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M.Sc. Microbiology, Choice Based Credit System  
For a four semester course, starting in August 2015  
Course Structure and Scheme of Examination-2015

SEMESTER I

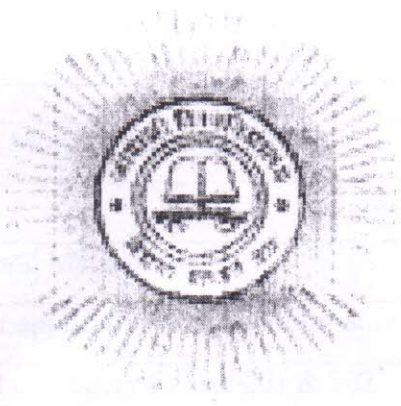
**Syllabus**  
For  
**M.SC. MICROBIOLOGY**  
**(FOUR SEMESTER COURSE)**

**ACADEMIC SESSION**

**JULY (2015-2017)**

Total Credit Value: 26 + 2 (Viva-voce)

SEMESTER I



**Jiwaji University, Gwalior**

Total Credit Value: 26 + 4 (Viva-voce)

# M.Sc. Microbiology, Choice Based Credit System

(Four Semester Course: Internal Assessment 40 and External Assessment 60)

## Course Structure and Scheme of Examination-2015

### SEMESTER I

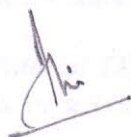
Code	Course	C/E/S	L	P	Credit	Marks
MB 101	Basics in Microbiology and General Bacteriology	Core	3	0	3	100
MB 102	Virology and Mycology	Core	3	0	3	100
MB 103	Cell biology and Biochemistry	Core	3	0	3	100
MB 104	Bioinstrumentation	Core	3	0	3	100
MB 105	Practical Course Based on Theory Course 101 & 102	Core	0	3	3	100
MB 106	Practical Course Based on Theory Course 103 & 104	Core	0	3	3	100
MB -107	Assignment/Personality development	Core			1	50
MB -108	Seminar-I	Core			1	50
MB -109	Comprehensive viva-voce exam	Virtual credit			4	100

Total Credit Value: #20 + 4 (Virtual credit)

### SEMESTER II

Code	Course	C/E/S	L	P	Credit	Marks
MB 201	Microbial genetics and Molecular Biology	Core	3	0	3	100
MB 202	Immunology	Core	3	0	3	100
MB 203	Microbial Physiology and Metabolism	Core	3	0	3	100
MB 204	Biostatistics, Computer application and Bioinformatics	Core	3	0	3	100
MB 205	Practical Course Based on Theory Course 201 & 202	Core	0	3	3	100
MB 206	Practical Course Based on Theory Course 203 & 204	Core	0	3	3	100
MB 207	Assignment/Personality development	Core			1	50
MB 208	Seminar-II	Core			1	50
MB 209	Comprehensive viva-voce exam	Virtual credit			4	100

Total Credit Value: #20 + 4 (Virtual credit)



### SEMESTER III

Code	Course	C/E/S	L	P	Credit	Marks
MB 301	Medical and Pharmaceutical Microbiology	Core	3	0	3	100
MB 302	Fermentation and Microbial Technology	Core	3	0	3	100
MB 303	Major Elective I: Recombinant DNA Technology	Elective C	3	0	3	100
MB 304	Major Elective II: Environmental Microbiology	Elective G	3	0	3*	100
MB 305	Practical Course I	Core	0	3	3	100
MB 306	Practical Course II	Core	0	3	3	100
MB 307	Assignment/Personality development	Core			1	50
MB 308	Seminar-III	Core			1	50
MB 309	Comprehensive viva-voce exam	Virtual credit			4	100

Total Credit Value: #20 + 4 (Virtual credit)

### SEMESTER IV

Code	Course	C/E/S	L	P	Credit	Marks
MB 401	Food Microbiology	Core	3	0	3	100
MB 402	Major Elective I: Agriculture Microbiology	Elective C/G	3	0	3*	100
MB 403	Practical Course I	Core	0	2	2	100
MB 404	Project/ Dissertation work	Core			12	400
MB 405	Comprehensive viva-voce exam	Virtual credit			4	100

Total Credit Value: #20 + 4 (Virtual credit)

\* 03 elective credits may be obtained from other departments/faculties/Institutes.

- Minimum credits be earned for the award of degree-

96 Credit (Valid credits - 80 + Virtual Credits - 16)

- Minimum credits for promotion to next semester - 12 valid credits/semester
- Two typed/ computerised bound copies of the dissertation shall be submitted to the University during the final M.Sc. at least fifteen days before the commencement of the final examination.
- Field work/ industrial training and group discussions accomplished with the bound copy of report are necessary for evaluation.
- Subjects offered may change from time to time depending on the availability of expertise.

Note: *Lecture (L): 1Hr = 1 Credit, Tutorial (T): 2 Hr = 1 Credit and Practical (P)/ Field work: 2Hr = 1 Credit per week in a semester for 16 – 18 weeks of academic work.*



# MB: 101 (Core) BASICS IN MICROBIOLOGY AND BACTERIOLOGY

## UNIT-I

1. Introduction, history and scope of Microbiology.
2. General characteristics and composition of Prokaryotes and Eukaryotes.
3. Classification of Microorganisms: Haeckel's three kingdom concept, Whittaker's five kingdom concept, three domain concept of Carl Woese , classification and salient features of bacteria according to Berger's Manual of Determinative Bacteriology.
4. Nomenclature and modern methods of Bacterial taxonomy.

## UNIT-II

1. Morphology and ultra structure of bacteria: size, shape, and arrangement of bacteria, ultra structure of bacterial cell wall of eubacteria and archeobacteria. Protoplast and spheroplast formation and L-form.
2. Components external to cell wall: Structure and function of flagella, fimbriae and pilli, capsule- types, composition and function, slime layers, S-layers.
3. Prokaryotic cell membrane and cytoplasmic matrix – cell membrane structure and function of bacteria and archeobacteria, mesosomes, ribosomes, cytoplasmic inclusion bodies (polyhydroxy butyrate, polyphosphate granules, oil droplets, cyanophycin granules) and nucleoid.
4. Bacterial response to external stimulus and bacterial endospores: Chemotaxis and phototaxis structure. formation and germination of bacterial endospore.

## UNIT-III

1. Bacterial nutrition: Basic nutritional requirements, growth factors, nutritional categories, physical requirements of bacterial growth.
2. Bacteriological media: types (complex, synthetic, differential, enrichment and selective media) and their uses, culture characteristics of bacteria on different media.
3. Cultivation of bacteria: aerobic and anaerobic culture, pure culture techniques, shaker and still culture, maintenance and preservation of microbial culture.
4. Bacterial growth: growth kinetics, growth curve. Batch, continuous and synchronous culture. Measurement of growth and influence of environmental factors affecting growth.



