



ग्वालियर, दिनांक 18 अगस्त, 2018

माइक्रो बायोलोजी विभाग
अध्ययन मंडल की बैठक का कार्यवाही विवरण

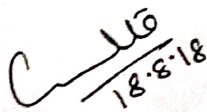
नवीन सत्र 2018-19 हेतु ~~माइक्रो बायोलोजी~~ विषय से सम्बंधित
अध्ययन मण्डल की बैठक आज दिनांक 18 अगस्त, 2018 को प्रातः 11:00 बजे
~~वन शास्त्र~~ विभाग में आयोजित की गई, जिसमें निम्नानुसार उपस्थिति रही -

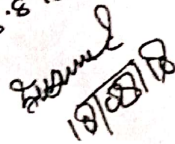
1. डॉ. सायना पांडेय *Saina Pandey*
2. डॉ. ~~विष्णु लाल शर्मा~~ *18-8-18*
3. डॉ. प्रीति कुलश्रेष्ठ *P. Kulshrestha 18/8/18*
4. डॉ. सुरभि श्रीवास्तव अनुपस्थित
5. डॉ. सुशील शर्मा DR SUSHIL KUMAR SHARMA *Sushil*
6. डॉ. महिन्द्र गुप्ता *18/8/18*
7. डॉ. चरन जीत मेहता *18-8-18*
8. डॉ. अविनाश मिश्रा - अनुपस्थित
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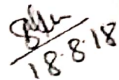
अध्ययनमंडल की बैठक की कार्यवाही निम्नानुसार रही -


1. ~~माइक्रोबायोलॉजी~~ विषय के स्नातक स्तर के प्रथम एवं द्वितीय वर्ष का पाठ्यक्रम अंक योजना सहित सत्र 2018-2019 हेतु अध्ययनमंडल द्वारा मान्य किया जाता है।
2. ~~माइक्रोबायोलॉजी~~ विषय के स्नातक स्तर के पंचम एवं षष्ठ सेमेस्टर के पाठ्यक्रम अंक योजना सहित सत्र 2018-2019 हेतु अध्ययनमंडल द्वारा मान्य किया जाता है।
3. ~~माइक्रोबायोलॉजी~~ विषय की सत्र 2018-2019 में होने वाली परीक्षाओं हेतु संलग्न परीक्षकों की सूची को अध्ययनमंडल द्वारा मान्य किया जाता है।
4. विभाग में सत्र 2018-2019 में यदि कोई शोध संगोष्ठी/कार्यशाला/अधिवेशन/अध्ययन भ्रमण आदि के आयोजन का प्रस्ताव है तो उसका विवरण एवं अनुमोदन
~~स्थानीय शैक्षणिक/शास्य संस्थानों के प्रमुख
विषय विशेषज्ञों द्वारा उपस्थित
राज्य विश्वविद्यालय पर से प्रतिक्रिया मिलाने~~
5. यदि अन्य कोई विषय हो तो उसका विवरण एवं अनुमोदन।

हस्ताक्षर अध्ययन मंडल अध्यक्ष एवं समस्त सदस्य


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Department of Higher Education, Madhya Pradesh Bhopal
Syllabus approved by Central Board of Studies in Microbiology
SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE
(From 2017-18 onwards)
B.Sc. Microbiology: Scheme

Year	Course title	CCE	Distribution of marks			
			Theory Exam	Total Theory	Practical Exam	Total (Theory + Practical)
B.Sc.- I year	Paper -I General Microbiology & Cell Biology	10	40	50	50	150
	Paper -II Tools & Techniques in Microbiology	10	40	50		
B.Sc.- II year	Paper -I Biochemistry & Microbial Physiology	10	40	50	50	150
	Paper -II Microbial Genetics & Molecular Biology	10	40	50		
B.Sc.- III year	Paper -I Applied & Environmental Microbiology	10	40	50	50	150
	Paper -II Immunology & Medical Microbiology	10	40	50		
Grand Total						450

Scheme of practical examination for each Year

- | | | |
|---------------------|----------|------------------------|
| 1. Major exercise | 14 Marks | Total marks- 50 |
| 2. Minor exercise-1 | 8 Marks | |
| 3. Minor exercise-2 | 8 Marks | |
| 4. Spotting (5) | 10 Marks | |
| 5. Viva-voce | 05 Marks | |
| 6. Practical record | 05 Marks | |

List of practicals are given for each year, separately (after syllabus)

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SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE
(From 2017-18 onwards)

B.Sc. FIRST YEAR - MICROBIOLOGY
Paper-I General Microbiology and Cell Biology

MM - 42.5

UNIT I

Introduction to Microbiology, History, Scope and Development of Microbiology, Branches of Microbiology, Concept of diseases, Contributions of eminent microbiologist of India and Abroad, Applications of Microbiology in human welfare.

UNIT II

Classification, general characteristics and structure of bacteria (Eubacteria and Archaeobacteria), Ultrastructure of bacterial cell, Surface appendages- flagella, pilli, prosthecae and stalk, Surface layers of bacteria- sheath, glycocalyx and cell wall, Internal cell structures- cell membrane, Internal membrane system, Mesosomes and Gas vacuoles, Cytoplasmic matrix- Ribosomes, Nucleoid and cytoplasmic inclusions, Dormant structures- Exospores, Cysts and Endospores Structure of Cyanobacteria, Actinomycetes, Mycoplasma, Rickettsia and Chlamydia with emphasis on function of each part components.

UNIT III

Classification, brief introduction to classes of fungi, general characteristics, thallus, mycelia modification, nutrition, heterokaryosis, structure with emphasis on function of each part and components of cell, Sexual and asexual reproduction, ^{Medical} Economic importance of fungi. Classification, general characteristics, morphology and structure of phages, phage nucleic acids, Virus host. General features of virus reproduction, Lytic and lysogenic cycle and their mechanism. DNA and RNA viruses, T4, TMV, Pox virus, Prions, Virions, Virusoid and Viriod

UNIT IV

Structural organization and function of cell organelles, Cell cycle, cell division, Membrane structure and intercellular transport, cell locomotion, cellular interaction, cell differentiation and senescence.

UNIT V

Isolation and maintenance of Microorganisms, Pure, axenic, mixed culture, strain, isolate, clone- Definitions. Pure culture techniques, Dilution, Plating- pour plate method, spread plate method, streak plate method, Enrichment culture and micromanipulator, Maintenance and preservation of pure cultures, subculturing, overlaying, cultures with mineral oils, lyophilization, sand cultures, storage at low temperature, Major Microbial Culture Collection Centers in India. → Cyo/preservation

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Department of Higher Education, Madhya Pradesh Bhopal
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SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE
(From 2017-18 onwards)
B.Sc. FIRST YEAR -MICROBIOLOGY
Paper-II Tools and techniques in Microbiology

MM - 42.5

UNIT I

Principle and working of Bright field Microscopy, Dark Field Microscopy, Phase Contrast Microscopy, UV and Fluorescent Microscopy, Electron Microscopy, Types of Electron Microscope (TEM & SEM). Preparation of Specimen, Advantages, limitations and applications of microscopy, Use of Software in Microscopy.

UNIT II

Instrumentation techniques, basic principle, function and applications of Autoclave, Oven, BOD Incubator, Laminar Air Flow, Colorimeter, Spectrophotometer, Centrifugation, Basic principles of sedimentation, methods and applications, Chromatography, types of chromatography and applications of Chromatography.

UNIT III

Occular and stage micrometry, Cell count, Haemocytometry, Use of Camera Lucida, Stains and staining techniques- Chemistry of dyes and stains, Fixation, Smears, Types of staining- Monochrome, negative staining, Differential staining - Gram staining and Acid Fast staining, Cell wall staining, Metachromatic granule staining, Capsule staining.

UNIT IV

Types of media, Preparation of media, Characteristics of growth medium, Sterilization, Mode of action of antimicrobial agents, Physical agents, Applications of high temperatures for destruction of Microorganisms- Moist heat, boiling water Pasteurization, dry-heat, incineration, low temperatures, desiccation, lyophilization, Osmotic pressure, plasmolysis and plasmoptysis, Radiation- Ultraviolet light, X- rays, Gamma rays, Cathode rays.

Chemical Agents, Characteristics of an ideal antimicrobial chemical agent, disinfectant, antiseptic, sanitizer, germicide, bactericide, bacteriostasis, antimicrobial agent, Criteria for selection of chemical agent for practical applications, Major groups of chemical antimicrobial agents and their mode of action.

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UNIT V

Principle of Biostatistics, Classification of Data, Tabulation and graphical representation, Measure of Central tendency, Mean, Mode, Median- merits and demerits, Measure of Dispersion Range, Mean Deviation Variance and Standard Deviation, χ^2 (Chi square), t-test and F-test.

Bioinformatics, Basic Organization of Computer, Computer Hardware, Software, Bit, Byte, Computer Memory, Binary Code, Binary System, Introduction to Bioinformatics, Database and applications of bioinformatics. *Boi of introduction of softwares/ tools useful for Bioinformatic analysis.*

List of suggested books:

- Microbiology-Pelczar MJ, Chan ECS & Kreig NR, 5th edition (Tata McGraw-Hill, NewDelhi).
- Fundamentals of Microbiology-Frobisher M, Hinsdill RD, Crabtree KT & Goodheart CR, 9th edition (W.B. Saunders Co.).
- Fundamental Principles of Bacteriology -Salle AJ, 7th edition (Tata McGraw-Hill, NewDelhi).
- Microbiology- Prescott LM, Harley JP & Klein DA, 7th edition (Wm. C. Brown Publishers,USA) Elementary Microbiology-Modi, HA (Vol.I), 1st edition (Ekta Pakashan, Nadiad).
- A Handbook of Elementary Microbiology-Modi, HA, 1st edition (Shanti Pakashan, Rohtak).
- A Textbook of Microbiology- Dubey RC & Maheshwari DK, 2nd edition(S Chand & Co. N. Delhi).
- General Microbiology (Vol I, II, III)- Powar CB & Dagainawala HF, 2nd edition (Himalaya Publication, Bombay).
- Biostatistics – Arora PN, Malhan PK, 1st edition (Himalaya Publishing House, Mumbai). How computers work-White R, 10th edition (Que Publishing).
- How the Internet works-Gralla P, 8th edition (Que Publishing).
- Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins (Methods of Biochemical Analysis -Baxevanis AD, Ouellette BFF, 1st edition (John Wiley & Sons).
- Bioinformatics: Sequence, Structure, and Databanks: A Practical Approach-Higgins D, Taylor W, 1st edition (Oxford University Press).

List of Practicals based on paper I and II for B.Sc. I Year (MM, 50):

Teachers should give instruction to the students to take necessary precautions while working in Microbiology laboratory.

1. Demonstration and briefing about principles and working of basic instruments, autoclave, incubator, hot air oven, pH meter, laminar air flow, spectrophotometer and centrifuge.
2. Basic media preparation, autoclaving, cleaning and sterilization of glass wares.
3. Media preparation Liquid media – Peptone water, Nutrient broth. Solid media – Nutrient agar (Agar slant, Agar plate) Enriched Medium – Blood agar, Differential medium – Mac Conkey agar, Enrichment Medium – Selenite F broth, Selective medium – EMB
4. Culture characteristics of Microorganisms on different media.
5. Demonstration of selective and differential media.
6. Isolation of bacteria from water and soil by serial dilution agar plating method.
7. Isolation of fungi from water and soil by serial dilution agar plating method.
8. Estimation of air microflora.

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- 9. Isolation of bacteria by pour plate method.
- 10. Isolation of bacteria by streak plate method.
- 11. Isolation of bacteria by spread plate method.
- 12. Preparation of smear and microscopic examinations of Fungi – *Mucor* spp., *Aspergillus* spp., *Penicillium* spp. & *Alternaria* spp. Bacteria – *Staphylococcus* spp. *Lactobacillus* spp. *Escherichia* spp. *Vibrio* spp. & *Leptospira* spp.
- 13. Staining techniques – Simple staining, Differential staining (Gram's, Ziehl-Neelsen), Spore and Capsular staining methods.
- 14. Designing of at least two innovative experiments based on the available facility in the college/ University related to subject.

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SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE
(From 2017-18 onwards)

B.Sc. SECOND YEAR - MICROBIOLOGY
Paper-I Biochemistry and Microbial Physiology

MM - 42.5

Unit I

General properties, classification and function of carbohydrates, lipids, proteins and ^{Nucleic acids} amino-acids.
General properties, classification and nomenclature of enzymes. Factors affecting enzyme activity, mechanism of enzyme action, regulations of enzyme activity, applications of enzymes.

Unit II

Growth and measurement of growth, mathematical expression of growth, growth curve, growth yield, factors affecting growth effect of nutrients, temperature, oxygen, pH, osmotic pressure. Cell count, direct and indirect method, dry weight and wet weight method, synchronous cultures. continuous culture, and batch cultures.

Unit III

Energy production in anaerobic and aerobic process, glycolysis, Pentose phosphate pathway, Entner Duodoroff pathway, fermentation, glucose fermentation by *E. coli*, TCA cycle, heterotrophic carbon dioxide fixation, Glyoxylate cycle, catabolism of lipids, α and β -oxidation, catabolism of proteins, aerobic respiration. Principles of Bioenergetics, oxidation-reduction reaction. Redox-potential, oxidative phosphorylation hypothesis.

Unit IV

Utilization of Energy, Methods of studying Microbial biosynthesis, assimilation of Ammonia, Nitrogen and Sulphate Utilization of energy in non-biosynthetic and biosynthetic process, Diffusion, gaseous exchange, osmosis, plasmolysis, transport of nutrients in bacteria- active transport, passive diffusion, facilitated diffusion, group translocation.

Unit V

Energy production by photosynthesis, photochemical reaction, cyclic and non cyclic photophosphorylation, role of ATP in metabolism, role of reducing power in metabolism, role of precursors of metabolism, component of electron transport chain and arrangement of ETC in cell membrane.

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Department of Higher Education, Madhya Pradesh Bhopal
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SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE
(From 2017-18 onwards)

B.Sc. SECOND YEAR - MICROBIOLOGY
Paper-II Microbial Genetics and Molecular Biology

MM - 42.5

UNIT I

Structure and genetic material of microbes, Nucleic acid as genetic material, Physical and chemical structure and different forms of DNA. Melting curve of DNA and T_m value determination, Buoyant density of DNA and its relationship with mole (G+C) content in DNA, Types of RNA, mRNA, rRNA, tRNA. Gene structure and functions.

UNIT II

Types of DNA replication, Replication of DNA in prokaryotes and eukaryotes, Conservative, Semi-conservative and Dispersive mode of replication, mechanism of replication, Messelson and Stahl experiment, DNA topology, Supercoiling of DNA and linking number, Enzymes involved in replication of DNA.

Molecular Mechanism of chromosomal replication, Models of chromosomal replication, Cairns model, Rolling Circle model. Translation and transcription in prokaryotes and eukaryotes.

UNIT III

Basic features of genetic code, Biological significance of degeneracy, Wobble hypothesis, Poly cistronic RNA, Overlapping genes, deciphering of genetic code, gene translocation, Ribosomes, and role in protein synthesis, tRNAs, initiation, elongation and termination of protein synthesis in prokaryotes, post translational modification of polypeptides, regulation of protein synthesis, Lac operon, Repressible operon.

UNIT IV

Genetic recombination in bacteria, transformation, conjugation, F factor, Hfr strains, transduction in microbes, plasmids and binary vectors, transposons, transformation techniques, use of bacteria and viruses in genetic engineering.

UNIT V

DNA mutation and repair, types of mutation, evidence of spontaneous nature of mutation, fluctuation test, new comb's experiment and replica testing, mode of action of physical, chemical and biological mutagens-UV rays, nitrous acid, 5-bromouracil, 2-aminopurine, EMS, Reversion in mutation, true reversion, suppression and types of suppressor mutation, DNA repair mechanism, Photo reactivation, excision, mismatch, SOS repair and dealkylation repair.

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List of recommended books:

- Microbiology-Pelczar MJ, Chan ECS & Kreig NR, 5th edition (Tata McGraw-Hill, New Delhi).
- Fundamentals of Microbiology-Frobisher M, Hinsdill RD, Crabtree KT & Goodheart CR, 9th edition (W.B. Saunders Co.).
- Fundamental Principles of Bacteriology -Salle AJ, 7th edition (Tata McGraw-Hill, New Delhi).
- Microbiology- Prescott LM, Harley JP & Klein DA, 7th edition (Wm. C. Brown Publishers, USA).
- Elementary Microbiology-Modi, HA (Vol.I), 1st edition (Ekta Pakashan, Nadiad).
- A Handbook of Elementary Microbiology-Modi, HA, 1st edition (Shanti Pakashan, Rohtak).
- A Textbook of Microbiology- Dubey RC & Maheshwari DK, 2nd edition (S Chand & Co. N. Delhi).
- General Microbiology (Vol I, II, III)- Powar CB& Dagainawala HF, 2nd edition (Himalaya Publication, Bombay) Lehninger-Principles of Biochemistry- Nelson DL & Cox MM, 4th edition (CBS Publishers, New Delhi).
- Microbial Physiology- Moat AG, Foster JW & Spector MP, 4th edition (John Wiley & Sons).
- Fundamentals of Biochemistry-Jain JL, Jain S & Jain N, 8th edition (SChand & Co. New Delhi).
- Biochemistry- Satyanarayana U, 4th edition (Elsevier, India).
- Genetics- Russel JP, 2nd edition (Scott, Foresman & Company, USA).
- Principles of Genetics- Gardner JE, Simmons JM & Snustad PD, 8th edition (John Wiley & Sons, Canada)..
- Concepts of Genetics- Klug WS&Cummings MR, 10th edition (Bejamin Cummings, USA).
- Microbial Genetics- Freifelder D, 2nd edition (Jones & Bartlett, Boston).
- Molecular Biology & Genetic Engineering- Singh BD, 1st edition (Kalyani Publishers).
- Essentials of Practical Microbiology- Patel B & Phanse N, 1st edition (Print Care, Indore).
- Experiments in Biotechnology- Nighojkar S& Nighojkar A, 1st edition (Satprachar Press, Indore).
- Recombinant DNA Technology- Sardul Singh Sandhu (2008). IK International publisher, New Delhi.

List of Practicals based on paper I and II for B.Sc. II Year (MM, 50)

1. To determine the pH of a given solution.
2. To prepare a buffer solution.
3. Identification of biological compound, Carbohydrates – Molisch’s test, Protein - Biuret test, Lipid - Saponification test
4. Qualitative analysis for amino acid- Color reaction for amino acid, Biuret test, Ninhydrine test.
5. Quantitative analysis of fat- Test for oil, Solubility test, Emulsion test, Absorption test.
6. Estimation of glucose by Cole’s method

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7. Estimation of protein by Folin Lowry method.
8. Estimation of total lipid by dichromate method.
9. Study of enzyme activity and effect of different factors on enzyme activity.
10. Demonstration on isolation of DNA.
11. Quantitative estimation of DNA by DPA method.
12. Quantitative estimation of RNA by Orcinol method.
13. To study conjugation in bacteria.
14. To transfer bacterial colonies by replica plating method.
15. Effect of UV light on growth of bacteria.
16. Effect of mutagen on the growth of bacteria.
17. To study antibiotic resistance in bacteria.
18. Primary screening of amylase/ protease producers.
19. Designing of at least two innovative experiments based on the available facility in the college/ University related to subject

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Semester V

MB501: Enzymology & Immunotechnology

Unit I:

Enzyme: Nomenclature & classification of enzymes. Mechanism of Enzyme action: Enzyme specificity, Active site, Effect of pH, temperature on enzymatic reactions. Coenzymes & Cofactors, substrate enzyme relationship, structure and function of conenzymes ; CoA, NAD/NADP, FMN/FAD, Biotin, Folic acid, vit. B12,

Unit II:

Enzyme Technology : Microbial Production of Industrial enzymes: Cellulase, amylase & protease. Application, of enzymes in food & pharmaceutical industries- large scale enzyme extraction, purification & stabilization. Clinical enzymology – Serum enzymes in health and diseases.

Unit III:

History & development of Immunology. Infection: types and sources of infection. Active & passive immunity, Brief introduction to humoral & cellular immunity. Clonal selection theory.

Unit IV:

Antigens: definition and determination of antigenicity. Structure, ^{and types} & function of immunoglobulins. Antigen - antibody reaction, Immunological techniques: RIA, ELISA.

Unit V:

Hybridoma ^{Technology} techniques: monoclonal antibody production & their applications. Vaccines: types of vaccines, prophylaxis against diseases.

Recommended Books:

1. Biochemistry by Lehninger
2. Enzyme: Biochemistry and Biotechnology Palmer and Trevor
3. Immunology by Kubey.
4. Immunology by G.P. Talwar.

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MB502: Practical work:

1. Detection of blood group.
2. Detection of antigen or antibody in serum.
3. Cell counting in blood.
4. Enzyme production by microorganisms.
5. Effect of various parameters viz pH, temperature on enzyme activity.

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Semester VI

MB601: Environmental Microbiology & Biostatistics

Unit I:

Soil microorganisms: Types of microbial communities in air, water and soil; microbial diversity: Rhizosphere & phyllosphere. Microbial interaction between microbes – neutralism, commensalism, synergism, mutualism, ammensalism, competition, parasitism and predation. Biogeochemical cycling – Carbon, Nitrogen, Sulphur and Phosphorus.

Unit II:

Microbiology of air and water – Aeromicrobial pathways – Enumeration of bacteria from air. Nitrogen fixation by symbiotic and non-symbiotic microorganisms. Use of microorganisms as biofertilizers. Mass cultivation of *Rhizobium* and *Azotobacter*. Use of blue-green algae as biofertilizers..

Unit III:

Liquid waste disposal. Nature of domestic and municipal waste and sewage. Sewage treatments, Solid waste disposal, Methods of disposal of Agricultural waste. Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolve Oxygen (DO), Bioremediation, Environmental Protection Agency (EPA). *Techniques for waste to wealth.*

Unit IV:

Biodegradation of herbicide & pesticides. Microbial products & plant health: PGPR (plant growth promoting rhizobacteria). Control of plant diseases: Chemical & biological control of plant diseases. Significance of mycorrhizae, toxin producing microbes (~~antibiotics~~, aflatoxins etc.), microbial herbicides, and biological control. *Bolulinum toxin.*

Unit V:

Define statistics & its uses. Central tendency: Mean Mode & median. Standard deviation, Standard Error. T- test, Chi square test, Applications of statistical methods in research.

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Recommended Books:

- 1 Introduction to Soil Microbiology by Martin Alexander.
- 2 General Microbiology by Pelczar, Pied & Chan
- 3 Biofertilizers in Agriculture by N.S. Subha Rao.
- 4 Statistics by Mishra & Mishra
- 5 General Microbiology, Vo. II, by Powar & Daginawala, Himalaya publication New Delhi.
- 6 Cell Biology by Powar, Himalaya publication New Delhi.
- 7 General Microbiology, Vol. II, by Powar and Daginawala Himalaya publication New Delhi.

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602 :Project Work

To be carried out on a specific defined objective under the supervision of a Teacher the compiled work is to be submitted in the form of dissertation.

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INDUSTRIAL MICROBIOLOGY

(UG Self finance Course) 2016-17

LIST OF EXAMINERS

Sr. No.	Name	Address	Mob. No.
1	Prof Shashi Chauhan	Retd.Prof. SOS Jiwaji Uni, Gwl	
2	Prof. Rekha Bhadoria	Prof. SOS Jiwaji Uni. Gwl	
3	Prof. R.M.Agrawal	Prof. SOS Jiwaji Uni. Gwl	
4	Prof. Avinash Tiwari	Prof. SOS Jiwaji Uni. Gwl	
5	Prof. M.K.Gupta	Prof. SOS Jiwaji Uni. Gwl	
6	Dr. Sushil Manderia	SOS Jiwaji Uni. Gwl	
7	Dr. Sapan Patel	SOS Jiwaji Uni. Gwl	
8	Dr. Archana Shrivastava	Director, CHRI Gwalior	
9	Dr. R.A.S. Chauhan	PG College Ambah	
10	Prof. B.M.Kulshreshtha	Govt. KRG College Gwalior	
11	Prof. Madhu Laxmi Sharma	Govt. KRG College Gwalior	
12	Prof. Sadhna Pandey	Govt. KRG College Gwalior	
13	Mrs. Charanjit Mehta	Govt. VRS College Morar	
14		Govt. KRG College Gwalior	
15	Dr. Preeti Kulshreshtha	Govt. KRG College Gwalior	
16	Dr. S.H.Qureshi	Govt. PG College Shivpuri	
17	Dr. A.C.raghuvanshi	Govt. Sci. College Gwalior	
18	Dr. H.O.Sharma	Govt. Sci. College Gwalior	
19	Dr. R.K.S. Kushwaha	Govt. PG College Morena	
20	Dr. R.K.Khare	Govt. Sci. College Gwalior	
21	Dr. V.K.Sewaria	Govt. Sci. College Gwalior	
22	Dr. D.P.Sharma	Govt. Sci. College Gwalior	
23	Prof. Deep Azad	Govt. SLP College Morar	
24	Dr. B.B.Gupta	Govt. SLP College Morar	
25	Dr. J.K.Mishra	Govt. PG College Morena	
26	Dr.R.P.Singh	Govt. PG College Morena	
27	Dr.S.K.Raina	Retd. Prof. PGV College Gwl	
28	Dr. Rajbeer Singh	K.K.College Etawah	
29	Dr. Reena Jain	Boston College Gwalior	
30	Dr. Madhu Gupta	CHRI Gwalior	
31	Dr. Usha Duseja	CHRI Gwalior	
32	Dr. P.P.Deo	Govt. Sci. College Gwalior	
33	Dr. Kusum kashyap	Govt. Girls College Chhatarpur	
34	Dr. K.K.Dubey	Retd . Prof.	
35	Dr. Sushil Sharma	Scientist, DRDO Gwalior	
36	Prof. Ragini Gothwal	Barkatullah Uni. BPL	
37	Dr. Surnhi Shrivastava	Gargi College Delhi	
38	Dr. Sangeeta Shrivatava	Pri.-Sci. Indian Institute of Sugarcane Research Lucknow	
39	Dr. Sanjeev Kumar	Pri. Sci. Indian Institute of Sugarcane Research Lucknow	
40	Dr. Alka Pandey	Govt. PG College Betul	
	Kaitasi Narayan Bhasdwar		

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