

“Social Transformation through Dynamic Education”



Bharati Vidyapeeth (Deemed to be University), Pune
YASHWANTRAO MOHITE COLLEGE OF ARTS, SCIENCE & COMMERCE
Erandwane, Pune- 411 038

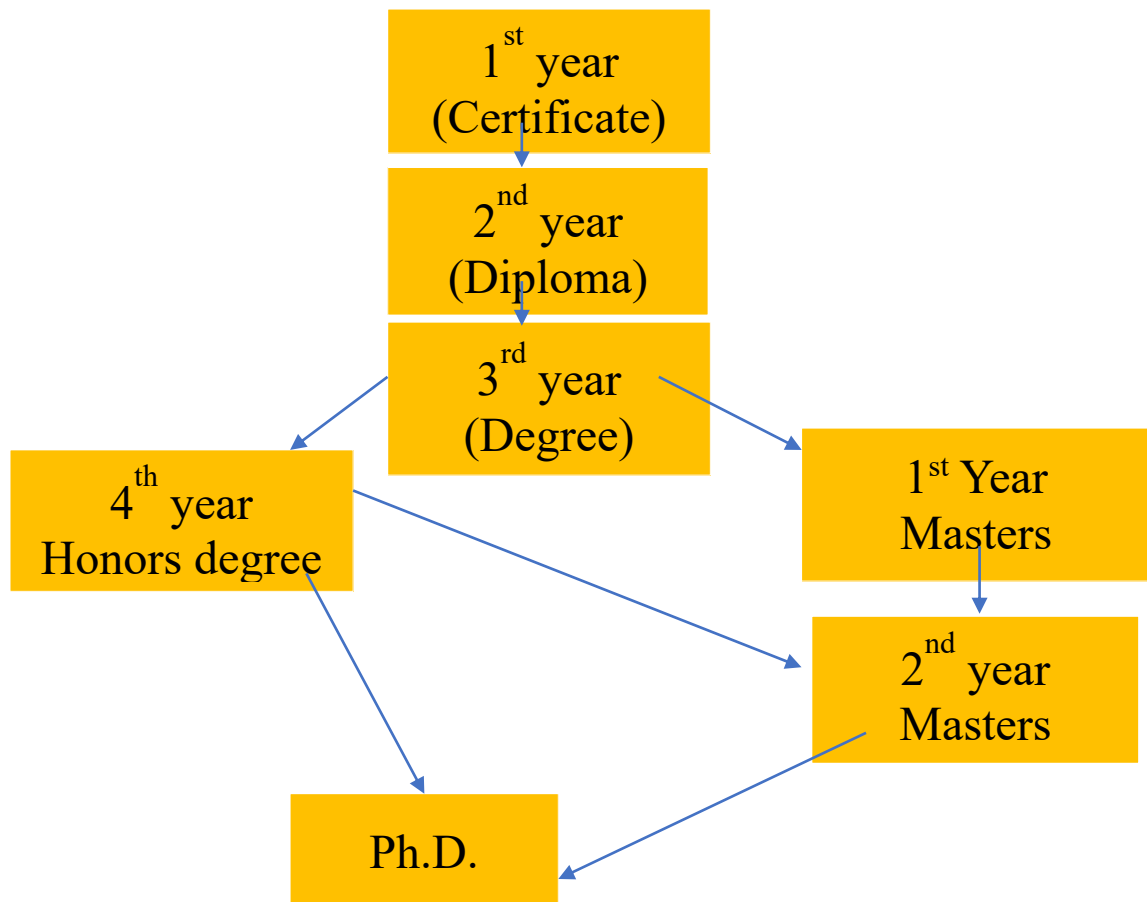
Accredited with 'A+' Grade (2017) by NAAC, 'A' Grade University Status by MHRD,

B.Sc. Microbiology Course Structure

As per NEP 2020

(To Be Implemented From Academic Year 2024-25)

Structure of Higher Education in NEP 2020



B.Sc. Course: Credit Distribution

Level	Sem	Major Subject				Minor Sub.		OE/GE		VSC,SEC		AEC,VEC,IKS			OJT,FP,CEP,CC,RP					Cu. Cr	Degree/Cu.Cr
		DSC		DSE		T	P	T	T	VSC	SEC	AEC	VEC	IKS	OJT	FP	CEP	CC	RP		
		T	P	T	P																
4.5	I	2+2	2	-	-	-	-	2	2	2	2	2	2	2	-	-	-	2	-	22	44 UG Certificate
	II	2+2	2	-	-	2	0	2	2	2	2	2	2	-	-	-	-	2	-	22	
Exit option : With award of UG certificate with 44 credits and additional 4 credits of internship																					
5	III	2+2	2	-	-	2	2	2	2	2	0	2	0	0	0	2	0	2	-	22	88 UG Diploma
	IV	2+2	2	0	0	2	2	2	2	0	2	2	0	0	0	0	2	2	-	22	
Exit option : With award of UG Diploma with 88 credits and additional 4 credits of internship																					
5.5	V	2+2 +2	2 + 2	2	2	2	2	-	-	2	0	0	0	0	0	2	0	0	0	22	132 UG Degree
	VI	2+2 +2	2 + 2	2	2	2	2	-	-	-	-	-	-	-	4	-	-	-	-	22	
Exit option : With award of UG Degree with 132 credits																					
6	VII	2+2 2+2	2 + 2	2	2	2+2 (RM)		-	-	2	-	-	-	-	-	-	-	-	-	22	176 UG Honors
	VIII	2+2 2+2	2 + 2	2	2	-	-	-	-	-	-	-	-	-	6	-	-	-	-	22	
Four Year UG Honors Degree with 176 credits																					
6	VII	2+2 2+2	2	2	2	2+2 (RM)		-	-	-	-	-	-	-	-	-	-	-	4	22	176 UG Honors with Research
	VIII	2+2 2+2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	8		
Four Year UG Honors with Research Degree with 176 credits																					

B.Sc. with Microbiology as Major Subject (Three / Four Year Course)
List of Major (DSC & DSE) Courses

Year	Sem.	Course Code	Course Name	Credits	No. of Lecture Hrs.
I	I	MJ-MB11	Fundamentals of Microbiology & Microbial Diversity	2	30
		MJ-MB12	Basic Techniques in Microbiology	2	30
		MJ-MB13	Practical Course I	2	60
	II	MJ-MB21	Bacteriology	2	30
		MJ-MB22	Basic Biochemistry and Cytoplasmic Inclusions	2	30
		MJ-MB23	Practical Course – II	2	60
II	III	MJ-MB31	Microbial Genetics	2	30
		MJ-MB32	Microbial Physiology	2	30
		MJ-MB33	Practical Course - III	2	60
	IV	MJ-MB41	Microbial Metabolism	2	30
		MJ-MB42	Applied Microbiology	2	30
		MJ-MB43	Practical course – III	2	60
III	V	MJ-MB51	Virology	2	30
		MJ-MB52	Genetics of Prokaryotes	2	30
		MJ-MB53	Enzymology	2	30
		MJ-MB54	Practical Course - V	2	60
		MJ-MB55	Practical Course - VI	2	60
		Elective (Select any One)			
		EL-MB51A	a) Food & Dairy Microbiology	2	30
		EL-MB51B	b) -		
	EL-MB51C	c) -			
	EL-MB57	Practical Course -VIII	2	60	
	VI	MJ-MB61	Medical Microbiology	2	30
		MJ-MB62	Immunology	2	30
		MJ-MB63	Industrial Microbiology	2	30
		MJ-MB64	Practical Course -IX	2	60
		MJ-MB65	Practical Course - X	2	60
		Elective (Select any One)			
		EL-MB61A	a) Agricultural & Environmental Microbiology	2	30
		EL-MB61B	b) -		
EL-MB61C	c) -				
EL-MB62	Practical Course -XII	2	60		
IV	VII	MJ-MB71	-	2	30
		MJ-MB72	-	2	30
		MJ-MB73	-	2	30
		MJ-MB74	-	2	30
		MJ-MB75	Practical Course -XIII	2	60
		MJ-MB76	Practical Course -XIV	2	60
		Elective (Select any One)			30
		EL-MB77	-	2	30
		EL-MB78	Practical Course -XV	2	60
	VIII	MJ-MB81	-	2	
		MJ-MB82	-	2	
		MJ-MB83	-	2	
		MJ-MB84	-	2	
		MJ-MB85	Practical Course XVI	2	60
		MJ-MB86	Practical Course XVII	2	60
		Elective (Select any One)			30
		EL-MB87	-	2	30
		EL-MB88	Practical Course XVIII	2	60

B.Sc. with Chemistry / Microbiology as a Major

Level	Sem	Major		Minor	OE/GE	VSC, SEC		AEC, VEC, IKS			OJT, FP, CEP, CC, RP				
		DSC	DSE			VSC	SEC	AEC	VEC	IKS	OJT	FP	CEP	CC	RP
4.5	I	MJ-MB11 MJ-MB12 MJ-MB13	-	-	OE-11 OE-12	Botany	Zoology	English/ Marathi	RER	IKS	-	-	-	NSS/ NCC/ Sports /Yoga	-
		OR													
	II	MJ-CH11 MJ-CH12 MJ-CH13	-		OE-11 OE-12	Physics	Maths	English/ Marathi	RER	IKS	-	-	-	NSS/ NCC/ Sports /Yoga	-
		OR													
	II	MJ-MB21 MJ-MB22 MJ-MB23	-	Botany/ Zoology/	OE-21 OE-22	Zoology	Botany	English/ Marathi	EVS	-	-	-	-	NSS/ NCC/ Sports /Yoga	-
		OR													
II	MJ-CH11 MJ-CH12 MJ-CH13	-	Phy/ Maths/ Stat/ Botany/ Zoology	OE-21 OE-22	Maths	Physics	English/ Marathi	EVS						NSS/ NCC/ Sports /Yoga	-

B.Sc. with Microbiology as a Major

Level	Sem	Major		Minor	OE/GE	VSC, SEC		AEC, VEC, IKS			OJT, FP, CEP, CC, RP				
		DSC	DSE			VSC	SEC	AEC	VEC	IKS	OJT	FP	CEP	CC	RP
4.5	I	MJ-MB11 MJ-MB12 MJ-MB13	-	-	OE-1 OE-2	Botany	Zoology	English/ Marathi	RER	IKS – General	-	-	-	NSS/ NCC/ Sports/ Yoga	-
	II	MJ-MB21 MJ-MB22 MJ-MB23	-	Botany/ Zoology	OE-1 OE-2	Zoology	Botany	English/ Marathi	EVS	-	-	-	-		-

List of Open Electives Offered by the Dept. of Microbiology

Year	Sem.	Course Code	Course Name	Credits	No. of Lecture Hrs.
I	I	OE-MB11	Microbial Technology for Sustainable Development - I	2	30
		OE-MB12	Microbial Technology for Sustainable development - II	2	30
	II	OE-MB21	Common Microbial Diseases, Public Health & Hygiene- I	2	30
		OE-MB22	Common Microbial Diseases, Public Health & hygiene- II	2	30
II	III	OE-MB31	Food Microbiology & Food Preservation Technology -I	2	30
		OE-MB32	Food Microbiology & Food Preservation Technology-II	2	30
	IV	MJ-MB41	Agricultural & Environmental Microbiology -I	2	30
		MJ-MB42	Agricultural & Environmental Microbiology -II	2	30

List of Open Electives for Students in Microbiology

Year	Sem.	Course Code	Course Name	Credits	No. of Lecture Hrs.
I	I	OE-11	Geomorphology	2	30
		OE-12	Climatology	2	30
	II	OE-21	Introduction to Cartography	2	30
		OE-22	Land Surveying	2	30
II	III			2	30
				2	30
	IV			2	30
				2	30

List of Open Electives (OE) Offered by Science Faculty for First Year B.Sc

Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
Microbiology	OE-MB11	Microbial Technology for Sustainable Development - I	2	30
	OE-MB12	Microbial Technology for Sustainable development - II	2	30
	OE-MB21	Common Microbial Diseases, Public Health & Hygiene- I	2	30
	OE-MB22	Common Microbial Diseases, Public Health & hygiene- II	2	30
Chemistry		Chemistry in Everyday Life	2	30
		Industrial Chemistry	2	30
Physics		Maintenance & repair of electric & domestic appliances	2	30
		Handling of electronic instruments	2	30
Botany		Garden & Nursery Management	2	30
Zoology		Bio economics	2	30
		Environmental Monitoring & Management	2	30
Maths		Basic Algebra	2	30
Computer Sc		Applications of IT in Business	2	30
		Electronics Instrumentation	2	
		Hands on Electronics Instrumentation	2	
		Digital Systems : From Logic gates to processors	2	
		Practical on digital systems	2	

List of Vocational Skill Courses (VSC) for First Year B.Sc

Offering Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
Microbiology			2	30
			2	30
			2	30
			2	30
Chemistry			2	30
			2	30
			2	30
Physics			2	30
			2	30
Botany	VSC11	Horticulture & Gardening	2	30
Zoology	VSC21	Bee Keeping	2	30
Maths	VSC	Operation Research	2	30
Computer Sc			2	30

List of Skill Enhancement Courses (SEC) for First Year B.Sc

Offering Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
Microbiology			2	30
			2	30
			2	30
			2	30
Chemistry			2	30
			2	30
			2	30
Physics			2	30
			2	30
Botany	SEC11	Floriculture	2	30
Zoology	SEC21	Ornamental Fishery	2	30
Maths			2	30
Computer Sc			2	30

List of Value Education Courses (VEC) for First Year B.Sc

Offering Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
	VEC11	Renewable Energy Resources (RER)	2	30
	VEC21	Environmental Studies (EVS)	2	30

List of Ability Enhancement Courses (AEC) for First Year B.Sc

Offering Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
English	AEC11A	Communication English	2	30
Marathi	AEC11B	Marathi	2	30
English	AEC21A	Communication English	2	30
Marathi	AEC21B	Marathi	2	30

List of Value Education Courses (VEC) for First Year B.Sc

Offering Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
Physics	VEC11	Renewable Energy Resources (RER)	2	30
IDS	VEC21	Environmental Studies (EVS)	2	30
			2	30
			2	30

List of Indian Knowledge System Courses (IKS) for First Year B.Sc

Offering Department	Course Code	Course Name	Credits	No. of Lecture Hrs.
			2	30
			2	30

B.Sc. with Microbiology as a Major

Eligibility for admission to B.Sc. degree programme :

- Higher Secondary School Certificate Examination (10+2) of the Maharashtra State Board or its equivalent examination of any other statutory Board/University with English and with any three Science subjects such as (i) Physics (ii) Chemistry (iii) Biology (iv) Mathematics (v) Geography (vi) Geology etc
- Higher Secondary School Certificate Examination (10+2) with English and with any one of the following vocational subjects in technical group of +2 levels.
- Diploma in Pharmacy, Diploma in Engineering (polytechnic) or its equivalent examination recognized by MBTE / **MBVE** , Mumbai or its equivalent of any other statutory Board or University.

Semester I

Sr. No.	Course Code	Title	Credits
1	MJ-MB11	Fundamentals of Microbiology & Microbial Diversity	2
2	MJ-MB12	Basic Techniques in Microbiology	2
3	MJ-MB13	Practical Course I	2
4	OE-11	Geomorphology	2
5	OE-11	Climatology	2
6	VSC-11	Horticulture & Gardening	2
7	SEC-11	Ornamental Fishery	2
8	AEC-11	Communication English / Marathi	2
9	VEC-11	Renewable Energy Resources	2
10	IKS	IKS for Creating Global Well Being	2
11	CC	NSS/NCC/Sports/Cultural/Yoga	2
		Total	22

Semester II

Sr. No.	Course Code	Title	Credits
1	MJ-MB21	Bacteriology	2
2	MJ-MB22	Basic Biochemistry and Cytoplasmic Inclusions	2
3	MJ-MB23	Practical Course – II	2
4	MR-21A MR-21B MR-21C	Botany / Zoology / Chemistry (Select Any One)	2
5	OE-21	Introduction to Cartography	2
6	OE-21	Land Surveying	2
7	VSC-21	Zoology	2
8	SEC-21	Botany	2
9	AEC-21A AEC-21B	Communication English / Marathi (Select Any One)	2
10	VEC-21	EVS	2
11	CC	NSS/NCC/Sports/Cultural/Yoga (Select Any One)	2
		Total	22

Scheme of Examination:

● **University Terms:** The dates for the commencement and conclusion of the First and the Second terms shall be fixed by the University authorities. The terms can be kept by students, who have registered their names with the University.

● **Scheme of Examination:** The assessment of students in the academic session 2023-24 and thereafter shall be based on-

- (a) University Examinations (UE)
- (b) Internal Assessment (IA)
- (c) Choice Based Credit System (CBCS) and
- (d) Semester Grade Point Average (SGPA) and Cumulative Grade Point Average System (CGPA).

● Weightage for Assessments (in Percentage)

Course Type	Formative / Internal Assessment	Summative /University
Theory	20 %	80 %
Practical	20 %	80 %
Projects	20 %	80 %

- For each course of 2 credits, there will be Internal Assessment of 10 marks and the University Examination of 40 marks of 2 hours duration at the end of each semester.
- For the course of 4 credits, there will be Internal Assessment of 20 marks and the University Examination of 80 marks of 3 hours duration at the end of each semester.
- Minimum marks for passing in each course will be 35 % (14 out of 40 and 4 out of 10)
- There will be a combined passing in each course with internal and university examination.
- The internal assessment may be in the form of –Home Assignment / Tutorial / Unit Test / Presentation / Seminar / Mid-semester

Syllabus for B.Sc. with Microbiology as a Major Subject

Program Outcomes:

On successful completion of the B.Sc. with Microbiology as a Major Programme -

- The students will have full knowledge with respect to the subject and its practicable applicability.
- They will have the understanding of basic and advanced concepts in Microbiology.
- They will be exposed to various emerging areas of Microbiology.
- They will prepare for further studies, helping in their bright career in the subject.
- They will have exposure to different processes used in industries and in research field.
- They will have the ability to apply the knowledge of microbiology in day to day life.
- They will be able to accept the challenges in life sciences.
- They will have acquired skills required in various industries, research labs and in the field of human health.
- Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.
- Understand the applications in pharmaceutical, food, dairy agriculture, beverages, nutraceutical industries.
- Understand the distribution, diversity and physiology of microorganisms and demonstrate the skills in aseptic handling of microbes including isolation, identification and maintenance.
- Competent to apply the knowledge gained for conserving the environment and resolving the environment related issues.
- Learning and practicing professional skills in handling microbes and contaminants in laboratories and production sectors.
- Exploring the microbial world and analyzing the specific benefits and challenges.
- Applying the knowledge acquired to undertake studies and identify specific remedial measures for the challenges in health, agriculture, and food sectors.
- Thorough knowledge and application of good laboratory and good manufacturing practices in microbial quality control.
- Understanding biochemical and physiological aspects of microbes and developing broader perspective to identify innovative solutions for present and future challenges posed by microbes.
- Understanding and application of microbial principles in forensic and working knowledge about clinical microbiology.
- Demonstrate the ability to identify ethical issues related to recombinant DNA technology, GMOs, intellectual property rights, biosafety and biohazards.
- Demonstrate the ability to identify key questions in microbiological research, optimize research Methods , and analyze outcomes by adopting scientific methods, thereby improving the employability.
- Enhance and demonstrate analytical skills and apply basic computational and statistical techniques in the field of microbiology.