MANGALORE UNIVERSITY

Three Year(6 Semester)B.Sc
Microbiology Degree Course

(CREDIT BASED SEMESTER SCHEME
TO BE EFFECTIVE FROM 2010-11)

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Practical: MB 353
Food , Industrial and Environmental Microbiology
Instruction hrs/week - 4 hrs

1. Enumeration of bacteria and fungi from soil.
2. Isolation of microbes from air by plate exposure method.
3. Estimation of dissolved oxygen in water.
4. Estimation of BOD in water.
5. Estimation of CO_2 in water.
6. MBR Test and phosphates test for milk.
7 Standard analysis of water.
8. Isolation and Identification of microbes from spoilt vegetables, fruits, stored foods idly, butter and curd.
9. Estimation of fat, lactose and lactic acid content of milk.
10. Preparation of wine.
11. Mini project work and report shall be submitted for evaluation.

Paper: MB – 352

Environmental Microbiology, Biostatistics and Bio informatics

Unit I : Air Microbiology 10hrs

Air microflora: Air sampling techniques –gravity slide, agarplate, liquid, impingement, seive divice and; filtration.

Air borne diseases, allergens and air pollution.

Unit II: Fresh water Microbiology 10 hrs

Sources of water and type of micro organisms in water.

Water pollution, Determining the sanitary quality of water, water purification and water treatment plants.

Unit III: Sewage Microbiology

Sources of sewage, chemical and microbiological characteristic of sewage treatment processes , Biological oxygen demand (BOD),Chemical oxygen demand (COD), most probable number (MPN) and water borne diseases

Unit IV : Biostatistics and Bioinformatics 10 hrs

Introduction, sample, population, sampling, Data, Tabulation and representation of Data.

Measures of central tendencies, mean, media and mode.

Bioinformatics - Introduction, history, biological sequences , proteomics, genomics, DNA chips, protein chips and search engines.

B.Sc VI Semester

Paper: MB 351 - Food & Industrial microbiology

40 hrs

Unit I : 10 hrs

Food as substrate for microbes, Principles of food contamination and spoilage.physical and chemical methods of preservation microbial examination of food direct microscopic count, pour plate method. spoilage of canned food, fruits, vegetables, grain.

Micrgo-organism as food: single cell protein and mushroom.

Food Poisoning: Endotoxin, Exotoxin & Aflatoxin.

Fermented foods : Idli, Pickles, Bread, silage (ensilage)

Unit II : 10 hrs

Microfloora of milk: sources of contamination.

Microbial Examination of milk: standard plate count, direct microscopic count and reductase test .

Biochemical activities of milk: souring , proteolytic activity, gassy fermentation and lactic acid fermentation.

Methods of milk preservation: Pasteurization and sterilization.

Fermented dairy products: buttermilk, cheese, yoghurt

Unit III: 10 hrs

A brief account of typical fermenter, types of fermenter regulation of temperature , sterilization, aeration and foam control in a fermenter.

strain improvement of microorganisms and methods of strain improvement.

Unit IV: 10 hrs

Secondary metabolites, Industrial production of ethyl alcohol, wine, vinegar, vitamin B-12 , gibberellins and Penicillin.

Production of Biogas and Bioleaching.

Practical V MB 303

Agriculture microbiology, Medical Microbiology and Immunology

Instruction hrs / week – 4hrs

1. Estimation of Organic Carbon by Chromic acid method.
2. Isolation of microorganisms from rhizosphere.
3. Isolation and identification of *Rhizobium* from root nodules
4. Test for ammonification in soil
5. Study of koleroga of arecanut, rust of sorghum, coffee rust, blister blight of tea, citrus canker.
6. Determination of blood group_- Antigen antibody reaction.
7. Snyders test for Dental caries.
8. Isolation of microorganisms from skin , mouth and wounds
9. Detection of allergens- pollen count by sticky slide method.
10. Study of Tuberculosis, Foot and mouth diseases, *Staphylococcus, E.coli, Clostridium, Candida , Aspergillus*, Ring worm diseses.
11. Field trip related to agiculture research institute, hospital, Diagnostic laboratories and submission of report .

FIFTH SEMESTER

PAPER : MB 302 MEDICAL MICROBIOLOGY AND IMMUNOLOGY

40hrs

UNIT I: 12 Hrs

Human Pathogenecity, virulence and infection with special reference to clinical features, epidemiology, laboratory diagnosis, etiology. control of following bacteria- *Staphylococcus, Streptococcus , Salmonella, Shigella, E coli , Clostridium .*

Infection: sources of infection, mode of entry and exit, mode of transmission, control of infection.

UNIT II : 08 Hrs

Viral diseases: K.F.D , chicken pox, measles, Rabies, HIV, hepatitis

Fungi: *Candida albicans, Aspergillus*, Ringworm disese.

Protogoans: *T. vaginalis,* Giardiasis, *E. histolytica, Balantidium coli* and *Plasmodium.*

UNIT III: 08Hrs

Antibiotics: Definition and classification of antibiotics: Characteristics of ideal antibiotics, antimicrobial spectrum of antibiotics and mode of action of following antibiotics: Penicillin, streptomycin, chloramphenicol, tetracycline, Bacitracin, Gentamycin, Ketaconozole, Metronidazole Amphotericin B

UNIT IV: 12Hrs.

Immunology: Types of immunity- Innate, acquired and non-specific immunity.

Antigens: Immunological properties of antigens.

Immunoglobulins: classes and basic structure of immunoglobulins

Immune Response: Hypersensitivity, Antigen - Antibody reaction,. agglutination, precipitation, immune diffusion tests.

Vaccines: Types of vaccines: monoclonal antibodies, production and uses.

FIFTH SEMESTER
Paper MB 301 Agriculture Microbiology

40 hrs

Unit I: 10hrs

Soil Microbiology- soil composition, physico-chemical properties of soil as a habitat for microbes, soil micro flora - bacteria, fungi, algae, protozoa and viruses.

Bio geochemical cycles-Carbon, Nitrogen, phosphorus and sulphur.

Unit II: 8hrs

Plant microbe interactions: Rhizosphere, phyllosophere, mycorrhizal association.

Interaction among microorganisms- neutralism, commensalism, antagonism and parasitism.

Unit III: 12hrs

Microrganisms in agriculture- Biofertilizers, - *Rhizobium, Azatobacter, Azospirillum*, and Cyano bacteria, Nitrogen fixation , biochemistry of Nitrogen fixation.

Host parasite interaction, role of secondary metaboliles in disease development (toxins, hormones, enzymes), Defense Mechanism (structural and biochemical)

A study of symptoms, etiology, epidemiology and control of the plant diseases- TMV sandal spike, citrus canker, Bacterial, blight of rice, Koleroga of areca blast of rice.

Unit IV: 10 hrs

Organic matter – cellulose, hemicellulose, lignin and chitin decomposition in soil.

Biodegradation of pesticides(DDT, CFC, Malathion).

General account of Bioremediation of contaminated soil.

Practical IV MB 252
Molecular Biology and Biotechnology
Instruction hrs / week - 3 hrs.

1. Estimation of protein by Biuret method.
2. Estimation of sugar by DNS method.
3. Demonstration of Replica Plating Technique.
4. Separation of amino acids by paper chromatography.
5. Demonstration of thin layer chromatographic technique.
6. Demonstration of protein separation by gel electrophoresis.
7. Isolation of bacteriophages from sewage.
8. Effects of ultraviolet radiation on microorganisms.
9. Test for antibiotic sensitivity
10. Extraction of DNA from yeast.

B.Sc. IV Semester

Paper MB 251 Molecular Biology and Biotechnology

48 hrs

Unit 1 :- Molecular Biology 12hrs

Central dogma of Molecular Biology. Gene concept, genetic code, protein synthesis , modification of proteins, transport of proteins. The regulation of bacterial gene expression (lac operon concept)

Unit II:- Mutation 12hrs

Mutation- Mutagens, biochemical and Molecular basis of mutation.
Types of mutation- induced, spontaneous, point & frame shift mutation
Genotypic and phenotypic variation in microorganisms.

Unit III:- Genetic Engineering 14hrs

Genetic Engineering:- Principles of genetic engineering, restriction enzymes, recombinant DNA technology.
Vectors- plasmids, cosmids, phagemids, shuttle vectors and bacteriophages..
Application of genetic engineering – production of insulin, hepatitis B Vaccine, gene therapy, transgenic plants, biopesticides,
Potential hazards and safeguards – GM foods and genetically modified organisms, Biosensors and Bioindicators.

Unit IV:- Bioseparations 10hrs

Brief account of macromolecular separation by paper and thin layer chromatography.
Electrophoresis- principle of separation, types of paper and gel electrophoresis

Practical III MB 202
Microbial physiology and microbial genetics
3 hrs/week

1. Estimation of RNA by Orcinol method.
2. Estimation of DNA by DPA method.
3. Study of conjugation in bacteria.
4. Study of transformation in bacteria.
5. Study of transduction in bacteria.
6. Catalase test.
7. Oxidase test.
8. Urease test.
9. TSI Agar test.
10. IMVIC test.

THIRD SEMESTER
Paper 4B 201 Microbial Physiology and Microbial genetics

48 hrs

Unit I: Bioenergetics:- 12hrs

Entropy, enthalpy, free energy change, exothermic and Endothermic reaction, oxidation and reduction.
ATP and other energy rich compounds, energy coupling reactions, Enzymology: Definition, Component and classification of enzymes Michanism of enzyme action.

Unit II: Metabolism:- 16 hrs

Anabolism,catabolism,Respiration-glycolysis,TCA,ETC,Oxidative phosphorylation
Pentose phosphate path way, homolactic and heterolactic fermentation.
Photosynthesis, photosynthetic pigments, Types of bacterial photosynthesis, cyclic and non – cyclic photophosphorylation, comparison of photosynthesis in green plants and bacteria, oxygenic and anoxygenic bacteria.

Unit III: Microbial genetics:- 10hrs

Fundamentals of genetics: Prokaryotic and eukaryotic genetic material, DNA, and its chemical composition, Watson and Crick model of DNA, of RNA, different forms of DNA (B DNA,A DNA,C DNA,D DNA,Z DNA, single stranded DNA, circular and spherical DNA) .

Unit IV:- 10hrs

Structure of RNA, types of RNA; rRNA, mRNA, tRNA. (Clover leaf model of t RNA) Replication of DNA. Genetic recombination in Prokaryotes – Conjugation, Transformation and Transduction.

Practical II: MB -152
Microbial culture techniques and Basic Biochemistry.
3 hrs/week

1. Isolation and culturing of microorganisms- point, streak, spread, pour, swab methods, Serial dilution technique.
2. Study of colony characteristics of microorganisms
3. .Enumeration of bacteria by haemocytometer
4. Micrometry
5. Effect of pH and temperature on the Growth of bacteria.
6. Preparation of standard alkali and acid solution
7. Determination of bacterial growth curve.
8. Determination of fermentation of carbohydrates by microbes.
9. Determination of gelatin hydrolysis by microbes.
10. Determination of starch hydrolysis by microbes.

Practical I: MB- 102
General Microbiology
Instruction hrs :- 3 hrs/ week

1. Good laboratory practices, safety regulations and first aid techniques
2. Study and use of microscope
3. Study of instruments and glasswares
4. Simple staining technique for bacteria and fungi
5. Negative staining technique
6. Gram's staining technique
7. Endospore staining technique
8. Study of Structural bacterial motility by hanging drop method.
9. Structural study of *Lactobacillus , E.Coli, Staphylococcus, Penicillium, Rhizopus and Aspergillus.*
10. Structural study of *Nostoc , Spirulina, Oscillatoria, Paramecium,, Euglena, E. histolytica*

B.Sc. I Semester
Microbiology Optional (Theory)
Paper MB ~~101~~: General Microbiology

48 hrs

Unit I: Introduction to Microbiology **8hrs**

Definition, history and Development of Microbiology.
The contributions of Antony Van Leuven hock , Robert koch, Joseph Lister, Jenner, Spallanzani, Flemining, M.W. Beijerinch, Iwanowsky to the Development of Microbiology.
Scope and Significance of Microbiology as a modern Science

Unit II :- Microscopy **8hrs**

Discovery of microscope, study of compound microscope, Types of Microscope- Dark field, Phase contrast, stereomicroscopes Fluorescent microscope, Electron, Scanning and Transmission microscopes.

Unit III :- Sterilization techniques: **12hrs**

Principles and methods of sterilization.
Physical methods and chemical methods.
Staining tecniques:- Principle of staining
types of stains, methods of staining - simple , negative,
Differential, structural staining (flagella, endospore, capsule)

Unit IV:- General account of microorganisms: **20hrs**

Bacteria:- Outlines of classification, structures and reproduction of Bacteria
Fungi:- Outlines of classification, structure and reproduction in general
Protozoa: General feature, classification, structure and reproduction.
Algae and Cyanobacteria: General character, classification, distribution, morphology and structures.
General features of viruses, mycoplasmas, Rickettsia and Actinomycetes.

Question Paper pattern for B.Sc Microbiology

Internal Assessment Practical Examination

(Common to I, II, III & IV Semesters)

Time : 2 hrs Max: Marks : 15

Q.1 Conduct the experiment A & report the result 10

Q.2 Conduct the experiment B & report the result 5

(Common to V and VI Semester)

Time : 2 hrs Max Marks : 25

Q.1 Conduct the experiment A and report the result 10

Q.2 Conduct the experiment B and report the result 6

03. Identify and comment on C,D and E 3x3=9

Question paper pattern for B.Sc., Microbiology

University Practical Examination

(Common to I, II ,III & IV Semester)

Time: 3 hrs Max marks : 35

Q.1. Conduct the experiment A & report the result	12
Q.2. Conduct the experiment B & report the result	8
Q.3. Identity and comment on C, D & E	3x3= 9
Q.4. Class record and viva	6

(Common to V and VI Semester)

Time: 4hrs Max Marks: 50

Q. 1 Conduct the experiment A and report the result	12
Q. 2 Conduct the experiment B and report the result	8
Q. 3 Identify and comment on C,D, E and F	4x4=16
Q.4 Class record	4
O.5 Viva voce (based on project report and field report submitted by the students)	10

Question Paper pattern for B.Sc Microbiology
Internal Assessment Examination-I
(Common to V & VI Semester)
(One Test to be conducted)

Time: 1.30 hrs | Max Marks:25

I. Answer the following | $1 \times 10 = 10$

1.

Or

1.

II. Answer any Three | $3 \times 5 = 15$

2.
3.
4.
5.
6.

Question Paper pattern for B.Sc Microbiology
Internal Assessment Examination-II
(Common to I,II,III,IV Semester)
(One Test to be conducted)

Time: 30 minutes Max Marks:10

I. Answer the following (Objective type questions) 10 × 1= 10

1.
(a) (b) (c) (d)

2.
(a) (b) (c) (d)

3.
(a) (b) (c) (d)

4.
(a) (b) (c) (d)

5.
(a) (b) (c) (d)

6.
(a) (b) (c) (d)

7.
(a) (b) (c) (d)

8.
(a) (b) (c) (d)

9.
(a) (b) (c) (d)

10.
(a) (b) (c) (d)

Question Paper pattern for B.Sc Microbiology
Internal Assessment Examination-I
(Common to I,II,III,IV Semester)
(One Test to be conducted)

Time:1.00 hrs

Max Marks:20

I. Answer any One
1.
2.

$1 \times 8 = 8$

II. Answer any Two
3.
4.
5.
6.

$2 \times 4 = 8$

III. Answer any Two
7.
8.
9.
10.

$2 \times 2 = 4$

Question paper pattern for B.Sc., Microbiology
University Theory examination
(Common to V and VI Semester)
(Third Year)

Time : 2 hrs

Max Marks : 50

I Answer any two : $2 \times 10=20$

1.
2.
3.
4.

II Answer any Three: $3 \times 6=18$

5.
6.
7.
8.
9.

III Answer any Six: $6 \times 2=12$

10.
11.
12.
13.
14.
15.
16.
17.
18.

Question Paper pattern for B.Sc., Microbiology
University Theory examination
(Common to I, II, III & IV Semester)
(First and Second Year)

Time : 2 hrs. Max Marks : 70

I Answer any Three : 3x10=30

1.

2.

3.

4.

II Answer any Four: 4x6 = 24

5

6

7

8

9

10

III White short notes on any Eight : 2 × 8=16

11.

12.

13.

14

15

16

17

18

19

20

ommon Scheme for fifth / sixth Semester :

SEMESTER

d	Paper	Instruction hour/week	Duration of Exam hours	Maximum Marks for Exam	Internal assessment Max Marks	Total Marks	Credits
	Theory MB301	3	2	50	25	75	2
gy	Theory MB 302	3	2	50	25	75	2
	Practical MB303	4	4	50	25	75	2

IB-301- Agricultural Microbiology (Theory)
IB 302- Medical Microbiology and Immunology (Theory)
IB303-Agricultural Microbiology, Medical microbiology and Immunology (Practical)

VI semester

and	Paper	Instruction hours /week	Duration of Exam hours	Max Marks for Exam	Internal assessment (max marks)	Total Marks	Credit
	Theory MB 351	3	2	50	25	75	2
ology	Theory MB 352	3	2	50	25	75	2
	Practical MB 353	4	4	50	25	75	2

MB 351- Food and Industrial Microbiology (Theory)
MB 352- Environmental Microbiology, Biostatistics and Bioinformatics (Theory)
MB-353-Food, Industrial and Environmental Microbiology (Practical)

Mangalore University
B.Sc Degree Course
Optional subject:- MICROBIOLOGY
Scheme for credit Based Semester
Common Scheme for First to Fourth Semester :B.Sc in Microbiolo

I and II Semester

Subject	Paper	Instruction hours per week	Duration of exam (hrs)	Max Marks for exam	Internal Assessment (Max Marks)	Total Marks	Cre
I Sem Microbiology	Theory MB101	4	2	70	30	100	2
	Practical MB102	3	3	35	15	50	1
II Sem Microbiology	Theory MB151	4	2	70	30	100	2
	Practical MB 152	3	3	35	15	50	

MB 101 – General Micro Biology (Theory)
MB 102 – General Microbiology (Practical)
MB 151 – Microbial Culture Techniques and Basic Biochemistry (Theory
MB 152 – Microbial culture Techniques and Basic Biochemistry (Practica

III and IV Semester

Subject and semester	Paper	Instruction hours per week	Duration of exam (hrs)	Max Marks for exam	Internal Assessment (Max Marks)	Total Marks
III Sem Microbiology	Theory MB201	4	2	70	30	100
	Practical MB202	3	3	35	15	50
IV Sem Microbiology	Theory MB251	4	2	70	30	100
	Practical MB 252	3	3	35	15	50

MB 201 – Microbial physiology and Microbial genetics (Theory)
MB 202 – Microbial physiology and Microbial genetics (Practical)
MB 251 – Molecular Biology and Biotechnology (Theory)
MB 252 – Molecular Biology and Biotechnology (Practical)

MANGALORE UNIVERSITY

Three Year(6 Semester)B.Sc
Microbiology Degree Course

(CREDIT BASED SEMESTER SCHEME
TO BE EFFECTIVE FROM 2010-11)

ದೂರವಾಣಿ Phone 0824-2287276
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ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
MANGALORE UNIVERSITY

ಕುಲಸಚಿವರ ಕಛೇರಿ
ಮಂಗಳಗಂಗೋತ್ರಿ - 574199
Office of the Registrar
Mangalagangothri - 574199

ದಿನಾಂಕ / Date :18.06.2010

ಸಂ: MU/ACC/CR.87/2009-10/A2

NOTIFICATION

Sub: Revised Syllabus of Microbiology for Undergraduate courses

Ref: Academic Council decision dated 6.05.2010.

The revised Syllabus of Microbiology, an optional subject for Undergraduate courses which approved by the Academic Council at its meeting held on 6.05.2010 is hereby notified for implementation with effect from the academic year 2010-11.

REGISTRAR.

To:

1. The Principals of the concerned Colleges.
2. The Registrar (Evaluation), Mangalore University.
3. The Chairman, UG BOS in Microbiology, Mangalore University.

Question paper pattern for B.Sc., Microbiology

University Practical Examination

(Common to I, II ,III & IV Semester)

Time: 3 hrs Max marks : 40

Q.1. Conduct the experiment A & report the result	12
Q.2. Conduct the experiment B & report the result	8
Q.3. Identity and comment on C, D, E & F	4 x3= 12
Q.4. Class record and viva	4+4 = 8

(Common to V and VI Semester)

Time: 4hrs Max Marks: 80

Q. 1 Conduct the experiment A and report the result	17
Q. 2 Conduct the experiment B and report the result	13
Q. 3 Identify and comment on C,D, E, F ,G & H	6 x4=24
Q.4 Class record	12
O.5 Viva voce (based on project report and field report submitted by the students)	14

Common Scheme for fifth / sixth Semester :

V SEMESTER

Subject and semester	Paper	Instruction hour/week	Duration of Exam hours	Maximum Marks for Exam	Internal assessment Max Marks	Tota Mark
V Sem Microbiology	Theory MB301	3	3	80	20	100
	Theory MB 302	3	3	80	20	100
	Practical MB303	4	4	80	20	100

MB-301- Agricultural Microbiology (Theory)
MB 302- Medical Microbiology and Immunology (Theory)
MB303-Agricultural Microbiology, Medical microbiology and Immunology (Practical)

VI semester

Subject and Semester	Paper	Instruction hours /week	Duration of Exam hours	Max Marks for Exam	Internal assessment (max marks)	Total Mark
VI Sem Microbiology	Theory MB 351	3	3	80	20	100
	Theory MB 352	3	3	80	20	100
	Practical MB 353	4	4	80	20	100

MB 351- Food and Industrial Microbiology (Theory)
MB 352- Environmental Microbiology, Biostatistics and Bioinformatics (Theory)
MB-353-Food, Industrial and Environmental Microbiology (Practical)

ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ
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Office of the Registrar
Mangalagangothri - 574199

MU/ACC/CR87/2009-10/A2

ದಿನಾಂಕ / Date : 4/10/2010

CIRCULAR

Sub: Revised syllabus of Microbiology for undergraduate courses- corrections in the scheme of examination & pattern of question papers.

Ref: This office notification of even No. dated: 18-6-2010.

* * * * *

This scheme of examination and pattern of question papers of revised syllabus Microbiology are corrected as per existing Regulations governing undergraduate ::ree programmes of Mangalore University and enclosed herewith for :plementation with effect from the academic year 2010-11.

Scheme of examination and pattern of question papers provided in above :ification are withdrawn. However, the syllabus is unaltered.

REGISTRAR

) The Principals of the concerned colleges.
) The Registrar (Evaluation), Mangalore University.
) The Chairman, UG BOS in Microbiology, Mangalore University.

Question Paper pattern for B.Sc Microbiology

Internal Assessment Practical Examination

(Common to I, II, III & IV Semesters)

Time : 2 hrs

Max: M

Q.1 Conduct the experiment A & report the result

Q.2 Conduct the experiment B & report the result

(Common to V and VI Semester)

Time : 2 hrs

Max Mar

Q.1 Conduct the experiment A and report the result 07

Q.2 Conduct the experiment B and report the result 04

03. Identify and comment on C,D and E 3x3=9

Question paper pattern for B.Sc., Microbiology

University Practical Examination

(Common to I, II ,III & IV Semester)

Time: 3 hrs — Max marks : 40

Q.1. Conduct the experiment A & report the result	12
Q.2. Conduct the experiment B & report the result	8
Q.3. Identity and comment on C, D, E & F	4 x3= 12
Q.4. Class record and viva	4+4 = 8

(Common to V and VI Semester)

Time: 4hrs — Max Marks: 80

Q. 1 Conduct the experiment A and report the result	17
Q. 2 Conduct the experiment B and report the result	13
Q. 3 Identify and comment on C,D, E, F ,G & H	6 x4=24
Q.4 Class record	12
O.5 Viva voce (based on project report and field report submitted by the students)	14

Question Paper pattern for B.Sc Microbiology
Internal Assessment Examination- I
(Common to V & VI Semester)
(One Test to be conducted)

Time: 1.00hrs | Max Marks

I. Answer the following | $1 \times 10 = 10$

1.

Or

1.

II. Answer any two | $2 \times 5 = 10$

2.

3.

4.

5.

6.

Question Paper pattern for B.Sc Microbiology
Internal Assessment Examination-II
(Common to I,II,III,IV Semester)
(One Test to be conducted)

Time: 30 minutes

Max Marks:10

I. Answer the following (Objective type questions) $10 \times 1 = 10$

1. (a) (b) (c) (d)

2. (a) (b) (c) (d)

3. (a) (b) (c) (d)

4. (a) (b) (c) (d)

5. (a) (b) (c) (d)

6. (a) (b) (c) (d)

7. (a) (b) (c) (d)

8. (a) (b) (c) (d)

9. (a) (b) (c) (d)

10. (a) (b) (c) (d)

Question Paper pattern for B.Sc Microbiology
Internal Assessment Examination-I
(Common to I,II,III,IV Semester)
(One Test to be conducted)

Time:1.00 hrs

Max Marks:20

I. Answer any One

1.

2.

II. Answer any Two

3.

4.

5.

6.

$2 \times 4 = 8$

III. Answer any Two

7.

8.

9.

10.

$2 \times 2 = 4$

Question paper pattern for B.Sc., Microbiology
University Theory examination
(Common to V and VI Semester)
(Third Year)

Time : 3 hrs Max Marks : 80

I Answer any Three 3 × 10= 30

1.
2.
3.
4.

II Answer any five : 5 × 6= 30

5.
6.
7.
8.
9.

III Answer any ten 10 × 2= 20

10.
11.
12.
13.
14.
15.
16.
17.
18.

Question Paper pattern for B.Sc., Microbiology
University Theory examination
(Common to I, II, III & IV Semester)
(First and Second Year)

Time : 3 hrs. Max Marks

I Answer any Three :

1.

2.

3.

4.

II Answer any Four: 4x6 = 24

5

6

7

8

9

10

III White short notes on any 10 : 2x

11.

12.

13.

14

15

16

17

18

19

20

Common Scheme for fifth / sixth Semester :

V SEMESTER

and	Paper	Instruction hour/week	Duration of Exam hours	Maximum Marks for Exam	Internal assessment Max Marks	Total Marks	Credits
iology	Theory MB301	3	3	80	20	100	2
	Theory MB 302	3	3	80	20	100	2
	Practical MB303	4	4	80	20	100	2

MB-301- Agricultural Microbiology (Theory)
MB 302- Medical Microbiology and Immunology (Theory)
MB303-Agricultural Microbiology, Medical microbiology and Immunology (Practical)

VI semester

ect and ester	Paper	Instruction hours /week	Duration of Exam hours	Max Marks for Exam	Internal assessment (max marks)	Total Marks	Credit
Sem robiology	Theory MB 351	3	3	80	20	100	2
	Theory MB 352	3	3	80	20	100	2
	Practical MB 353	4	4	80	20	100	2

MB 351- Food and Industrial Microbiology (Theory)
MB 352- Environmental Microbiology, Biostatistics and Bioinformatics (Theory)
MB-353-Food, Industrial and Environmental Microbiology (Practical)

Mangalore University
B.Sc Degree Course
Optional subject:- MICROBIOLOGY
Scheme for credit Based Semester
Common Scheme for First to Fourth Semester :B.Sc in Microbiology

I and II Semester

Subject	Paper	Instruction hours per week	Duration of exam (hrs)	Max Marks for exam	Internal Assessment (Max Marks)	Total Marks	Credi
I Sem Microbiology	Theory MB101	4	3	80	20	100	2
	Practical MB102	3	3	40	10	50	1
II Sem Microbiology	Theory MB151	4	3	80	20	100	2
	Practical MB 152	3	3	40	10	50	1

MB 101 – General Micro Biology (Theory)
MB 102 – General Microbiology (Practical)
MB 151 – Microbial Culture Techniques and Basic Biochemistry (Theory)
MB 152 – Microbial culture Techniques and Basic Biochemistry (Practical)

III and IV Semester

Subject and semester	Paper	Instruction hours per week	Duration of exam (hrs)	Max Marks for exam	Internal Assessment (Max Marks)	Total Marks	Cr
III Sem Microbiology	Theory MB201	4	3	80	20	100	
	Practical MB202	3	3	40	10	50	
IV Sem Microbiology	Theory MB251	4	3	80	20	100	
	Practical MB 252	3	3	40	10	50	

MB 201 – Microbial physiology and Microbial genetics (Theory)
MB 202 – Microbial physiology and Microbial genetics (Practical)
MB 251 – Molecular Biology and Biotechnology (Theory)
MB 252 – Molecular Biology and Biotechnology (Practical)

MANGALORE UNIVERSITY

Three Year(6 Semester)B.Sc
Microbiology Degree Course

(CREDIT BASED SEMESTER SCHEME
TO BE EFFECTIVE FROM 2010-11)

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Office of the Registrar
Mangalagangothri - 574

ಸಂ: MU/ACC/CR87/2009-10/A2

ದಿನಾಂಕ / Date : 4/1

CIRCULAR

Sub: Revised syllabus of Microbiology for undergraduate courses- corrections in the scheme of examination & pattern of question papers.

Ref: This office notification of even No. dated: 18-6-2010.

* * * * *

This scheme of examination and pattern of question papers of revised syllabus of Microbiology are corrected as per existing Regulations governing undergraduate degree programmes of Mangalore University and enclosed herewith for implementation with effect from the academic year 2010-11.

Scheme of examination and pattern of question papers provided in above notification are withdrawn. However, the syllabus is unaltered.

REGISTRAR

To:

1) The Principals of the concerned colleges.
2) The Registrar (Evaluation), Mangalore University.
3) The Chairman, UG BOS in Microbiology, Mangalore University.