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VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના મગદલ્લા રોડ, સુરત ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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-: પરિપત્ર :-

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન બાયોસાયન્સ વિષય ચલાવતી સ્નાતક કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૦–૨૧ અમલમાં આવનાર B.Sc. Bio-Science Sem-III & IV નો અભ્યાસક્રમ અંગે બાયોસાયન્સ વિષયની અભ્યાસસમિતિની તા.૧૯/૦૬/૨૦૨૦ ની સભાનાં ઠરાવ ક્રમાંકઃ ૩ અન્વયે નીચે મુજબ કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિજ્ઞાન વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલે તેની તા.૩૦/૬/૨૦૨૦ ની સભાના **ઠરાવ ક્રમાંકઃ૮૭** અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્ઉપરાંત તેનો અમલ કરવો.

બાયોસાયન્સ વિષયની અભ્યાસસમિતિની તા.૧૯/૦૬/૨૦૨૦ ની સભાનાં ઠરાવ ક્રમાંકઃ ૩

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૦–૨૧ થી અમલમાં આવનાર B.Sc. Bio-Science Sem-III & IV નાં અભ્યાસક્રમ મંજુર કરી તે મંજૂર કરવા વિજ્ઞાન વિદ્યાશાખા ને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૩૦/૦૬/૨૦૨૦ ની સભાનાં ઠરાવ ક્રમાંકઃ ૮૭

:: આથી ઠરાવવામાં આવે છે કે, બાયોસાયન્સ વિષયની અભ્યાસસમિતિની તા.૩૦/૧૨/૨૦૧૯ ની સભાના ઠરાવ ક્રમાંકઃ ૩ અન્વયે ભલામણ કરેલ અને વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ સ્વીકારેલ શૈક્ષણિક વર્ષ ૨૦૨૦–૨૧ થી અમલમાં આવનાર B.Sc. Bio-Science Sem-III & IV નાં અભ્યાસક્રમ મંજૂર કરવામાં આવે છે.

બિડાણઃ ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/ ૫૮૧૩ /૨૦૨૦
તા. ૧૫–૦૭–૨૦૨૦

ઈ.ચા. કુલસચિવ

પ્રતિ,
૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન બાયોસાયન્સ વિષય ચલાવતી સ્નાતક કોલેજોનાં આચાર્યશ્રીઓ .
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

CBCS Semester system

S. Y. B. Sc. BIOSCIENCE

Semester III & IV (New)

Title Summary for B.Sc. Bioscience Syllabus

(Effective from June 2020)

Semester	Paper	Title
III	BS 301	MICROBIAL CHEMISTRY
	BS 302	MICROBIAL GENETICS
	BS 303	INSTRUMENTATION & BIOSTATISTICS
	BS 300P	PRACTICALS – SEMESTER III
IV	BS 401	MICROBIAL CYTOLOGY & PHYSIOLOGY
	BS 402	INTRODUCTORY MEDICAL MICROBIOLOGY
	BS 403	HUMAN PHYSIOLOGY
	BS 400P	PRACTICALS – SEMESTER IV

S. Y. B. Sc. Semester - III
BIOSCIENCE
301: MICROBIAL CHEMISTRY

Unit: I Carbohydrates. **[08 Hours.]**

- Introduction, natural occurrence & physiological importance.
- Classification: aldose & ketoses. Monosaccharide, Disaccharides & polysaccharides. Their structure.
- Physical properties of carbohydrates, asymmetrical carbon atom, stereoisomerism & optical isomerism.
- Configuration in Sugar: Linear & Ring structure.

Unit: II Amino acids & Proteins. **[08 Hours.]**

- Introduction to amino acids.
- Essential amino acids, structure & importance.
- Peptide linkage, polypeptide –primary, secondary tertiary structure.
- Classification of proteins. Importance of proteins.

Unit: III Fatty acids & lipids. **[07 Hours.]**

- Introduction & classification of lipids.
- Fatty acids - saturated & unsaturated.
- Triglycerides, Phospholipids, glycolipids, lipoprotein, steroids.
- Physiological importance.

Unit: IV Enzymes & Solution. **[07 Hours.]**

- Introduction & Characteristics of enzymes.
- Nomenclature, types, classification. Mechanics of enzyme action.
- Factors affecting enzyme activity. Biological roles of enzymes.
- Solution, suspension, Colloids & Buffers.

Reference books:

- **Biochemistry** by Satyanarayana, 3rd ed. Books & Allied Pvt. Ltd.
- **Harper's Review of physiological chemistry.** 6th ed. Lange med publication.
- **Fundamentals of Biochemistry** 6th ed. by Jain, J. L., & Jain, N. (2006)., S. Chand Publications.
- **Biochemistry** by Moore, Wiley Publishing, Inc.

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S. Y. B. Sc. Semester - III
BIOSCIENCE
302: MICROBIAL GENETICS

Unit: I Biology of Nucleic acids. **[08 Hours.]**

- Introduction, Components and organization of nucleic acids
- Nucleoside, nucleotide, polynucleotide.
- DNA structure & importance.
- RNA structure & types.

Unit: II Central dogma of the Life. **[07 Hours.]**

- DNA as hereditary material, the flow of genetic information.
- DNA replication, Semi-conservative
- Patterns of DNA synthesis. The replication machinery.
- Replication fork, Termination of replication.

Unit: III Gene Expression. **[08 Hours.]**

- Bacterial structural gene, Polycistronic mRNA, Ribozymes.
- The transcription machinery, RNA polymerase.
- Transcription in bacteria.
- Genetic code, Organization of code.

Unit: IV Gene Mutation. **[07 Hours.]**

- Introduction, types of Mutations.
- Gene mutation, Types of gene mutation.
- Spontaneous and induced mutations, Effects of mutation.
- DNA Repair: Excision, Direct, Mismatch & Recombination.

Reference books:

- **Prescott, Harley, and Klein's Microbiology** 7th ed. by Wiley, J., & Sherwood, L. (2007), McGraw-Hill Science/Engineering/Math.
- **Genetics: A Molecular Approach** 2nd ed. by Russell, P. J. (2005)., Benjamin Cummings.
- **Cell biology, Genetics & Molecular Biology** by Verma, (2005) S. Chand & Co. Ltd.
- **Cell & Molecular Biology**, by Sheeler & Bianchi. Biley publication.

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S. Y. B. Sc. Semester - III
BIOSCIENCE
303: INSTRUMENTATION & BIOSTATISTICS

Unit: I Introduction to Biophysics. [07 Hours.]

- Introduction to Electromagnetic spectrum.
- Types of EM Radiation – X Ray, Gamma, UV, Visible, Infrared, Microwave, Radio wave (Properties & application).
- Introduction to Radiation & Radioactivity. Radioisotopes & their uses.
- Radiation hazards.

Unit: II Instrumentation. [07 Hours.]

- Introduction, principle, operational technique of pH meter.
- Beer's & Lambert's law.
- Introduction & operational technique of photoelectric colorimeter.
- Introduction to spectrophotometer.

Unit: III Separation Techniques. [08 Hours.]

- Chromatographic technique, Types of Chromatography.
- Paper Chromatography – ascending, descending and radial chromatography.
- Thin layer Chromatography.
- Introduction, principle, operational technique of electrophoresis.

Unit: IV Introduction to Biostatistics. [08 Hours.]

- Data, table & frequency, statistical averages; mean, mode, median.
- Graphical representation of statistical data.
- Random sampling, standard error, Variation, standard deviation normal distribution study, normal curve, probability.
- Chi-square test, test of significance

Reference books:

- **Biophysics** by Casey, East West agency.
- **Biostatistics** by Lecois, East West agency.
- **Methods in Biostatistics** by Mahajan, Jaypee publication.
- **Principles and Techniques of Biochemistry & molecular biology** by Wilson, 6th ed. Cambridge.

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S. Y. B. Sc. Semester - III
300P: BIOSCIENCE PRACTICAL

Practical based on paper 301, 302 & 303
(Time duration: 6 hours/week)

1. Qualitative determination of monosaccharide.
2. Qualitative determination of disaccharides.
3. Qualitative determination of polysaccharides.
4. Qualitative determination of protein.
5. Qualitative determination of unknown solution.
6. Preparation of normal, molar and molal solutions.
7. Preparation of % and buffer solutions.
8. Study of lethal effect of ultraviolet radiation.
9. Demonstration of induced mutation in bacteria.
10. Introduction to principle & operational technique of pH meter.
11. Measurement of pH – tomato juice, lemon juice, detergent, spinach leaf extract, soapy water, whey, mild HCl, acetic acid, NaOH etc.
12. Introduction to principle & operational technique of electrophoresis.
13. Introduction to principle & operational technique of photoelectric colorimeter.
14. Preparation of standard graph of sugar solution/dye by colorimetric measurement.
15. Preparation of standard graph of protein by colorimetric measurement.
16. Unidimentional paper chromatography of amino acids.
17. Unidimentional paper chromatography of sugars.
18. Unidimentional paper chromatography of unknown amino acid mixture.
19. Separation of chlorophyll by ascending chromatography.
20. Study of permanent slides & specimens as per theory paper 301, 302 & 303.

Reference books:

- **Practical Biochemistry** by Plummer Tata McGraw-Hill.
- **Experimental physiology & Biochemistry** by Chand, Jaypee publication.
- **Experimental Microbiology** vol. I & II by Rakesh Patel, Aditya publication.
- **Practical Clinical Biochemistry: Methods and Interpretation** By R. Chawla, 4th ed. Jaypee Brothers.
- **Experiments in Microbiology, Plant Pathology and Biotechnology** 4th ed. by K. R. Aneja (New Age International Publishers)
- **Analytical Biochemistry** by David Holme and Hezal Peak, Prentice hall.

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S. Y. B. Sc. Semester - IV
BIOSCIENCE
401: MICROBIAL CYTOLOGY & PHYSIOLOGY

Unit: I Bacterial cell structure & functions. [08 Hours.]

- Bacterial & archaeal cell wall and membrane, Cell wall Free State.
- Inclusion bodies and Ribosomes
- Nucleoid, plasmid, Bacterial endospore.
- Bacterial capsule, Pilli, Bacterial flagella, structure & motility.

Unit: II Bacterial Nutrition. [07 Hours.]

- Nutritional requirement & nutritional types of bacteria.
- Physical condition & Gaseous requirement of growth.
- Growth factors, Uptake of nutrients by cell.
- Membrane transport mechanisms.

Unit: III Culture media & Isolation. [07 Hours.]

- Culture media: Ingredients, types and application of media.
- Isolation of pure culture, Isolation techniques.
- Anaerobiosis: Anaerobic cultivation.
- Preservation & maintenance of culture.

Unit: IV Microbial Growth. [08 Hours.]

- Reproduction in bacteria, Binary fission.
- Mathematics of growth, Generation time and growth rate.
- Measurement of growth: Cell number and cell mass.
- Normal growth curve, Diauxic growth and factors affecting growth.

Reference book:

- **Prescott, Harley, and Klein's Microbiology** Wiley, J., & Sherwood, L. (2007), 7Ed., McGraw-Hill Science/Engineering/Math.
- **Microbiology** by Pelzar, Chan, Krieg, Tata McGraw Hill pub. New York
- **Introduction to Microbial Physiology** by P. J. Soni, Nirav Prakashan.
- **Elementary Microbiology** by Dr. H. A. Modi, Ekta Prakashan.

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S. Y. B. Sc. Semester - IV
BIOSCIENCE
402: INTRODUCTORY MEDICAL MICROBIOLOGY

Unit: I Immune system & Immunity. **[08 Hours.]**

- Cells, tissues & organs of immune system.
- Immune response: Primary & Secondary, Humoral & cellular.
- Definition, types. Innate immunity: Species, Racial, Individual.
- Acquired immunity: Active & Passive. Herd Immunity.

Unit: II Host defense mechanism. **[07 Hours.]**

- Physical barrier – skin, mucus membrane.
- Chemical barrier.
- Phagocytosis, inflammation, Interferon etc.
- Specific defense.

Unit: III Antigen & Antibody. **[07 Hours.]**

- Antigen – Definition, classification, properties.
- Types of Antigen, Antigenic specificity.
- Antibody, Immunoglobulin, Basic structure of immunoglobulin.
- Types of Immunoglobulin – G, M, A, D, E.

Unit: IV Introduction to medical microbiology. **[08 Hours.]**

- Normal flora: Microbial flora of human body, their importance.
- Pathogens, Bacterial Pathogenesis, portal entry of pathogen.
- Infection & virulence, virulence factors, attenuation & exaltation.
- Types of infection, types of pathological condition and types of diseases.

Reference books:

- **Prescott, Harley, and Klein's Microbiology** Wiley, J., & Sherwood, L. (2007), 7Ed., McGraw-Hill Science.
- **An introduction to Immunology** by Rao.
- **Modern Immunology** by Dasgupta, Jaypee publication.
- **Text book of Medical Microbiology** by Anantnarayan, McGraw Hill Science.

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S. Y. B. Sc. Semester IV
BIOSCIENCE
403: HUMAN PHYSIOLOGY

Unit: I Tissues **[08 Hours.]**

- Introduction, types, classification of tissues.
- Types of Epithelial tissue.
- Connective tissue.
- Muscles & Nerve tissues.

Unit: II Blood **[08 Hours.]**

- Blood constituent-Blood plasma, serum.
- Types & functions of blood cells – RBC, WBC, Thrombocytes.
- Structure, functions & types of hemoglobin, Abnormal Hb.
- Transport of Oxygen & Carbon dioxide.

Unit: III Blood coagulation & Blood pressure. **[07 Hours.]**

- Introduction to Homeostasis
- Blood coagulation mechanism.
- Blood pressure - Systolic, diastolic.
- Measurement of blood pressure.

Unit: IV Temperature Regulation. **[07 Hours.]**

- Normal human body temperature.
- Heat exchange between body & environment.
- Central mechanism regulates body temperature.
- Osmoregulation in human body.

Reference books:

- **Practical Hematology** by Davis.
- **Physiological basis of medical practice** by Best & Tailor, B. I. Waverly Publications.
- **Anatomy & Physiology for Nurses** by Smith.
- **Medical Physiology** by Sembulingam, 5th ed. Jaypee Publications.

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S. Y. B. Sc. Semester - IV
400P: BIOSCIENCE PRACTICAL

Practical based on paper 401, 402 & 403
(Time duration: 6 hours/week)

1. Determination of blood groups.
2. Blood cell count: RBC and WBC counting.
3. Differential counts (DC).
4. Estimation of hemoglobin by Sahli's method.
5. Preparation of hemin crystals.
6. Measurement of blood pressure.
7. Determination of clotting time by capillary method.
8. Differential staining: Gram's staining and Acid-fast staining.
9. Spirochete staining by Fontana's method.
10. Capsule and Cell wall staining.
11. Volutin and Endospore staining.
12. Preparation of media: Culture media and Biochemical media.
13. Study of biochemical properties of some bacteria.
14. Study of bacterial growth curve by turbidometric method
15. Effect of heat and some chemical agents on bacterial growth.
16. Pure culture study of *Escherichia. coli* and *Klebseilla mobillis* (*E. aerogenes).*
17. Pure culture study of *Proteus vulgaris* and *Serratia marcescens.*
18. Pure culture study of *Bacillus megaterium, Bacillus subtilis* and *Bacillus. cereus.*
19. Pure culture study of *Staphylococcus aureus* and *Staphylococcus epidermidis.*
20. Study of permanent slides & specimens as per theory paper 401, 402 & 403.

Reference books:

- **Manual of Microbiology** 2nd ed. by Kanika Sharma, (Ane Books Pvt. Ltd)
- **Experimental Microbiology Vol. 1** 9th ed. by Rakesh Patel & Kiran Patel (Aditya Publication)
- **Microbiology: A Laboratory Manual** 11th ed. by J. G. Cappuccino (Pearson Education Pvt. Ltd, Singapore)
- **Experiments in Microbiology, Plant Pathology and Biotechnology** 4th ed. by K. R. Aneja (New Age International Publishers)
- **Experimental physiology & Biochemistry** by Chanda, Jaypee publication.
- **Practical Hematology** by Davis.

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