

S-29 Nov., 2013 AC after Circulars from Circular No.55 & onwards

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डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद**परिपत्रक क्रमांक/एस.यू./विज्ञान/अभ्यासक्रम/७४/२०१४**

या परिपत्रकाद्वारे सर्व संबंधितांना सुचित करण्यात येते की, विज्ञान विद्याशाखेने शिफारस केल्यानुसार बी. एस्सी. / एम. एस्सी. प्रथम व द्वितीय वर्षाच्या सुधारित अभ्यासक्रमास आणि बी. एस्सी. प्रथम वर्षाच्या अभ्यासक्रमात किरकोळ बदल करण्यास विद्यापरिषदेच्या वतीने मा. कुलगुरु यांनी, त्यांना प्राप्त असलेल्या विशेष अधिकार महाराष्ट्र विद्यापीठ अधिनियम-१९९४ कलम १४(७) अन्वये मान्यता दिलेली आहे. त्या अनुषंगाने सुधारीत तयार केलेल्या अभ्यासक्रमाची प्रत या परिपत्रकासोबत आपल्या पुढील कार्यवाहीसाठी पाठविण्यात येत आहे.

[1]	B.Sc. Physics	Semester-III & IV,
[2]	B.Sc. Chemistry	Semester-III & IV,
[3]	B.Sc. Botany	Semester-III & IV,
[4]	B.Sc. Zoology with minor changes	Semester-I & II,
[5]	B.Sc. Zoology	Semester-III & IV,
[6]	B.Sc. Fisheries	Semester-III & IV,
[7]	B.Sc. Electronics (Opt.)	Semester-III & IV,
[8]	B.A./B.Sc. Mathematics	Semester-III & IV,
[9]	B.Sc. Computer Science	Semester-I & II,
[10]	B.Sc. Information Technology	Semester-I & II,
[11]	B.C.A.	Semester-I & II,
[12]	B.Sc. Computer Science(Opt.)	Semester-I & II,
[13]	B.Sc. Information Technology(Opt.)	Semester-I & II,
[14]	B.Sc. Computer Application(Opt.)	Semester-I & II,
[15]	B.Sc. Computer Maintenance(Opt.)	Semester-I & II,
[16]	B.Sc. Biotechnology (Progressively)	Semester-I to VI,
[17]	B.Sc. Biotechnology (Opt.) (Progressively)	Semester-I to IV,
[18]	B.Sc. Sericulture Technology	Semester-I & II,
[19]	B.Sc. Networking Multimedia	Semester-III & IV,
[20]	B.Sc. Bioinformatics	Semester-I & II,
[21]	B.Sc. Hardware & Networking	Semester-I & II,
[22]	B.Sc. Animation	Semester-I & II,
[23]	B.Sc. Dairy Science & Technology	Semester-III & IV,
[24]	B.Sc. Biochemistry	Semester-III & IV,
[25]	B.Sc. Analytical Chemistry	Semester-III & IV,
[26]	B.Sc. Textile & Int. Decoration with minor changes	Semester-I & II,
[27]	B.Sc. Textile & Int. Decoration	Semester-III & IV,
[28]	B.Sc. Home Science with minor changes	Semester-I & II,
[29]	B.Sc. Home Science	Semester-III & IV,
[30]	B.Sc. Agro.Chem. & Fertilizers	Semester-III & IV,

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[31]	B.Sc. Geology	Semester-III & IV,
[32]	B.A. Statistics with minor changes	Semester-I & II,
[33]	B.A. Statistics	Semester-III & IV,
[34]	B.Sc. Statistics with minor changes	Semester-I & II,
[35]	B.Sc. Statistics	Semester-III & IV,
[36]	B.Sc. Industrial Chemistry	Semester-III & IV,
[37]	B.Sc. Horticultural	Semester-I & II,
[38]	B.Sc. Dry land Agriculture	Semester-I & II,
[39]	B.Sc. Microbiology	Semester-III & IV,
[40]	M.Sc. Computer Science	Semester-I to IV,
[41]	M.Sc. Information Technology	Semester-I to IV.

हा सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाचा आराखडा शैक्षणिक वर्ष २०१४-१५ करिता मर्यादित असेल व विद्यापरिषदेच्या अंतिम मान्यतेनंतर हे परिपत्रक नियमित ठेवण्याबाबत या कार्यालयाद्वारे नवीन परिपत्रक पारीत करण्यात येईल. तसेच सुधारीत व नवीन तयार केलेल्या अभ्यासक्रमाची प्रत विद्यापीठाच्या संकेतस्थळावर उपलब्ध आहे.

करिता, या परिपत्रकाची सर्व संबंधितांनी नोंद घ्यावी.

विद्यापीठ प्रांगण,
औरंगाबाद-४३१ ००४.
संदर्भ क्र.एस.यु./सा.शा./सबवि /२०१३-१४/
६५९९-७०२
दिनांक :- २७-०५-२०१४.

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संचालक,
महाविद्यालये व विद्यापीठ
विकास मंडळ.

या परिपत्रकाची एक प्रत :-

- १) मा. परिक्षा नियंत्रक, परिक्षा विभाग,
 - २) मा. प्राचार्य, सर्व संलग्नीत महाविद्यालये,
 - ३) संचालक, युनिक यांना विनंती करण्यात येते की, सदरील अभ्यासक्रम विद्यापीठाच्या संकेतस्थळावर उपलब्ध करुण देण्यात यावेत.
 - ४) संचालक, ई-सुविधा केंद्र, विद्यापीठ परिसर,
 - ५) जनसंपर्क अधिकारी, मुख्य प्रशासकीय इमारत,
 - ६) कक्ष अधिकारी, पात्रता विभाग, मुख्य प्रशासकीय इमारत,
 - ७) कक्ष अधिकारी, बी.ए. / बी.एस्सी./ बी.सी.एस./एम.एस्सी. विभाग, परीक्षा भवन,
 - ८) अभिलेख विभाग, मुख्य प्रशासकीय इमारती मागे,
- डॉ. बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ, औरंगाबाद.

B. Sc. II year Revised Syllabus 2014-15 onwards

DR BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD**Course Structure**

Year	Semester	Paper number	Paper Title	Periods	Marks	
B. Sc. Second	III	Paper-VII	Environmental Microbiology	45	50	
		Paper-VIII	Immunology	45	50	
		Paper-IX	Practical	45	50	
		Paper-X	Practical	45	50	
	IV	Paper-XI	Applied Microbiology	45	50	
		Paper-XII	Clinical Microbiology	45	50	
		Paper-XIII	Practical	45	50	
		Paper-XIV	Practical	45	50	
				Total	360	400

B. Sc. II year Revised Syllabus 2014-15 onwards

**B.Sc. Second Year [Microbiology]
Semester III Paper VII
Environmental Microbiology**

Unit 1: Microbiology of air:

- Composition of air.
- Number and kinds of microorganisms in air (indoor, outdoor)
- Distribution and sources of air borne microorganisms.
- Air as a carrier of microorganisms.
- Droplet, droplet nuclei, Dispersal of Microorganisms in air.
- Techniques for microbiological analysis of air.
- Significance of air flora in human health, hospitals, industries.
- Air sanitation – dust control, UV radiation, bactericidal vapors, filtration, Laminar air flow system (HEPA filters)

Unit 2. Microbiology of Water and Waste water:

- Types of waters, sources of microbes in water.
- Determining sanitary quality of water indicators of fecal pollution: Fecal and non-fecal coliforms (IMViC & elevated temperature tests).
- Bacteriological examination of water: Presumptive, confirmed, completed test, SPC, MPN and Membrane filter technique.
- Water purification methods: Disinfection of potable water supplies.
- Definition of sewage and chemical composition.
- Microbiology of sewage treatment: septic tank, evapotranspiration, Imhoff's tank
- Municipal sewage treatment process: Primary, Secondary, (aerobic and anaerobic process), chemical treatment: chlorination.
- Disposal of treated sewage. (Sludge as fertilizer, irrigation and dilution)

Unit 3. Microbiology of Soil:

- Soil as an environment, as a culture medium.
- Brief account and definition of microbial interactions with examples.
- Symbiosis, mutualism, commensalism, competition, synergism, satellitism, predation, parasitism with example:
 - I. Microbe-microbe interactions (any one example)
 - II. Plant-microbe interactions (Phyllosphere; legu. plant-Rhizobium)
 - III. Animal-microbe interactions (Rumen; Bioluminescence)
- Major biogeochemical cycles: Carbon nitrogen, phosphorus, sulphur (cyclic turnover with microbiology).
- General account of microbes used as biofertilizers, phosphate solubilizers. (Definition, Types, advantages, disadvantages)
- Rhizosphere: definition, rhizosphere and non rhizospheric microflora and R: S ratio, significance for fertility.

Unit 4. Environmental Pollution

- Air pollution : sources, causes, health hazards, airborne diseases any 5 (list of causative agents)
- Water pollution : sources, causes, health hazards, waterborne diseases any 5 (list of causative agents).
- Waste water pollution : sources, causes, health hazards.
- Soil : sources, causes, health hazards,

B. Sc. II year Revised Syllabus 2014-15 onwards

**B.Sc. Second Year Semester III
Paper VIII Immunology**

Unit 1. Gnotobiology

- Normal flora of human body.
- Defensive mechanism of the host
- Nonspecific factors: physiological barriers, natural cellular & humoral factors.
- Aggressive factors and mechanisms.
- Infection:
- Definitions with one example: (primary infection, secondary infection, cross infection)
- Sources of infection.
- Determining factors in infection
- Modes of transmission of infectious diseases.
- Process of infection : entry and spread of infection in host body

Unit 2. Immune system and Immune responses:

- Immune system : organs and cells involved, functions, types of cells functions of immune system.
- Production of antibodies: organs & cells involved, monoclonal Antibodies, Regulation of antibody production (genetic control).
- Factors influencing antibody production:
- Introduction to stem cells and stem cell therapy.

Unit 3. Immunity:

- Definition and classification: Innate / Acquired, Active/Passive, Cellular/Humoral, specific / non - specific humoral factors of immunity: complement, interferon.

Antigen:

- Definition, determinant's of antigenicity, a) size, b) chemical, c) nature, d) susceptibility to tissue enzymes, foreignness, specificity of antigens,
- Types of antigens: species specific antigen, Isoantigen, autoantigen, organ specific antigen, MHC antigen, Heterogenetic (Heterophile)antigen, antigens in relation to bacterial cell.

Antibody:

- Immunoglobulins: structure & classes,
- Types of antibodies: antitoxin, precipitin, agglutinin, bacteriolysin, bacteriocidin, bacteriotropin, complement fixing, neutralizing.

Unit 4. Antigen – Antibody reactions:

- General features of Antigen- Antibody reactions
- Mechanisms , methods & applications of:
 - Agglutination;
 - Precipitation
 - Complement fixation
 - Neutralization
 - Immunofluorescence
 - ELISA
- General methods of prophylaxis.
 - Toxoid & immune sera, Principle involved in preparation. use of adjuvants.
 - Vaccines : types, principles of methods of BCG, TAB, OPV, T.T., DPT, vaccines production, administration of vaccines, Immunization schedule.

B. Sc. II year Revised Syllabus 2014-15 onwards

- Hypersensitivity (Four types with one disease in brief)

**B.Sc. Second Year Semester IV
Paper XI Applied Microbiology.**

Unit 1. Dairy Microbiology:

- Definition of and composition of milk
- Sources of microorganisms in milk
- Desirable and undesirable changes carried out by microorganism in milk
- Types of microorganisms: Biochemical types, temperature characteristic and pathogens (bovine and human origin).
- Changes in the flora of raw milk stored at room temp.
- Microbiological examination of milk: SPC, DMC, Reductase and Phosphatase test.
- Sterilization of milk: Pasteurization

Unit 2. Food Microbiology:

- Food as a substrate for microorganisms.
- Major groups of bacteria, fungi, yeasts important in food microbiology.
- Sources of contamination of food, factors affecting kind and number of microorganisms in food.
- Principles of food preservation:
- Microbiostatic and microbicidal methods : Asepsis, removal of microorganisms, anaerobic conditions, high temp, low temp, drying, chemical preservatives, high osmotic pressure, radiation, smoking.
- Microbial spoilage of foods.
- Classification of foods by ease of spoilage, chemical changes caused by microorganisms in food.
- Types of spoilage of canned and non-canned foods with organisms involved. (Tabular form).

Unit 3. Foodborne diseases and intoxication

- Food borne diseases: Food infections, indicators of food pathogens associated with food.
- Food intoxication: Staphylococcal, Clostridial, Mycotoxins, Enteropathogenic *E. coli*, Salmonellosis and Shigellosis.

Unit 4. Fermented Food and Probiotics

- Cheese: Classification and production
- Butter
- Idli
- Criterion for probiotics: Yoghurt and Curd
- Mushroom as SCP

B. Sc. II year Revised Syllabus 2014-15 onwards

**B.Sc. Second Year Semester IV
Paper XII Clinical Microbiology**

Unit 1. Study of Human Diseases caused by bacteria

Classification, habitat, morphology, staining reactions, cultural characters, biochemical characters, antigenic structure, pathogenesis. Laboratory diagnosis, epidemiology, prophylaxis, chemotherapy w. r. t.

- *Staphylococcus aureus*
- *Pneumococcus (Str.pneumoniae)*
- *Mycobacterium tuberculosis*

Unit 2. Study of Human Diseases caused by Enteric bacteria and spirochete

Classification, habitat, morphology, staining reactions, cultural characters, biochemical characters, antigenic structure, pathogenesis. Laboratory diagnosis, epidemiology, prophylaxis, chemotherapy w. r. t.

- *Salmonella typhi*
- *Vibrio cholera*
- *Treponema pallidum*

Unit 3 Viruses

- HIV: Morphology, types, Life cycle, pathogenesis, Laboratory diagnosis, epidemiology Prophylaxis, treatment.
- Hepatitis virus : Morphology, types, Life cycle, pathogenesis, Laboratory diagnosis, epidemiology, Prophylaxis, treatment.
- Oncogenic viruses: Morphology, types, Life cycle, pathogenesis, Laboratory diagnosis, epidemiology, Prophylaxis, treatment.

Unit 4.

- Protozoa: *Plasmodium spp* (morphology, life cycle, clinical signs and symptoms, lab. Diagnosis prophylaxis / prevention and chemotherapy.
- Fungi: *Candida albicans* (morphology, clinical signs and symptoms, lab. Diagnosis prophylaxis / prevention and chemotherapy.
- Typhus fever : (morphology of causative agent, clinical signs and symptoms, lab. Diagnosis prophylaxis / prevention and chemotherapy.

B. Sc. II year Revised Syllabus 2014-15 onwards

**B.Sc. Second year Semester III
Paper IX. Practical**

1. Enumeration of microbes from: Indoor and outdoor environment
2. Bacteriological examination of drinking water:
 - I. MPN
 - II. SPC
3. Qualitative analysis of water:
 - I. Presumptive
 - II. Confirmed
 - III. Completed test
4. Testing of (water & domestic sewage) for physicochemical parameters like chlorine, phosphate, nitrate and BOD.
5. Isolation of *E. coli* and identification by IMViC
6. Isolation of coliphages from sewage
7. Isolation enteric pathogens from domestic sewage (salmonella and shigella spp)

Paper X Practical

1. Demonstration of media for cultivation of pathogenic bacteria
 - I. Mannitol salt agar.
 - II. Wilson and Blair's medium
 - III. Lowenstein- Jenson's medium
 - IV. Corn- meal agar.
2. Staining techniques
 - I. Acid fast staining (Demonstration)
 - II. Blood staining (differential WBC count)
3. Hemoglobin examination
4. Isolation & study of normal flora of skin/ nose/ throat.
5. Agglutination tests: (Slide tests)
 - I. Blood grouping
 - II. Widal test
 - III. RPR test.
6. Precipitation test: Demonstration.
 - I. Single radial immunodiffusion
 - II. Immuno electrophoresis.

B. Sc. II year Revised Syllabus 2014-15 onwards

**B. Sc. Second year Semester IV
Paper XIII Practical**

1. Determination of R: S ratio.
2. Demonstration of:
 - I. Ammonification
 - II. Nitrification
 - III. Denitrification
 - IV. Nitrate reduction
 - V. Sulfate reduction.
3. Isolation & study of *Rhizobium* sp from root nodules of leguminous plants.
4. Isolation & study of *Azotobacter* sp. from soil.
5. Bacteriological analysis of milk:
 - I. DMC
 - II. MBRT
6. Isolation of microorganisms from common food items; curd/ bread/ pickles/ spoilt food.
7. Visit to waste treatment plants, dairies, food industries, agricultural universities.

Paper XIV Practical

1. Study bacterial pathogens:
 - I. *Staphylococcus aureus*
 - II. *Salmonella typhi*
 - III. *Vibrio cholerae*
2. Isolation & Identification of *Candida albicans*
3. Demonstration of haemolysin & coagulase tests.
4. Determination of antibiotic resistance of bacteria.
5. Detection of specific antigen by ELISA (demonstration – Viral Disease)
6. Visits to related labs, hospitals & institutes.

Sharma
(Chairman BOS)
28/04/2014
(Dr. Mohd Shaker)

