Basic Tamil** comprising of Two Courses (level will be at 6th Std.).
3. Students who have studied Tamil upto XII STD and have taken any Language other than Tamil in part 1 shall take advanced tamil compraising of two course.

SECOND SEMESTER

Course Category	Course Code	Course	Hours distribution				Credits	Hours/week	Marks		
			L	T	P	S			CIA	ESE	Total
Part –I	----	Language – II	L				3	6	25	75	100
Part –II	100L2Z	English Paper-II	L				3	6	25	75	100
Part -III	136C2A	Core-III: Microbial Physiology and Metabolism	L				5	5	25	75	100
	136C21	Core-IV: Practical-II Microbial Physiology and Metabolism			P		5	5	40	60	100
	136E2A	Elective-II: Bio Instrumentation	L				3	4	25	75	100
Part –IV	136S2A	SEC-II (NME): Nutrition & Health Hygiene *	L				2	2	25	75	100
	100L2L	Basic Tamil-II (Other Language Students) *									
	100L2M	Advanced Tamil-II (Other Language Students) *									
	136S2B	SEC-III: Sericulture	L				2	2	25	75	100
Total							23	30			

THIRD SEMESTER

Course Category	Course Code	Course	Hours distribution				Credits	Hours/week	Marks		
			L	T	P	S			CIA	ESE	Total
Part –I	----	Language-III	L				3	6	25	75	100
Part –II	200L3Z	English Paper-III	L				3	6	25	75	100
Part -III	236C3A	Core-V: Molecular Biology and Microbial Genetics	L				5	5	25	75	100
	236C31	Core-VI: Practical-III – Molecular Biology and Microbial Genetics			P		5	5	40	60	100
	236E3A	Elective-III: Clinical Laboratory Technology	L				3	3	25	75	100
Part –IV	236S3A	SEC-IV: Organic Farming & Biofertiliser Technology (Entrepreneurial Skill)	L				1	1	25	75	100
	236S3B	SEC-V: Aquaculture	L				2	2	25	75	100
	---	E.V.S.	L					1			
Total							23	30			

FOURTH SEMESTER

Course Category	Course Code	Course	Hours distribution				Credits	Hours/week	Marks		
			L	T	P	S			CIA	ESE	Total
Part –I	----	Language-IV	L				3	6	25	75	100
Part –II	200L4Z	English Paper-IV	L				3	6	25	75	100
Part -III	236C4A	Core-VII: Immunology and Immunotechnology	L				5	5	25	75	100
	236C41	Core-VIII: Practical-IV - Immunology and Immunotechnology			P		5	5	40	60	100
	236E4A	Elective-IV: Food Processing Technology	L				3	3	25	75	100
Part –IV	236S4A	SEC-VI: Vaccine Technology	L				2	2	25	75	100
	236S4B	SEC-VII: Apiculture	L				2	2	25	75	100
	236V4A	E.V.S.	L				2	1	25	75	100
Total							25	30			

FIFTH SEMESTER

Course Category	Course Code	Course	Hours distribution				Credits	Hours/we	Marks		
			L	T	P	S			CIA	ESE	Total
Part -III	336C5A	Core-IX: Bacteriology And Mycology	L				4	5	25	75	100
	336C5B	Core-X: Virology And Parasitology	L				4	5	25	75	100
	336C51	Core-XI: Practical V			P		4	5	40	60	100
	336C52	Core-XII: Group Project - Project with Viva-voce					4	5	40	60	100
	336E5A	Elective-V: Recombinant DNA Technology	L				3	4	25	75	100
	336E5B	Elective-VI: Biosafety& Bioethics	L				3	4	25	75	100
Part –IV	336V5A	Value Education					2	2	25	75	100
	336V5B	Internship/ Industrial visit/Field visit					2	--	25	75	100
Total							26	30			

SIXTH SEMESTER

Course Category	Course Code	Course	Hours distribution				Credits	Hours/week	Marks		
			L	T	P	S			CIA	ESE	Total
Part -III	336C6A	Core-XIII: Environmental And Agriculture Microbiology	L				4	6	25	75	100
	336C6B	Core-XIV: Food, Dairy And Probiotic Microbiology	L				4	6	25	75	100

	336C61	Core-XV: Practical VI			P		4	6	40	60	100
	336E6A	Elective-VII: Pharmaceutical Microbiology	L				3	5	25	75	100
	336E6B	Elective-VIII: Entrepreneurship And Bio-Business	L				3	5	25	75	100
Part –IV	336V6A	Professional competency skill: Microbial Quality Control And Testing	L				2	2	25	75	100
	336V6B	Extension activity					1	--	--	--	---
Total							21	30			

Credit Distribution for UG MICROBIOLOGY

S.No	Part	Course Details	Credit
1	**III**	Core(15x4/5)	68
2		Elective Generic/ Discipline Specific Elective(8x3=24)	24
3	I& II	Language & English (Lang - 4x3=12 Eng - 4x3=12)	24
4	IV	NME(2x2)	4
5		EVS(1x2)	2
6		Value Education(1x2)	2
7		Extension Activity(1x1)	1
8		• Skill Enhancement Course [4 Courses x 2 credits =8 credits] SEC-4 – 1 Credit • Summer internship/ Industrial training (2x1=2 credits) • Foundation course • Professional Competency Skill	9 2 2 2
			140

B.Sc. MICROBIOLOGY

(With effect from the Academic Year 2020-21)

1. Preamble

Microbiology is a wide discipline of biology which encompasses five groups of microorganisms i.e. bacteria, protozoa, algae, fungi, and viruses. It studies their interaction with their environments as well as how these organisms are harnessed in human endeavour and their impact on society. The study has its extensions in various other conventional and advanced fields of biology by employing microbes as study models. Since the inception of microbiology as a branch of science, it has remained an ever-expanding field of active research, broadly categorized as pure and applied science.Knowledge of different aspects of Microbiology has become crucial and indispensableto the society. Study of microbes has become an integral part of education and human progress. There is a continuous demand for microbiologists as work force in education, industry and research. Hence Microbiological tools and techniques are used in almost allfields which are indispensable for people working in fields like Agriculture, FoodIndustry, Medical Sciences, Environmental Science and Pharmaceutical Science etc…The syllabi for the three-year B.Sc. degree course in Microbiology are framed in such a way that the students at the end of the course, can be adept at Microbiological techniques for pursuing higher studies and can also apply Microbiological methods judiciously to a variety of industrial needs.

2. Programme Learning Outcome

2.1 Nature and Extant of the Programme

The undergraduate programme in Microbiology is the first level of college or university degree in the country as in several other parts of the world. After obtaining this degree, a microbiologist may enter into the job market or opt for undertaking furtherhigher studies in the subject. After graduation the students may join industry, academia, or public health departments and play their role as microbiologists in a useful manner contributing their knowledge to the welfare of the society. Thus the undergraduate level degree in microbiology must prepare the students for all these objectives. The LOCF curriculum has been developed encompassing all the diversified aspects of Microbiology with reasonable depth of knowledge and skills so to as to specialize them in the various aspects of the subject . it also equips them with the expected professional expertise

2.2 Aim of the Programme

The aim of the undergraduate degree in Microbiology is to make students knowledgeable about the various basic concepts in a wide ranging context which involve the use of knowledge and skills of Microbiology. Their understanding, knowledge and skills in Microbiology needs to be developed through a thorough teaching learning process in the class, practical skills through the laboratory work, their presentation and articulation skills, exposure to industry and interaction with industry experts.

2.3 Graduate Attributes

The students graduating in this degree must have an intricate knowledge of the fundamentals of Microbiology as applicable to wide ranging contexts. They should havethe appropriate skills of Microbiology so as to perform their duties as microbiologists. They must be able to analyze the problems related to microbiology and come up with most suitable solutions. As microbiology is an interdisciplinary subject the students might have to take inputs from other areas of expertise. So the students must develop thespirit of team work. Microbiology is a very dynamic subject and practitioners might have to face several newer problems. To this end, the microbiologists must be trained to be innovative to solve such newer problems. Several newer developments are taking place in microbiology. The students are trained to pick up leads and see the possibilityof converting these into products through entrepreneurship. Furthermore, the students are made to interact with industry experts so that they may able to see the possibility of their transition into entrepreneurs. They are also made aware of the requirements of developing a Microbiology enterprise by having knowledge of patents, copyrights and various regulatory processes to make their efforts a success. Besides attaining the attributes related to the profession of Microbiology, the graduates in this discipline should also develop ethical awareness which is mandatory for practising a scientific discipline including ethics of working in a laboratory and ethics followed for scientific publishing of their research work in future. The students graduating in microbiology should also develop excellent communication skills both in the written as well as spoken language which is indispensible for them to pursue higher studies from some of the best and internationally acclaimed universities and research institutions spread across the globe.

3. COURSE STRUCTURE:

FIRST SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part-I	Language Paper – I	6	3	25	75	100
Part-II	**BP2-ENG01-Communicative English I**	**3**	**3**	**50**	**50**	**100**
Part-III	BMY-DSC01: General Microbiology and Microbial Physiology	6	4	25	75	100
	BMY-DSC02: Major Practical-I (General Microbiology and Microbial Physiology)	3	4	40	60	100
	BMY-DSA01: Biochemistry (Theory)	5	3	25	75	100
	BMY-DSAP1: Biochemistry (Practical)	3	2	40	60	100
Part-IV	*Basic Tamil/Adv. Tamil/NME-I*	-	2	25	75	100
	BP4-ELSC 01-English for Life Sciences I	**4**	**4**	**50**	**50**	**100**

*Choose any one paper from the other Department.

SECOND SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part-I	Language Paper – II	6	3	25	75	100
Part-II	**BP2-ENG02-Communicative English II**	**3**	**3**	**50**	**50**	**100**
Part-III	BMY-DSC03: Basic and Applied Immunology	6	4	25	75	100
	BMY-DSC04: Major Practical II (Basic and Applied Immunology)	3	4	40	60	100
	BMY-DSA02: Bioinstrumentation (Theory)	5	3	25	75	100
	BMY-DSAP2: Bioinstrumentation (Practical)	3	2	40	60	100
Part-IV	Basic Tamil/Adv. Tamil/ NME-II	-	2	25	75	100
	BP4-ELSC 02-English for Life Sciences II	**4**	**4**	**50**	**50**	**100**

*Choose any one paper from the other Department

THIRD SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part-I	Language Paper – III	6	3	25	75	100
Part-II	BP2-ENG03-Language Through Literature- I	6	3	50	50	100
Part-III	BMY-DSC05: Molecular Biology	6	4	25	75	100
	BMY-DSC06: Major Practical III (Molecular Biology)	3	4	40	60	100
	BMY-DSA03: Clinical Lab Technology (Theory)	6	3	25	75	100
	BMY-DSAP3: Clinical Lab Technology (Practical)	3	2	40	60	100
Part-IV	Environmental Studies	-	Examination will be held in Semester IV			
	Soft Skills	-	3	50	50	100

FOURTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part-I	Language Paper – IV	6	3	25	75	100
Part-II	BP2-ENG03-Language Through Literature- II	6	3	50	50	100
	BMY-DSC07: Soil and Agricultural Microbiology	6	4	25	75	100

Part-III	BMY-DSC08: Major Practical IV (Soil and Agricultural Microbiology)	3	4	40	60	100
	BMY-DSA04: Clinical Biochemistry (Theory)	6	3	25	75	100
	BMY-DSAP4: Clinical Biochemistry (Practical)	3	2	40	60	100
Part-IV	Environmental Studies	-	2	25	75	100
	Soft skills	-	3	50	50	100

FIFTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. marks	Total
Part-III	BMY-DSC09: Medical Bacteriology	6	4	25	75	100
	BMY-DSC10: Medical Mycology and Parasitology	6	4	25	75	100
	BMY-DSC11: Medical Virology	6	4	25	75	100
	BMY-DSC12: Major Practical V (Medical Bacteriology, Mycology, Parasitology and Virology)	6	4	40	60	100
	BMY-DSE01: Biotechnology and Genetic Engineering	5	5	25	75	100
Part-IV	Value Education	1	2	25	75	100

SIXTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part-III	BMY-DSC13: Environmental Microbiology	6	4	25	75	100
	BMY-DSC14: Food and Dairy Microbiology	6	4	25	75	100
	BMY-DSC15: Major Practical VI (Environmental, Food and Dairy Microbiology)	6	4	40	60	100
	BMY-DSE02: Industrial and Pharmaceutical Microbiology	6	5	25	75	100
	BMY-DSE03: Microbial Marketable Products	5	5	25	75	100
Part-V	Extension Activities	1	1			

NOTE: "The University Practical examinations for both core and allied of B.Sc. Microbiology will be conducted only at the end of the academic year (i.e. even semesters only)"

LEARNING OUTCOME

Programme Name		BSC MICROBIOLOGY	LINK
Shift		I	
Course Name	Course Code	Course Outcome	
SEMESTER I			
CORE PAPER-1 FUNDAMENTALS OF MICROBIOLOGY AND MICROBIAL DIVERSITY	22MBUGCT1	1. Study the historical events that led to the discoveries and inventions and understand the Classification of Microorganisms. 2. Gain Knowledge of detailed structure and functions of prokaryotic cell organelles. 3. Understand the various microbiological techniques, different types of media, and techniques involved in culturing microorganisms. 4. Explain the principles and working mechanism of different microscopes/Microscope, their function and scope of application. 5. Understand the concept of asepsis and modes of sterilization and disinfectants.	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/136C1A.pdf?1998467936
PRACTICAL PAPER -1 FUNDAMENTALS OF MICROBIOLOGY AND MICROBIAL DIVERSITY	22MBUGCP1	1. Practice sterilization methods; learn to prepare media and their quality control. 2. Learn streak plate, pour plate and serial dilution and pigment production of microbes. 3. Understand Microscopy methods, different Staining techniques and motility test. 4. Observe culture characteristics of microorganisms. 5. Study on Microbial Diversity using Hay Infusion Broth-Wet mount	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/136C11.pdf?106337343
ELECTIVE PAPER-1 BASIC AND CLINICAL BIOCHEMISTRY	22MBUGDE1	1. Explain the structure, classification , biochemical functions and significance of carbohydrates and lipids 2. Differentiate essential and non-essential amino acids, biologically important modified amino acids and their functions, Illustrate the role, classification of Proteins and recognize the structural level organization of proteins, its functions and denaturation. 3.Assess defective enzymes and Inborn errors. Recognize diseases related to carbohydrate and lipid metabolism. 4.Discuss and evaluate the pathology of aminoacid metabolic disorders. 5. Appraise the imbalances of enzymes in	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/136E1A.pdf?71091631

		organ function and relate the role of Clinical Biochemistry in screening and diagnosis.	
SEC-1 (NME): Social and Preventive Medicine	22MBUG SEC1	1. Identify the health information system 2. Associate various factors with health management system 3.Choose the appropriate health care services 4. Appraise the role of preventive medicine in community setting 5. Recommend the usage of alternate medicine during outbreaks	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/136S1A.pdf?878142116
SEMESTER II			
IMMUNOLOGY & MICROBIAL GENETICS	SN22A	1. Understanding the key concepts in immunology and overall organization of the immune system. 2. Understanding the structure of antigen and antibody. 3. Comprehend the salient features of antigen antibody reaction & its uses in diagnostics and various other studies. 4. Illustratively assess hypersensitivity and autoimmune disorders. 5. Analyze graft rejection in transplantation by learning the MHC molecules and their functions. • Learn about immunization and their preparation and its importance	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC03.pdf?1328454580
ALLIED BIOCHEMISTRY - II	SN32A	1. Acquire theoretical knowledge about basic laboratory equipment. 2. Use the principles and applications of centrifugation and electrophoretic methods in laboratory. 3. Demonstrate the use of spectroscopic techniques. 4. Attain knowledge to use chromatographic techniques in research. 5. Apply Biosensors and radioisotopic analysis in research.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSA01.pdf?1264351389

ALLIED PAPER – II-BIOINSTRUMENTATION		1.Acquire theoretical knowledge about basic laboratory equipments. 2.Use the principles and applications of centrifugation and electrophoretic methods in laboratory. 3.Demonstrate the use of spectroscopic techniques. 4.Attain knowledge to use chromatographic techniques in research. 5.Apply Biosensors and radioisotopic analysis in research.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSA01.pdf?1264351389
SEMESTER III			
MOLECULAR BIOLOGY	SN23A	1. Understand the chemical components of DNA and various forms of DNA. Know about the organization of prokaryotic and eukaryotic genome. 2. Understand the DNA replication, repair and recombination in prokaryotes with that of eukaryotes. 3. To know about RNA synthesis and processing and function of different types of RNA. 4. To know about protein synthesis and inhibition factors of protein synthesis. 5. To Understand prokaryotic and eukaryotic gene expression and control of gene expression.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC05.pdf?1069329009
ALLIED-CLINICAL LAB TECHNOLOGY	SN33A	1. Outline the structure of organization of clinical laboratory and safety regulation 2. Impart knowledge on biological specimen collection 3. Describe haematology process 4. Focus on basic concepts routine urine analysis 5. Study about Laboratory Standard Accreditation Boards	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSA03.pdf?810214327
SEMESTER IV			

SOIL & AGRICULTURAL MICROBIOLOGY	SN24A	1. Upon successful completion of this course, the student should be able to understand types, structure, formation and microbial flora of soil. 2. Understand the role soil microflora in biogeochemical cycle in the environments. 3. Know about the mechanism and responsibility of microbial interaction with microbes, plant, animal and insects. 4. Be familiar with the role of microorganism in nitrogen fixation and know about the types and mode of action of biopesticides. 5. Know about defense mechanism, etiology, epidemiology and management various plant diseases caused by microorganisms.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC07.pdf?1144961181
ALLIED-CLINICAL BIOCHEMISTRY	SN34A	1. Provide knowledge on blood glucose homeostasis. Maintenance of blood glucose by hormone 2. Discuss the Liver function 3. Study the function of amino acid and Kidney function tests - Inulin, urea and creatinine clearance tests 4. Learn lipid mechanisms and abnormal levels of these lipids in diseases. 5. Learn about hormonal disorders - Acromegaly, Cushing's syndrome, Addison's disease, Goitre, Grave's disease.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSA04.pdf?2057023061
SEMESTER V			
MEDICAL BACTERIOLOGY	SN25A	1. Knowledge of various techniques of sample collection, transport and processing for laboratory diagnosis of bacterial diseases. 2. Knowledge of basic and general concepts of causation of disease by the pathogenic microorganisms. 3. Information for the assessment of their severity including the broad categorization of the methods of diagnosis. 4. Insights to practical aspects of antibiotic sensitivity testing. 5. Knowledge of various zoonotic infections, ways to tackle them and use biosafety precautions	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC09.pdf?1498037668

MEDICAL MYCOLOGY & PARASITOLOGY	SN25B	1. Information for collection of different clinical samples, their transport, culture and examination by microscopy, staining and biochemical methods for the diagnosis of fungal and protozoan diseases. 2. Knowledge of basic and general concepts of causation of disease by the pathogenic microorganisms and the various parameters of assessment of their severity including the broad categorization of the methods of diagnosis. 3. Insights to treatment options of fungal and protozoan diseases. 4. Knowledge about the importance of protozoan in the intestine. 5. Knowledge of Nematodes as infectious agent.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC10.pdf?1136166693
MEDICAL VIROLOGY	SN25C	(a) Knowledge about viruses and the chemical nature of viruses, different types of viruses infecting animals, plants and bacteria - Bacteriophages (b) Understanding about the emerging viral diseases. (c) Information about the role of viruses in the causation of the cancer. (d) Gain wider knowledge on clinical aspects and related implications of viral diseases. (e) Knowledge on viral vaccines and antiviral drugs.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC11.pdf?102427068
BIO TECHNOLOGY AND GENETIC ENGINEERING	SN45A	1. Acquire knowledge about the History and the development of biotechnology and genetic engineering with the contribution of the scientist 2. Equipped with various production methods of the widely used biotechnological products 3. Gain basic understanding of role of the enzymes as a tool in Biotechnology 4. Learn the significance of vector, as atool in the construction of genetic modification of the organisms. 5. Be familiarize with understanding of use of biotechnology and genetic engineering in health,agriculture and industries.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSE01.pdf?1749749128
SEMESTER VI			

ENVIROMENTAL MICROBIOLOGY	SN26A	1. The basic knowledge about the natural ecosystem and role of microorganisms in the eco system 2. An understanding of the composition of air, air borne organisms and how the organisms causes the diseases and its preventive measures 3. Knowledge about different types of microorganism in water causes of water pollution, and methods to analyze the quality of water and treatment for purification of drinking water, hygienic practices to control the water borne diseases. 4. An understanding the role and application of microorganisms to degrade the environmental contaminants. and microbes involved in solid and liquid waste management. 5. Knowledge about the role of microbes in biodegradation and bioremediation of heavy metals and hydrocarbon etc.,	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC13.pdf?1767096614
FOOD & DAIRY MICROBIOLOGY	SN26B	1. Gain knowledge about food as a substrate for various microbes, the role of factors and its importance 2. Understand about the principles and application of different types of food preservation technique,chemical preservative and its advantages and disadvantages 3. Equip themselves the pragmatic understanding of food spoilage 4. Acquire a thorough understanding of food borne diseases, testing methods, and preventive technique. 5. Learn about the various fermented product and its various stage spoilage	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSC14.pdf?1603543225
INDUSTRIAL AND PHARMACEUTICAL MICROBIOLOGY	SN46A	1. Understand the basic knowledge about the fermentationprocess and the requirements of process. 2. Gain the basic knowledge about the designing of fermentation 3. Acquire the knowledge about the production of antibiotic and enzymes 4. Equip themselves about knowledge of the various separation procedures in pharmaceutical industries 5. Understand about the principles of raw material used in pharmaceuticals and	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSE02.pdf?1184158163

		validation and sterility of pharmaceutical product	
MICROBIAL MARKETABLE PRODUCTS	SN46B	1. Acquire the knowledge about Spirullina and its cultivation 2. Gain in depth knowledge about edible mushroom and its cultivation 3. Acquire a thorough understanding of the importance of probiotics in human health and their production on a large scale 4. Get an awareness of the availability of natural pigment and its application, Bio fertilizers and their application 5. Imbibe knowledge on the various marketing strategy such as patenting, trade mark, marketing, license procurement etc.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMY-DSE03.pdf?1797460734

ASSESSMENT PATTERN
CORE PAPERS, ELECTIVE PAPERS AND EXTRA DISCIPLINARY PAPERS

INTERNAL ASSESSMENT: 25 Marks
EXTERNAL ASSESSMENT: 75 Marks
TOTAL: 100 Marks

INTERNAL ASSESSMENT PATTERN

Attendance (5 Marks)			**Seminar**	**Assignment**	**Test**	**Total**
90-100	**80-90**	**70-80**	**(5 Marks)**	**(5 Marks)**	**(10 Marks)**	**25**

EXTERNAL ASSESSMENT
End Semester External University Examination: 75 MARKS
Duration 3 Hours

- Part -A-(10X1=10) Answer any 10 out of 12 Questions 1-12
- Part -B-(5X5=25) Answer any 5 out of 7 Questions 13-19
- Part -C-(3X10=30) Answer any 3 out of 5 Questions 20-24

QUESTION PAPER PATTERN

Subject Name	**Marks**	**Total**
Language,English, Core, Allied and NME Papers	PART- A: 10 out of 12 = 10 x 2 = 20 marks	75
	PART- B: 5 out of 7 = 5 x 5 = 25 marks	
	PART- C: 3 out of 5 = 3 x 10 = 30 marks	