

ANNEXURE 18B16

V.V. VANNIAPERUMAL COLLEGE FOR WOMEN



(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

CHOICE BASED CREDIT SYSTEM

REGULATIONS AND SYLLABUS

(with effect from Academic Year 2018 - 2019)

V.V. Vanniaperumal College for Women, Virudhunagar, established in 1962, offers 19 UG Programmes, 14 PG Programmes, 6 M.Phil. Programmes and 3 Ph.D. Programmes. All these programmes, except Ph.D. Programmes, have been framed as per the guidelines given by UGC under Choice Based Credit System (CBCS).

The Departments of Commerce, English and History upgraded as Research Centres offer Ph.D. Programmes as per the norms and regulations of Madurai Kamaraj University, Madurai and do not come under the purview of CBCS.

CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed Courses. The CBCS is followed as per the guidelines formulated by the UGC. The Students' performance will be evaluated based on the uniform grading system. Computation of the Cumulative Grade Point Average (CGPA) is made to ensure uniformity in evaluation system.

List of Programmes in which CBCS/Elective Course System is implemented

UG PROGRAMMES

- Arts & Humanities : History (E.M. & T.M.), English and Tamil
- Physical & Life Sciences : Mathematics, Zoology, Chemistry, Physics, Biochemistry, Home Science - Nutrition and Dietetics, Costume Design and Fashion, Microbiology, Biotechnology, Computer Science, Information Technology and Computer Applications.
- Commerce & Management : Commerce, Commerce with Computer Applications, Commerce with Professional Accounting
Business Administration

PG PROGRAMMES

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Physics, Biochemistry, Food Processing & Quality Control, Chemistry, Zoology, Computer Science, Information Technology
Commerce & Management	:	Commerce, Business Administration

PRE-DOCTORAL PROGRAMMES (M.Phil.)

Arts & Humanities	:	History, English, Tamil
Physical & Life Sciences	:	Mathematics, Biochemistry
Commerce & Management	:	Commerce

OUTLINE OF CHOICE BASED CREDIT SYSTEM

1. Core Courses
2. Elective Courses
 - 2.1. Discipline Specific Elective Courses (DSEC)
 - 2.2. Dissertation / Project
3. Non Major Elective Courses (NMEC)
4. Generic Elective Courses (GEC)
5. Ability Enhancement Courses (AEC)
 - 5.1 Ability Enhancement Compulsory Courses (AECC)
 - 5.2. Skill Enhancement Courses (SEC)

List of Non Major Elective Courses (NMEC) Offered

UG PROGRAMMES

Name of the Course	Semester	Department
History of India upto A.D.1858	III	History(EM)
இந்திய வரலாறு கி.பி. 1858 வரை	III	History (TM)
Indian National Movement (A.D 1885-1947)	IV	History(EM)
இந்திய தேசிய இயக்கம் (கி.பி. 1885 – 1947)	IV	History(TM)
English for Professions I	III	English
English for Professions II	IV	
இக்காலநீதி இலக்கியம்	III	Tamil
உரைநடை இலக்கியம்	IV	
Basic Hindi - I	III	Hindi
Basic Hindi - II	IV	
Practical Banking	III	Commerce
Basic Accounting Principles	IV	
Business Management	III	Business Administration
Entrepreneurship	IV	
Quantitative Aptitude – I	III	Mathematics
Statistics and Operation Research	IV	
Physics in Everyday life	III	Physics
Fundamentals of Electronics	IV	
Industrial Chemistry	III	Chemistry
Drugs and Natural Products	IV	
Applied Zoology	III	Zoology
Animal Science	IV	
Basic Food Science	III	Home Science – Nutrition and Dietetics
Basic Nutrition and Dietetics	IV	
Women and Health	III	Biochemistry
Life style associated disorders	IV	
Medical Lab Technology	III	Microbiology
Applied Microbiology	IV	
Infectious Diseases	III	Biotechnology
Organic Farming	IV	
Basics of Fashion	III	Costume Design And Fashion
Interior Designing	IV	
Introduction to Computers and Office Automation	III	Computer Science
Introduction to Internet and HTML 5	IV	
Computer Fundamentals and E-mail	III	Information Technology
Introduction to HTML	IV	
Fundamentals of Computers	III	Computer Applications
Web Design with HTML	IV	
Horticulture – I	III	Botany
Horticulture – II	IV	
மருத்துவ தாவரவியல் - I	III	
மருத்துவ தாவரவியல் - II	IV	
Library and Information Science – I	III	Library Science
Library and Information Science - II	IV	

List of Generic Elective Courses (GEC) Offered

GENERIC ELECTIVE COURSES – 1

1. Human Rights/
2. Women Studies

GENERIC ELECTIVE COURSES – 2

1. Constitution of India/
2. Modern Economics/
3. Adolescent Psychology/
4. Disaster Management

ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

1. Environmental Studies
2. Value Education

மேல்நிலை கல்வி வரை தமிழை முதன்மை பாடமாக எடுத்து படிக்காத மாணவிகள் கீழ்க்கண்ட பாடங்களை கட்டாயம் படிக்க வேண்டும்

1. அடிப்படை தமிழ் - எழுத்தறிதல்
2. அடிப்படைத் தமிழ் - மொழித்திறனறிதல்

ELIGIBILITY FOR ADMISSION

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Tamilnadu or any other equivalent Examination accepted by Academic Council with Biology as one of the subjects in Higher Secondary Course.

DURATION OF THE PROGRAMME

The candidates shall undergo the prescribed Programme of study for a period of three academic years (six semesters).

MEDIUM OF INSTRUCTION

English

COURSES OFFERED

- Part I : Tamil/Hindi
- Part II : English
- Part-III : Core Courses
 Elective Courses: Discipline Specific Electives Courses
 Field Project
 Allied Courses: 1. Chemistry
 2. Concepts in Biology
- Part IV: Non-Major Elective Courses (NMEC)
 Generic Elective Courses (GEC)
 Ability Enhancement Compulsory Courses (AECC)
 Skill Enhancement Courses (SEC)
- Part V : National Service Scheme, Physical Education, Youth Red Cross
 Society, Red Ribbon Club, Science Forum, Eco Club, Library and
 Information Science, Consumer Forum, Health and Fitness Club,
 National Cadet Corps

Study Tour/ Field visit is mandatory for UG students.

Internship / Field Project is compulsory for II year UG Science students

Internship: A designated activity that carries one credit involving more than 7 days of working in an organization under the guidance of an identified mentor

Field Project: Project students comprising of maximum 5 members in a team need to undertake project that involve conducting surveys inside/outside the college premises and collection of data from designated communities or natural places.

EVALUATION SCHEME

Components	Internal Assessment Marks	External Examination Marks	Total Marks
Theory	25	75	100
Practical	40	60	100
Project	40	60	100

PART III - Core Courses, Discipline Specific Elective Courses & Allied Courses

INTERNAL ASSESSMENT**Distribution of Marks****Theory**

Mode of Evaluation		Marks
Periodic Test	:	15
Assignment	:	5
Quiz	:	5
Total	:	25

Three Periodic Tests - Average of the best two will be considered

Two Assignments - Best of the two will be considered

Three Quiz Tests - Best of the three will be considered

Practical

Mode of Evaluation		Marks
Model Test	:	30
Performance	:	10
Total	:	40

Two Model Tests - Best one will be considered

Performance - Attendance and Record

Question Pattern for Periodic Tests**Duration: 2 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q.No.(1- 4)	Multiple Choice	4	4	1	4
B Q.No.(5- 7)	Either or type	3	3	7	21
C Q.No.(8-10)	Open Choice	3	2	10	20
Total					45

EXTERNAL EXAMINATION**Question Pattern****Duration: 3 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 10)	Multiple Choice (Atleast Two question from each unit)	10	10	1	10
B Q. No.(11 -15)	Either Or type (one set from each unit)	5	5	7	35
C Q. No.(16-20)	Open Choice (one from each unit)	5	3	10	30
				Total	75

ONLINE ASSESSMENT

Online Test will be conducted for the Core Courses in V & VI Semester.

Multiple Choice questions Pattern will be followed.

PART IV - Skill Enhancement Courses and Non Major Elective Courses**INTERNAL ASSESSMENT****Distribution of Marks****Theory**

Mode of Evaluation		Marks
Periodic Test	:	25
Assignment	:	10
Quiz	:	5
Total	:	40

Three Periodic tests - Average of the best two will be considered

Two Assignments - Best of the two will be considered

Three Quiz Tests - Best of the three will be considered

Question Pattern**Duration: 1 Hour**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 4)	Open Choice	4	3	5	15
B Q. No.(5- 6)	Open Choice	2	1	10	10
Total					25

EXTERNAL EXAMINATION**Question Pattern****Duration: 2 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 8)	Open Choice	8	6	5	30
B Q. No.(9- 13)	Open Choice	5	3	10	30
Total					60

PART IV - Generic Elective Courses and Ability Enhancement Compulsory Courses

- Assessment by Internal Examiner only
- Model Examination is conducted after two periodic tests.
- Book and Study Material prepared by the Faculty Members of the respective departments will be prescribed.

ASSESSMENT PATTERN

Mode of Evaluation		Marks
Periodic Test	:	30
Assignment	:	10
Model Examination	:	60
Total	:	100

Two Periodic tests - Best of the two will be considered

Two Assignments - Best of the two will be considered

Question Pattern for Periodic Test**Duration: 1 Hour**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 4)	Open Choice	4	3	6	18
B Q. No.(5- 6)	Open Choice	2	1	12	12
Total					30

Question Pattern for Model Examination**Duration: 2 Hours**

Section	Types of Question	No. of Questions	No. of Questions to be answered	Marks for each Question	Total Marks
A Q. No.(1- 8)	Open Choice	8	5	6	30
B Q. No.(9- 13)	Open Choice	5	3	10	30
Total					60

ELIGIBILITY FOR THE DEGREE

- i) The candidate will not be eligible for degree without completing the prescribed Courses of study and a minimum Pass marks in all the Courses.
- ii) Attendance, progress and conduct certification from the Head of the Institution will be required for the students to write the examination.
 - No Pass minimum for Internal Assessment.
 - Pass minimum for External Examination is 27 marks out of 75 marks for Core Courses, Allied Courses and Discipline Specific Elective Courses.
 - Pass minimum for External Examination is 21 marks out of 60 marks for Non Major Elective Courses and Skill Enhancement Courses.
 - The aggregate minimum pass percentage is 40.
 - Pass minimum for External Practical Examination is 21 marks out of 60 marks.
 - Pass minimum for Generic Elective Course and Ability Enhancement Compulsory Courses is 40.

B.Sc. MICROBIOLOGY (SEMESTER)

Programme Code - 2024

PROGRAMME OUTCOMES

- Encourage the student's thinking ability by analyzing, synthesizing, evaluating and applying scientific concepts.
- Develop good rapport with fellow-beings through efficient oral, written and technical communication.
- Connect with the society to transform ideas into action.
- Support voluntarily in spreading scientific temperament and stand for the national cause in all core issues.
- Uphold the values and beliefs inherent in the nation's tradition and culture.
- Strive to preserve nature in all forms for a sustainable future.
- Develop an independent and self-disciplined specialized learning in tune with the changing socio-technological scenario.

PROGRAMME SPECIFIC OUTCOMES

- ✚ Elucidate basic biological principles that will help in combating human health problems caused by microorganisms.
- ✚ Stimulate novel applications of microorganisms in the Biotechnology Industries.
- ✚ Meet the needs of Agricultural, Environmental, Genetic Engineering and developing Bioscience fields and create Self-employment for the empowerment of women.
- ✚ Motivate students for taking up higher studies in Microbiology and other relevant areas.

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PART I TAMIL

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UTAG11	தாள்: 1 பொதுத்தமிழ்	3	100
2.	II	18UTAG21N	தாள்: 2 பொதுத்தமிழ்	3	100
3.	III	18UTAG31	தாள்: 3 பொதுத்தமிழ்	3	100
4.	IV	18UTAG41	தாள்: 4 பொதுத்தமிழ்	3	100
TOTAL				12	400

PART I HINDI

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UHGD11	Prose – I & II, Ancient Stories - I, General Essays, Functional Hindi – I & Grammar	3	100
2.	II	18UHGD21	Drama, Ancient Stories - II, Letter Correspondence, Functional Hindi-II & Grammar	3	100
3.	III	18UHGD31	Ancient Poetry, Drama, Indian History, Hindi Grammar & Functional Hindi III	3	100
4.	IV	18UHGD41	Modern Poetry, Hindi Literary Essays, Letter Correspondence, Conversation & Functional Hindi IV	3	100
TOTAL				12	400

PART II

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UENG11A	English for Advanced Learners I	3	100
		18UENG11B	English for Career Guidance - I		
		18UENG11C	English for Communicative Competence-I		
2.	II	18UENG21A	English for Advanced Learners II	3	100
		18UENG21B	English for Career Guidance - II		
		18UENG21C	English for Communicative Competence - II		
3.	III	18UENG31A	English for Advanced Learners III	3	100
		18UENG31B	English for Career Guidance – III		
		18UENG31C	English for Communicative Competence - III		
4.	IV	18UENG41A	English for Advanced Learners IV	3	100
		18UENG41B	English for Career Guidance – IV		
		18UENG41C	English for Communicative Competence - IV		
TOTAL				12	400

PART III – CORE, DISCIPLINE SPECIFIC ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1	I	18UMBC11	General Microbiology	4	100
2	I	18UMBC12	Biochemistry	4	100
3	II	18UMBC21	Microbial Taxonomy	4	100
4	II	18UMBC22	Microbial physiology and Metabolism	4	100
5	II	18UMBC21P	Major Practical- I	2	100
6	III	18UMBC31	Molecular Biology	5	100
7	IV	18UMBC41	Microbial Genetics	5	100
8	IV	18UMBC41P	Major Practical –II	2	100
9	V	18UMBC51	Clinical Microbiology	4	100
10	V	18UMBC52	Immunology	4	100
11	V	18UMBC53	Bioinformatics	4	100
12	V	18UMBE51	Discipline Specific Elective 1 1. Virology 2. Diagnostic Microbiology	4	100
13	V	18UMBO51	Online Assessment	1	50
14	VI	18UMBC61	Agricultural Microbiology	4	100
15	VI	18UMBC62	Industrial Microbiology	4	100
16	VI	18UMBC63	Biotechnology	4	100
17	VI	18UMBE61	Discipline Specific Elective 2 1. Environmental Microbiology 2. Food Microbiology	4	100
18	VI	18UMBO61	Online Assessment	1	50
19	VI	18UMBC61P	Major Practical –III	3	100
20	VI	18UMBC62P	Major Practical –IV	3	100
21	VI	18UMBC63P	Major Practical –V	2	100
Total				72	2000

PART III – ALLIED COURSE I- CHEMISTRY

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UCHA11	Chemistry –I	4	100
2.	II	18UCHA21	Chemistry – II	4	100
		18UCHA21P	Allied Chemistry Practical	2	100
Total				10	300

PART III - ALLIED COURSE II- CONCEPTS IN BIOLOGY

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	III	18UBIA31	Biology-I (Cell biology)	4	100
2	IV	18UBIA41	Biology-II (Applied biology)	4	100
3	III&IV	18UBIA41P	Biology Practicals (Cell Biology, Applied Biology Practicals)	2	100
Total				10	300

PART IV - SKILL ENHANCEMENT COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	II	18UMBS21	Microbiological and Analytical Techniques	2	100
2.	III	18UMBS31	Enzymology and Enzyme Technology	2	100
3.	IV	18UMBS41	Mushroom Technology	2	100
4.	V	18UMBS51	Cosmetic Microbiology	2	100
5.	V	18UMBS52	Pharmaceutical Microbiology	2	100
6.	VI	18UMBS61	Nanobiotechnology	2	100
Total				12	600

PART IV – NON MAJOR ELECTIVE COURSES

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UMBN31	Medical Lab Technology	2	100
2.	II	18UMBN41	Applied Microbiology	2	100
Total				4	200

**PART IV–GENERIC ELECTIVE COURSES AND ABILITY ENHANCEMENT
COMPULSORY COURSES**

S.No.	Sem.	Code	Title of the Course	Credits	Marks
1.	I	18UGVE11	Value Education	2	100
2	III	18UGEH31/ 18UGEW32	Human Rights/ Women studies	1	100
3.	IV	18UGEC41/	Constitution of India/	1	100
4		18UGEM42/	Modern Economics/		
6		18UGEA43/	Adolescent Psychology/		
7		18UGED44	Disaster Management		
8		18UMBI41G	Internship/Field Project	1	100
9		PART V	Extension Activities	1	-
10	V	18UGES51	Environmental Studies	2	100
Total				8	400

PART –V - EXTENSION ACTIVITIES

S.No.	Sem.	Code	Title of the Course	Credit
1	I, II, III & IV	18UVNS1 18UVNS2	National Service Scheme	1
2		18UVPE1 18UVPE2	Physical Education	
3		18UVYR1 18UVYR2	Youth Red Cross Society	
4		18UVRR1	Red Ribbon Club	
5		18UVSF1	Science Forum	
6		18UVEC1	Eco Club	
7		18UVLI1	Library and Information Science	
8		18UVCC1	Consumer Forum	
9		18UVHF1	Health and Fitness Club	
10		18UVNC1 18UVNC2	National Cadet Corps	



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BACHELOR OF MICROBIOLOGY

PROGRAMME STRUCTURE

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
I	Part I	18UTAG11	Tamil/Hindi I	6	3	25	75
	Part II	18UENG11	English I	6	3	25	75
	Part III	18UMBC11	Core Course -1 General Microbiology	4	4	25	75
		18UMBC12	Core Course -2 Biochemistry	4	4	25	75
		18UMBC21P	Core Course -3 Major Practical – I	2	-	-	-
		18UCHA11	Allied Course –I Chemistry - 1	4	4	25	75
		18UCHA21P	Allied Course Allied Chemistry Practical - I	2	-	-	-
	Part IV	18UGVE11	Value Education	2	2	40	60
	TOTAL			30	20	600	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
II	Part I	18UTAG21	Tamil /Hindi II	6	3	25	75
	Part II	18UENG21	English II	6	3	25	75
	Part III	18UMBC21	Core Course - 4 Microbial Taxonomy	4	4	25	75
		18UMBC22	Core Course - 5 Microbial Physiology and Metabolism	4	4	25	75
		18UMBC21P	Core Course - 3 Major Practical -I	2	2	40	60
		18UCHA21	Allied Course -I Chemistry - II	4	4	25	75
		18UCHA21P	Allied Course Allied Chemistry Practical	2	2	40	60
	Part IV	18UMBS21	SEC -1 Microbiological and Analytical Techniques	2	2	40	60
		TOTAL		30	24	800	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
III	Part I	18UTAG31	Tamil/ Hindi III	6	3	25	75
	Part II	18UENG31	English III	6	3	25	75
	Part III	18UMBC31	Core Course -6 Molecular Biology	5	5	25	75
		18UMBC41P	Core Course -7 Major Practical – II	2	-	-	-
		18UBIA31 18UBIA41P	Allied-Course -II Cell Biology Cell Biology and Applied Biology Practical-1	4 2	4 -	25 -	75 -
	Part IV	18UMBS31	SEC -2 Enzymology and Enzyme Technology	2	2	40	60
		18UMBN31	NMEC-1 Medical Lab Technology	2	2	40	60
	Part IV	18UGEH31/ 18UGEW32	Generic Elective -1 1.Human Rights/ 2. Women studies	0	1	40	60
		18UGEC41/ 18UGEM42/ 18UGEA43/ 18UGED44	Generic Elective -2 Constitution of India/ Modern Economics/ Adolescent Psychology/ Disaster Management	1	-	-	-
		TOTAL		30	20	700	

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
IV	Part I	18UTAG41	Tamil /Hindi IV	6	3	25	75
	Part II	18UENG41	English IV	6	3	25	75
	Part III	18UMBC41	Core Course - 8 Microbial Genetics	5	5	25	75
		18UMBC41P	Core Course - 7 Major Practical –II	2	2	40	60
		18UBIA41	Allied Course – II Applied Biology Cell Biology and Applied Biology Practical-1	4	4	25	75
		18UBIA41P		2	2	40	60
	Part IV	18UMBS41	SEC -3 Mushroom Technology	2	2	40	60
		18UMBN41	NMEC-2 Applied Microbiology	2	2	40	60
		18UMBI41G	Internship/Field Project	0	1	100	-
			Generic Elective -2				
		18UGEC41/	Constitution of India/	1	1	100	-
		18UGEM42/	Modern Economics/				
		18UGEA43/	Adolescent Psychology/				
	18UGED44	Disaster Management					
	Part V		Extension Activities	-	1	-	-
		TOTAL	30	26	1000		

Semester	Course Code	Courses	Hours per week	Credits	Total Marks		
					Int.	Ext.	
V	Part III	18UMBC51	Core Course – 9 Clinical Microbiology	4	4	25	75
		18UMBC52	Core Course - 10 Immunology	4	4	25	75
		18UMBC53	Core Course – 11 Bioinformatics	4	4	25	75
		18UMBC61P	Core Course – 12 Major Practical - III	3	-	-	-
		18UMBC62P	Core Course – 13 Major Practical - IV	3	-	-	-
		18UMBC63P	Core Course – 14 Major Practical -V	2	-	-	-
		18UMBE51 18UMBE52	DSEC -1 1.Virology 2.Diagnostic Microbiology	4	4	25	75
		18UMBO51	Online Assessment	-	1	50	
	Part IV	18UMBS51	SEC -4 Cosmetic Microbiology	2	2	40	60
		18UMBS52	SEC -5 Pharmaceutical Microbiology	2	2	40	60
		18UGES51	Environmental Studies	2	2	40	60
			TOTAL	30	23	750	

Semester		Course Code	Courses	Hours per week	Credits	Total Marks	
						Int.	Ext.
VI	Part III	18UMBC61	Core Course -15 Agricultural Microbiology	5	4	25	75
		18UMBC62	Core Course -16 Industrial Microbiology	5	4	25	75
		18UMBC63	Core Course -17 Biotechnology	5	4	25	75
		18UMBC61P	Core Course – 12 Major Practical - III	3	3	40	60
		18UMBC62P	Core Course – 12 Major Practical –IV	3	3	40	60
		18UMBC63P	Core Course – 12 Major Practical –V	2	2	40	60
		18UMBE61 18UMBE62	DSEC -2 1.Environmental Microbiology 2. Food Microbiology	5	4	25	75
		18UMBO61	Online Assessment	-	1	50	
	Part IV	18UMBS61	SEC -6 Nanobiotechnology	2	2	40	60
TOTAL				30	27	850	



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B.Sc. MICROBIOLOGY (SEMESTER) (2018 -19 onwards)

Semester III	MOLECULAR BIOLOGY	Hours/Week: 5	
Core Course - 6		Credits: 5	
Course Code 18UMBC31		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

- get knowledge about the genetic material (DNA & RNA).
- know the different forms of DNA in prokaryotic microorganisms.
- inculcate the value of genome in microorganisms.
- get familiar about the process of DNA replication, transcription and translation.
- get knowledge about regulation of gene expression.

UNIT I

Central dogma of Molecular biology – Structural aspects of DNA – Double helical structure - various forms of DNA & functions of DNA – RNA: Types and functions. Genome organization in Prokaryotes and Eukaryotes. (10 Hours)

UNIT II

DNA replication: Semi conservative replication - Models of replication: D-loop, Theta and Rolling circle. Mechanism of DNA replication in prokaryotes. Enzymes involved in DNA replication. (10 Hours)

UNIT III

Transcription: RNA polymerases and their functions – Transcription in prokaryotes: initiation, elongation, termination and factors involved - Post transcriptional modifications. (15 Hours)

UNIT IV

Genetic code: Salient features and Wobble hypothesis - Translation: mechanism of protein synthesis in prokaryotes, factors involved in translation - Post translational modifications. (15 Hours)

UNIT V

Regulation of gene expression in bacteria – Operon model – detailed study of *lac*, *trp* and *ara* operon. Cistron, Muton and Recon. (10 Hours)

TEXT BOOKS

Verma P.S. & Agarwal V.K. (2002). Concepts of Molecular Biology, 2/e, S.Chand & Company Limited.

REFERENCE BOOKS

1. Jeyanthi, G.P. (2009). *Molecular Biology*, MJP Publishers.
2. Verma, P.S. & Agarwal, V.K. (2013). *Cell Biology, Genetics, Molecular Biology, Evolution and Ecology*, New Delhi: S.Chand and company (P) Ltd
3. Watson. D. & Hopkins. H. (1988). *Molecular Biology of the Gene*, 4/e, The Benjamin/cummings Publishing Company, Inc.
4. David Freifelder, (1998). *Molecular Biology*, 2/e, Narosa Publishing House.



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VIRUDHUNAGAR - 626 001

B.Sc. MICROBIOLOGY (SEMESTER) (2018 -19 onwards)

Semester III	MEDICAL LAB ECHNOLOGY	Hours/Week: 2	
Non Major Elective Course - 1		Credits: 2	
Course Code 18UMBN31		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

- get knowledge about the components of blood and their functions.
- know how to collect and handle blood samples in laboratory.
- study various haematological techniques.
- get awareness about clinical biochemistry.

UNIT I

Components of blood and their functions - Erythrocytes, Leukocytes, Lymphocytes, Monocytes, and Thrombocytes. (7Hours)

UNIT II

Anticoagulants - Blood collection by vein puncture and capillary puncture. Safety disposal of blood samples. Separation of serum and plasma. (5 Hours)

UNIT III

Routine procedures in blood bank: General Laboratory preparations in Blood bank. Maintenance of laboratory records. (4 Hours)

UNIT IV

Routine hematological tests: ABO blood grouping, Rh typing - Determination of hemoglobin concentration: Cyanmethaemoglobin method - RBC, WBC and Platelet count – ESR: Westergren method. (8 Hours)

UNIT V

Clinical Biochemistry: Routine biochemical tests in Blood sugar (folin – wu method), blood urea (oxime method), creatinine (alkaline picrate method) and cholesterol (leffler method). (6 Hours)

TEXT BOOK

Mukherjee, K.L., (1988). *Medical Laboratory Technology*, Volume – I to III, New Delhi: Tata McGraw-Hill Publishing Company Limited.

REFERENCE BOOK

Praful.B. Godkar & Darshan P.Godkar, (2014). *Text Book of Medical Laboratory Technology*, Volume I & II , 3/e, Bhalani Publishing House.



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B.Sc. MICROBIOLOGY (SEMESTER) (2018 -19 onwards)

Semester III	ENZYMOLGY & ENZYME TECHNOLOGY	Hours/Week: 2	
Skill Enhancement Course - 2		Credits: 2	
Course Code 18UMBS31		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

- receive a deeper insight into the fundamentals of enzyme structures and functions.
- understand the basic knowledge of kinetic theories with mechanistic overview of enzyme activity and regulations.
- get knowledge on extraction, purification and assaying of enzymes.
- analyse current applications and future potential of enzymes in industrial and medical fields.

UNIT I

Enzymes: Nomenclature and classification - General properties of enzymes – Factors influence the Enzyme activity - Enzyme specificity. (7 Hours)

UNIT II

Mechanism of Enzyme catalysis – Enzyme kinetics: Derivation of Michaelis-Menten, Lineweaver-Burk equations and their plots. (8 Hours)

UNIT III

Allosteric enzymes - Multienzyme complex (Pyruvate dehydrogenase) - Coenzymes - Isoenzymes. (5 Hours)

UNIT IV

Extraction, Purification and Assay of Enzymes. (6 Hours)

UNIT V

Applications of enzymes (Food & Industrial) - Immobilization of enzymes.

(4 Hours)

TEXT BOOK

Jain, J.L., Sunjay Jain, Nitin Jain, (2005). *Fundamentals of Biochemistry*, 6/e. Chand Publications.

REFERENCE BOOKS

1. Palanivelu, P. (2006). *Enzymes, Ribozymes and DNAzymes*, Palkalai Nagar, Madurai: 21st Century Publications,
2. Palanivelu, P. (2004). *Analytical Biochemistry & Separation Techniques*, Palkalai Nagar, Madurai: 4/e 21st Century Publication.

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Semester: III	HUMAN RIGHTS (2018 -19 onwards)	Hours/Week: 0	
Generic Elective - 1		Credits : 1	
Course Code: 18UGEH31		<u>Internal</u> 100	<u>External</u> -

COURSE OUTCOMES

On completion of the course, the students will be able to

- understand the basic concepts on Human Rights and Human values.
- learn the definition and the development of Human Rights.
- understand the various theories on Human Rights.
- know the International instruments and conventions on human Rights.
- acquire idea of the evolution of Human Rights in India.
- imbibe the knowledge of Human Rights violation in India.

UNIT I

Human Rights - Definition – Development of Human Rights: The Magna Carta (1215) - The Declaration on Rights of Man and Citizen (1789) - The Bill of Rights (1791).

UNIT II

Universal Declaration of Human Rights (1948) - International Covenant on Civil and Political Rights– International Covenant on Economic, Social and Cultural Rights.

UNIT III

Human Rights in India - Constitutional Guarantees on Human Rights - The Protection of Human Rights Act (1993).

UNIT IV

National Human Rights Commission - State Human Rights Commission – Human Rights Court.

UNIT V

Human Rights Violations in India- Children – Women – Refugees – Minorities – SCs & ST – Trans-gender.

TEXT BOOK

Study Material prepared by the faculty in Department of History.

REFERENCE BOOKS

1. Basu,L.N. (2006). *Human Rights: Practice and Limitations*, Jaipur: Pointer Publishers.
2. Chauhan,S.R, & Chauhan, N.S (ed.), (2007). *International Dimension of the Human Rights*, Vol. I – III, New Delhi: Rajdhani Publishers.
3. Gupta,U.N. (2004). *Human Rights*, Vol.I – IV, New Delhi: Atlantic Publishers.
4. Natarajan,A. (2004). *Human Rights in International Perspectives*, Madurai: Munnetra Pathipagam.
5. Raja Muthirulandi, E. (2003). *Manidha Urimaigal (Tamil)*, Madurai: BPI Publishers.

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Semester: III	WOMEN STUDIES	Hours/Week: 0	
Generic Elective - 1		Credits : 1	
Course Code: 18UGEW32		(2018 -19 onwards)	<u>Internal</u> 100

COURSE OUTCOMES

On completion of the course, the students will be able to

- understand the concept of Feminism.
- acquire the knowledge on the atrocities committed against women.
- know more of women's organisations and political rights.
- know about the various Government welfare schemes for women.
- gain knowledge on the legal rights of women.
- analyse the real empowerment of women in all fields.

UNIT I

Women Studies - Definition - Feminism- Kinds of Feminism.

UNIT II

Violence Against Women – Female Foeticide–Domestic violence - Problems of working women -Eve-Teasing - Sexual Harassment- Portrayal of women in Mass Media.

UNIT III

Women Indian Association -National Council of Women in India - Self Help Groups – Panchayat Raj and role of women in politics -NGOs and women Development.

UNIT IV

Central Government's Social Welfare schemes- State Government's Social Welfare Programmes for Women – Women and Children.

UNIT V

Dowry Prohibition Act 1961 - Equal Remuneration Act 1976 – Hindu Women’s Right to Property Act 1989 – Prohibition of indecent Representation of Women Act 1987 – Domestic Violence (Prevention) Act 2005 – POCSO Act 2012.

TEXT BOOK

Study Material prepared by the faculty in Department of History.

REFERENCE BOOKS

1. Anwarul Yaquin, Badar Anwar, (1982). *Protection of Women Under the Law*, New Delhi.
2. Chatterjee, B.B, (1971). *Impact of Social Legislation on Social Change*, Calcutta.
3. Gandhi,M.K., (1962). *Women and Social Injustice*, Ahemadabad.
4. Gangrade,K.D, (1978). *Social Legislation in India, Vol.I and II*, Delhi.
5. Mandakini Das, Pritirekha, Das Pathnayak (ed)., (2010). *Empowering Women: Issues and Challenges and Strategies*, New Delhi.

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Semester: III & IV	CONSTITUTION OF INDIA	Hours/Week: 1 + 1	
Generic Elective - 2		Credits : 1	
Course Code: 18UGEC41		(2018 -19 onwards)	<u>Internal</u> 100

COURSE OUTCOMES

On completion of the course, the students will be able to

- understand the basic tenets of the Constitution.
- realize the duties and responsibilities as a citizen of India.
- shine in competitive examinations.
- understand that the constitution is a base for the functioning of the Government
- aware of the actual working of political institutions.
- know the powers of Judiciary in the protection of citizen.

UNIT I

Constituent Assembly - Sources – Salient Features of the Constitution –
 Fundamental Rights – Fundamental Duties – Directive Principles of State Policy.

UNIT II

President and Vice-President – Election, Position, Powers and Functions – Prime
 Minister and his cabinet.

UNIT III

Indian Parliament – Lok Sabha and Rajya Sabha – Composition – Powers and
 Functions.

UNIT IV

Process of Law making – Committee system – Mode of Amendments-
Constitutional Amendments.

UNIT V

Judiciary – Supreme Court – Composition - Powers and Functions – Judicial
Review - State Government – Governor - Chief Minister- High court.

TEXT BOOK

Study Material prepared by the faculty in Department of History.

REFERENCE BOOKS

1. Gomathinayagam,P& Anusuya,R. (1980). *Modern Governments*, Rajapalayam:
Sri Vinayaga Pathipagam.
2. Kapur,A.C. (1975). *Select Constitutions*, New Delhi: S.Chand & Co.
3. Kasthuri,J. (1998). *Modern Governments*, Udumalpet: Ennes Publications.
4. Mahajan, V.D. (1969). *Select Modern Governments*, New Delhi: S.Chand & Co.
5. Ramalingam, T.S. (1971). *Modern Governments*, Madurai: T.S.R. Publications.

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Semester: III & IV	MODERN ECONOMICS (2018-2019 Onwards)	Hours/Week: 1 +1	
Generic Elective - 2		Credits: 1	
Course Code 18UGEM42		Internal 100	External -

COURSE OUTCOMES

On completion of the course, the students will be able to

- understand the economic development and the various sectors of Indian Economy.
- get clear knowledge about economic issues.
- get introduced to the framework of Budgets and Income and Expenditure of the Government.
- understand the role of banks in economic development.
- apply the E-payment methods in day to day life.

UNIT I: Economic Development: Economic Development – Meaning – Nature of Indian Economy – Features of Indian Economy - Agriculture and Economic Development – Industrial Sector and Economic Development – LPG – Advantages and Disadvantages – MNCs – Obstacles to Economic Development.

UNIT II: Economic Issues: Population growth in India –Causes – Measures –Poverty – Causes – Measures – Unemployment – Causes – Types – Measures.

UNIT III: Government Budget and the Economy: Meaning –Types –Principles of Budgeting –Budgetary Procedure –Direct and Indirect Taxes –Merits –Demerits –Causes for Growth of Public Expenditure.

UNIT IV: Role of Commercial Banks in Economic Development: Commercial Banks – Classifications – Public Sector Banks – Merits - Private Sector Banks – Merits – Differences between Public Sector Banks and Private Sector Banks - Role of Commercial

Banks in Economic Development —Innovative Schemes for developing Infrastructure – Demonetization – Reasons for Demonetisation – Merits and Demerits of Demonetisation.

UNIT V: E-Banking: E-Banking – Advantages – Disadvantages – Mobile Banking – Facilities – Advantages – Disadvantages - Internet Banking – Types – Features – Advantages – Disadvantages – Electronic Payment System (EPS) – Meaning – Benefits – Disadvantages – Methods of EPS– ATM – Debit Card – Credit Card – Smart Card– Electronic Clearing Service (ECS) – National Electronic Funds Transfer (NEFT) – Real Time Gross Settlement (RTGS) - Risks involved in E-Payments – Security tips to overcome Risks in E-Payments

TEXT BOOK

Study Material prepared by the faculty in Department of Commerce and Economics.

REFERENCE BOOKS

1. Sankaran .S, (2012). *Micro Economics*, Chennai: Margham Publications.
2. Sankaran. S, (2012). *Monetary Economics*, Chennai: Margham Publications.
3. Ruddar Dutt and Sundharam. K.P.M., (2017). *Indian Economy*, New Delhi: S. Chand & Company Ltd.
4. Mithani.D.M., (2010). *Money, Banking, Trade and Public Finance*, Mumbai: Himalaya Publishing House.
5. Rama. A and Aruna Devi. A. (2019). *Banking Technology*, Chennai: New Century Book House (P) Ltd.

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Semester: III & IV	ADOLESCENT PSYCHOLOGY (2018 -19 onwards)	Hours/Week: 1+ 1	
Generic Elective- 2		Credits: 1	
Course Code 18UGEA43		Internal 100	External -

COURSE OUTCOMES

On completion of the course, students will be able to

- gain knowledge regarding the changes in different domains of development during adolescence.
- develop and maintain good relationship with parents and peers.
- aware of the issues challenging adolescents and measures to be taken to prevent those issues.
- face the challenges they face across the life span
- adopt a few counseling techniques.

UNIT I

Adolescence- Age of adolescence, characteristics, problems of adolescence. Biological transitions, Emotional transitions, Social transitions, Cognitive transitions, Changes in moral behavior, Developmental tasks.

UNIT II

Challenges of Adolescents-Health issues, Sexually transmitted diseases, Mental health issues, Social issues- Sexual abuse, Substance abuse, Influence of electronic media.

UNIT III

Development of Self- Identity development and autonomy, self - esteem, Gender and self- regulation. Self-reliance and personal decision making process. Peer Pressure and Family conflicts.

UNIT IV

Counselling – Styles of Counselling – An effective Counseling relationship-
Managing crises – Effective Counselor - Maintain boundaries – Taking care of
ourselves.

UNIT V

Qualities of a good Counsellors

Empathy – open mindedness – Genuine and Trust Winning – Maintaining
confidentiality – certain Do's and Dont's.

Related Experience

Discussion about the problems confronting adolescents today.

Group discussion on the use and misuse of electronic media by adolescents.

Discussion on issues relating to parent, adolescents relationship.

To study about the health problems of adolescents.

To make a study on the stress experience by adolescents.

Critical Analyses issues and debates in Counseling psychology.

Reflect on the their role in different fields of Counseling.

TEXT BOOK

Study Material prepared by the faculty in Department of Home Science.

REFERENCE BOOKS

1. Chauhan S. (1983), *Psychology of Adolescence*, New Delhi: Allied Publishers Private Limited.
2. Elizabeth B Hurlock (1985). *Developmental Psychology A Life - Span Approach*, New York: TMH Edition.
3. Aron, A., & Aron, E.N. (1994). *Statistics for Psychology*. New Jersey: Prentice Hall.
4. Miles, J. (2001). *Research Methods and Statics*, Exeter: Crucial.

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Semester: III & IV	DISASTER MANAGEMENT (2018 -19 onwards)	Hours/Week: 1+ 1	
Generic Elective- 2		Credits: 1	
Course Code 18UGED44		Internal 100	External -

COURSE OUTCOMES

On completion of this course, the students will be able to

- get a general insight in the dimensions of disasters caused by nature as well as the disasters and environmental hazards induced by human developmental activities
- become aware of the fundamentals of disaster assessment and environmental impact assessment
- become sensitized to the various institutional agencies for disaster management
- be aware of disaster recovery plan
- understand the association at National, State and District level of cope up with disaster

UNIT I

Disaster – Features and Effects of Disaster – Process of Disaster – Hazards and its Classification – Vulnerability and its Categories - Stages in Disaster – Disaster Management and its Activities – Disaster Management Cycle.

UNIT II

Earthquake - Factors Determining Earthquakes –Seismic Waves in Earthquake Processes - Magnitude and Intensity - Earthquake Damages - Disaster Management and Earthquake.

Volcanoes - Active and Non-Active Volcanoes - Types of Volcanoes – Landslides - Basic Causes of Landslides – Tsunami - Causes of Tsunami - Tsunami Warning System - Disaster Management Team and Tsunami – Flood - Types of Flood - Damages due to Floods.

UNIT III

Damage Assessments for Different Disaster – Objectives, Features, Levels, Types: Damage to Buildings, House Property, Land, Crops and Live Stock – Impact of Human Lives – Assessment Damages - Damage Reports: Flash Report, Initial Report, Interim Report, Specialist Report and Final Report – Points to be Considered while Preparing Reports - Reporting Format and Quantification of Needs– Disaster Assistance: Individual Assistance and Public Assistance.

UNIT IV

National Crisis Management Committee (NCCM), State Crisis Management Group (SCMG): Task, District Disaster Management Committee, Disaster-Related Roles and Resources, Disaster Agencies, Site Operations Centre and Rescue Camps.

UNIT V

Disaster Mitigation Strategies in Floods and Water Hazards, Earthquakes, Volcanic Eruptions, Landslides, Drought and Desertification – Main Mitigation Strategies - - The Disaster Recovery Planning: Objectives and Phases - Reconstruction and Rehabilitation: Physical, Social, Psychological and Economic rehabilitation.

TEXT BOOK

Study material prepared by the faculty in Department of Commerce.

REFERENCE BOOKS

1. Rajdeep Dasgupta. (2011). *Disaster Management and Rehabilitation*, New Delhi: Mittal Publications.
2. Sunder.I. & Sezhiyan.T. (2012). *Disaster Management*, New Delhi : Sarup and Sons.
3. Ramana Murthy.K. (2004). *Disaster Management*, New Delhi: Dominant.



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VIRUDHUNAGAR - 626 001

B.Sc. MICROBIOLOGY (SEMESTER)

(2018 -19 onwards)

Semester IV	MICROBIAL GENETICS	Hours/Week: 5	
Core Course - 8		Credits: 5	
Course Code 18UMBC41		Internal 25	External 75

COURSE OUTCOMES

On completion of the course, the students will be able to

- get familiar of gene concept and its significance
- understand the mechanism of genetic exchange in bacteria and its significance.
- know the types of mutation and mutagens.
- elaborately view the mechanism of DNA damage and repair.
- get knowledge about the screening mutants.
- know the characteristics and significance of transposable elements.

UNIT I

Genetics – Concepts of gene - DNA and RNA as a genetic material:
Experimental evidences – Genetic exchange in bacteria: Transformation, Transduction (Generalized & Specialized) Co transduction and Conjugation: F factor mediated, Hfr and Sexduction – arriving at *E.coli* genetic map. (10 Hours)

UNIT II

Mutation – Types of mutation – Mutagens: Physical mutagens (ionizing and non ionizing) & Chemical mutagens (5 Bromo uracil, Hydroxylamine, Alkalyting agents, Intercalating agents & Nitrous acid) and their mode of action. (10 Hours)

UNIT III

Isolation of auxotrophic mutants – Complementation - Fluctuation test and its significance - Detection of mutation by Ames test – Screening procedures for the

isolation of mutants: Visible mutations, Nutritious mutations, Conditional mutations and modern molecular screens. (15 Hours)

UNIT IV

DNA damage and repair - Photoreactivation, Excision, SOS, Mismatch and Recombinant repair. (10 Hours)

UNIT V

General characteristics and significance of transposable elements - modes of transposition: replicative & non replicative - Simple transposons: IS elements - Complex transposons: Tn3 - Composite transposons: Tn10 - Eukaryotic transposable elements: Ty. (15 Hours)

TEXT BOOK

Verma, P.S. & Agarwal, V.K.(2013). *Cell Biology, Genetics, Molecular Biology, Evolution and Ecology*, New Delhi: S.Chand and company (P) Ltd.

REFERENCES BOOKS

1. Ajoy Paul, (2011). *The Text Book of Genetics – from genes to genomes*, Kolkata Books and Allied (P) Ltd.,
2. David Friefelder, (1987). *Microbial Genetics*, Narosa Publishing House.
3. Peter J.Russell, (2001). *Genetics*, 5/e. Benjamin/ Cumming Publishing Company, Inc.



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**B.Sc. MICROBIOLOGY (SEMESTER)
(2018 -19 onwards)**

Semester IV	MAJOR PRACTICAL –II	Hours/Week: 2	
Core Course - 7		Credits: 2	
Course Code 18UMBC41P		Internal 40	External 60

Molecular Biology

1. Laboratory safety guidelines and regulations for molecular biology and microbial genetics.
2. Extraction of DNA from fruits.
3. Isolation of Chromosomal DNA from bacteria.
4. Quantification of DNA by Diphenylamine method.
5. Separation of protein by polyacrylamide gel electrophoresis.
6. Induction of *lac* operon.

Microbial genetics

1. Isolation of spontaneous mutant: antibiotic resistant mutants (streptomycin)
2. Isolation of auxotrophic mutants by UV mutagenesis.
3. Transformation in *E.coli* (Blue white selection)
4. Genetic recombination in bacteria (Conjugation)

REFERENCE BOOKS

1. Palanivelu, P. (2004., *Analytical Biochemistry & Separation Techniques*, Palkalai Nagar, Madurai 4/e, 21st Century Publication.
2. Murugalatha, N. (2012). *Microbiological Techniques*, MJP Publishers.
3. Dubey, R.C.& Maheshwari (2005). *Practical Microbiology*, S.Chand & company Ltd.
4. Kanika Sharma, (2011). *Manual of Microbiology Tools and Techniques*, 2/e, Ane Books pvt Ltd.
5. Aneja, K.R. (2003). *Experiments in Microbiology, Plant Pathology, Tissue Culture and Mushroom Cultivation*, 4/e, New Age International Publishers.
6. Ameer khusro, Preetam Raj, J.P., *Practical Bacteriology*, New Delhi: Narosa Publishing House.

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B.Sc. MICROBIOLOGY (SEMESTER) (2018 -19 onwards)

Semester IV	APPLIED MICROBIOLOGY	Hours/Week: 2	
Non Major Elective Course - II		Credits: 2	
Course Code 18UMBN41		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

- know the beneficial effects of microorganisms in agriculture and environment.
- get familiar about spoilage and preservation of food.
- know the applications of microorganisms in various industries.
- enlist and clarify the mode of action of drugs.

UNIT I

General Microbiology: Microorganisms- Prokaryotic cell Vs Eukaryotic cell - Microbes in air, water and soil - Sources of contamination and control methods - Normal flora of microorganisms - Potability of water by MPN (Most Probable Number) test.
 (6 Hours)

UNIT II

Agricultural and Environmental Microbiology: Beneficial effects of microorganisms in the environment and its production strategy: *Rhizobium*, *Phosphobacteria*, *Trichoderma* and *Azolla*.
 (5 Hours)

UNIT III

Food and Dairy Microbiology: General factors affecting the food - spoilage and preservation of vegetables - Bacteriology of milk and its preservation - Milk quality analysis: Methylene Blue Dye Reduction Test and Resazurin test.
 (6 Hours)

UNIT IV

Industrial Microbiology: Applications of microorganisms in industry - General account on fermentation: aerobic and anaerobic fermentation - Industrial production of Penicillin and Amylase. (6 Hours)

UNIT V

Pharmaceutical microbiology: Introduction to Chemotherapy - Structure and Mechanism of antimicrobial agents: Antibacterial drugs- Penicillin and Streptomycin. Antiviral drugs- Amantidine and Acyclovir. Antifungal drugs- Amphotericin B and Clotrimazole. (7 Hours)

REFERENCE BOOKS

1. Prescott, Harley & Klein. (2006). *Microbiology*, New York: 6/e. The McGraw Hill Companies.
2. Patel, A.H, (1996). *Industrial Microbiology*, Macmillan India Limited.
3. Frazier, WC & Westho of DC. (2003). *Food Microbiology*, New York: McGraw-Hill Companies, 4th Edition.
4. Dubey, R.C, Text book of *Biotechnology*, Revised Edition 2006.



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B.Sc. MICROBIOLOGY (SEMESTER)

(2018 -19 onwards)

Semester IV	MUSHROOM TECHNOLOGY	Hours/Week: 2	
Skill Enhancement Course - 3		Credits: 2	
Course Code 18UMBS41		Internal 40	External 60

COURSE OUTCOMES

On completion of the course, the students will be able to

- know the method of producing spawn, substrate and mushroom.
- identify the difference between edible and poisonous mushrooms.
- understand the importance of mushroom in food and medicinal aspects.
- analyze the biotic and abiotic factors which reduce the yield of mushroom.
- locate present status of mushroom industries in India.

UNIT I

Introduction – History of Mushroom cultivation – Morphology of Mushroom – Life cycle of Mushroom – Identification of Mushroom – Essential growth factors for mushroom. (6 Hours)

UNIT II

Mushroom cultivation strategies – Preparation of compost – Preparation of spawn – Casing – Harvesting – Preservation and Processing of Mushroom. (8 Hours)

UNIT III

Cultivation of Edible Mushrooms – *Agaricus bisporus*, *Pleurotus* spp., *Volvariella* sp. (6 Hours)

UNIT IV

Mushroom diseases: Bubble disease, Truffle disease, Bacterial blotch disease – Abiotic disorders of Mushrooms – Insect pests of Mushrooms. (5 Hours)

UNIT V

Importance of Mushrooms – Nutritional values and Medicinal values of Mushrooms – Mushroom industry – Economics of Mushroom production. (5 Hours)

TEXT BOOK

Pathak, V.N., Nagendra Yadav & Maneesha Gaur,(2000). *Mushroom Production and Processing Technology*,2/e. Agrobios Publications.

REFERENCE BOOKS

1. Nita Bahl, (2015). *Handbook on Mushrooms*, New Delhi: 4/e. Oxford & IBH Publishing.
2. Aneja, K.R. (2005). *Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom cultivation*,4/e.