Unit-1: **Introduction to Microbiology** (8 Hours)
1) Microorganisms and Microbiology
2) Microbiology: A multifaceted Science
3) The position of Microorganisms in living world
4) Major groups of Microorganisms
5) Structure and activity of cell
6) Microorganisms and their Environment

Unit-2: **Historical Developments in Microbiology** (7 Hours)
1) Early Developments in Microbiology
2) Developments of Microbiology in 19th Century
3) Growth of Microbiology in 20th Century

Unit-3: **Scope of Microbiology** (8 Hours)
1) Medical Microbiology, Public Health Microbiology
2) Immunology
3) Agricultural Microbiology
4) Food Microbiology, Dairy Microbiology
5) Aero Microbiology, Exo Microbiology
6) Aquatic Microbiology
7) Soil Microbiology (Terrestrial Microbiology)
8) Sanitary Microbiology
9) Geo microbiology, Petroleum Microbiology
10) Industrial Microbiology, Microbes in some other fields

Unit-4: **Distribution and General Characteristics of Bacteria** (7 Hours)
1) Distribution in Nature
2) General Characteristics
   a) Morphology and arrangement
   b) Important Characteristics
   c) Practical Significance

Reference Books:

1. **General Microbiology**: R Y Stanier, Adelberg E A and J L Ingraham, Mac Millan Press Inc.
2. **Introduction to microbiology**: Ingraham J L and Ingraham C A Thomson Brooks
3. **Principles of microbiology**: R M Atlas Wm C brown Publishers
4. **Brock’s biology of Microorganisms**: Madigan M T and Martinko J M Pearson Education Inc
5. **Microbiology: An introduction**: Tortora G J, Funke B R and Case C L Pearson Education Inc
6. **Elementary Microbiology Volume:1**: Dr.H.A.Modi, Akta Prakashan
1 Rules and safety in microbiological laboratory  
2 Introduction to laboratory equipments-I (Microscope, Autoclave, Incubator, Hot Air Oven, Water Bath, Refrigerator)  
3 Introduction to laboratory equipments-II (pH meter, Colony counter, PhotoelectricColorimeter / Spectrophotometer, Centrifuge, Orbital shaker)  
4 Laboratory glass wares & accessories  
5 Cleaning, preparation & sterilization of glass wares.  
6 Disposal of laboratory waste and cultures  
7 Medium Preparation & sterilization  
8 Adjustment of pH of medium  

Reference Books :-  
GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-I
MIC-101: Introduction and Historical Developments in Microbiology
(Syllabus of Practical portion) (With Effect From 1st July, 2016).
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

For Exam:

1. Preparation of glasswares
2. Sterilization of glasswares
3. Adjustment of pH
4. Medium Preparation: Nutrient Agar
5. Counting of Colonies
6. Preparation of Chronic acid solution
7. Cleaning of Glasswares with Chronic acid

Board of Studies (Microbiology)

1. Dr. S.R. Dave
2. Dr. S.A Bhatt
3. Dr. Rakesh Patel
4. Dr. Devayani Tipre
5. Dr. Nupur Modi
6. Dr. Nikhil Bhatt
7. Dr. Srinivas Duggirala
8. Dr. Pradip Acharya
9. Mrs. Preeti Shukla
10. Dr. Niraj Seth
11. Dr. Pratik Shilpakar
12. Mr. Arvind Dungarachiya
13. Dr. Rakesh Soni
14. Dr. Haribhai Patel
GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-I
MIC 102: Basic Techniques in Microbiology
(Syllabus of theoretical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)

Unit 1: Aseptic Techniques and Sterilization (8 Hrs.)
1 Aseptic techniques in microbiology: Working area, Culture handling, Disposal of materials. (3 Hrs.)
2 Basic Laboratory sterilization techniques (Physical):
   - Sterilization by heat: Moist heat (Steam under pressure, Fractional sterilization, Boiling water, Pasteurization), Dry heat, (Hot air sterilization, Incineration) (3 Hrs.)
   - Sterilization by radiation: Ultraviolet light, Ionizing radiation (1 Hr.)
   - Sterilization by filtration: Membrane filters (1 Hr.)

Unit 2: Stains and Techniques (7 Hrs.)
1 Stains, Mordant, Intensifier, Decolourizer (2 Hrs.)
2 Smear Preparation, Fixation (1 Hr.)
3 Principle of Staining techniques: Simple, Negative, Differential (Gram staining, Acid Fast staining) (2 Hrs.)
4 Principle of Special Staining Techniques: Endospore, Capsule, Flagella, Nucleus, Metachromatic Granule (2 Hrs.)

Unit 3: Microscopy (7 Hrs.)
1 Principle and parts of compound microscope (1 Hr.)
2 Bright-field microscopy: Resolving power, Numerical Aperature, Magnification Limit of resolution, (3 Hrs.)
3 Introduction of Dark-field, Fluorescence, Phase-contrast, Transmission electron, Scanning electron microscopy, Limitation of electron microscopy (3 Hrs.)

Unit 4: Cultivation and Pure Culture Techniques (8 Hrs.)
1 Cultivation in liquid media and characteristics of growth (1 Hr.)
2 Cultivation in solid and solidified media and colony characterization (1 Hr.)
3 Cultivation of aerobic and anaerobic bacteria (1 ½ Hrs.)
4 Selective methods of pure culture (1 ½ Hrs.)
   - Chemical methods of selection: Use of special carbon or nitrogen source, Use of dilute media, Use of inhibitor or toxic chemicals
   - Physical methods of selection: Heat treatment, Incubation temperature, pH of the medium,
   - Biological methods of selection and Selection in nature
5 Methods of Isolating Pure culture: Streak Plate, Pour plate, Spread plate, Micromanipulator (1 Hr.)
6 Maintenance and preservation of pure culture (1 Hr.)
7 Culture collection centers (1 Hr.)
<table>
<thead>
<tr>
<th>Textbook</th>
<th>Supplementary Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>3</strong> Microbiology: An introduction: Tortora G J, Funke B R and Case C L. Pearson Education Inc</td>
</tr>
<tr>
<td></td>
<td><strong>4</strong> Microbiology: Principles and Explorations: Black J G. John Wiley &amp; Sons, Inc.</td>
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<tr>
<td></td>
<td><strong>5</strong> Microbiology: Willey J M, Sherwood L M, Woolverton C J. Mac Millan Press Inc.</td>
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<td><strong>6</strong> Elementary Microbiology: H. A. Modi, Akta Prakashan.</td>
</tr>
<tr>
<td></td>
<td><strong>7</strong> Principles of Microbiology: Atlas R M. Wm. C. Brown Publishers</td>
</tr>
</tbody>
</table>
1 Preparation of standard solution
2 Basic microbe handling techniques
3 Cultivation methods for bacteria: Broth
4 Cultivation methods for bacteria: Agar slants
5 Cultivation methods for bacteria: Agar plate method (streak plate, spread plate, pour plate)
6 Monochrome staining,
7 Negative staining

Board of Studies (Microbiology)

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10 Dr. Niraj Seth
11 Dr. Pratik Shilpakar
12 Mr. Arvind Dungarachiya
13 Dr. Rakesh Soni
14 Dr. Haribhai patel
Unit-1: Ionic equilibrium (50% Marks) (15 Hours)

1.1 Degree of ionization (1 hour)

1.2 Ostwald dilution law and its limitations (1 hour)

1.3 pH scale (2 hours)
- Definition of pH and importance of pH scale
- Relation between pH and concentration of $H^+$ in solution
- pH range of acidic, basic solution
- Introduction about pOH, relation between pH and pOH, ionic product of water ($K_w$)

1.4 Hydrolysis of salts (from weak acid [HA] and strong base [BOH]) including derivation of

- $K_h = \frac{[HA][OH^-]}{[A^-]}$
- $K_h = \frac{K_w}{K_a}$
- $h = \sqrt{\frac{K_h}{C}}$
- $pH = \frac{1}{2}[pK_w + pK_a + \log C]$

1.5 Hydrolysis of salts (from weak base [BOH] and strong acid [HA]) including derivation of

- $K_h = \frac{[BOH][H^+]}{[B^+]}$
- $K_h = \frac{K_w}{K_b}$
- $h = \sqrt{\frac{K_h}{C}}$
- $pH = \frac{1}{2}[pK_w - pK_a - \log C]$

1.6 Hydrolysis of salts (from weak acid [HA] and weak base [BOH]) including derivation of

- $K_h = \frac{[HA][BOH]}{[A^-][B^+]}
- K_h = \frac{K_w}{K_a \times K_b}$
• $h = \sqrt{K_h}$
• $pH = \frac{1}{2}[pK_w + pK_a - pK_h]$

1.7 Buffer solutions
- Properties of buffer solutions
- Buffer capacity and buffer limit of buffer solution
- pH of buffer formed from weak acid and its salt including derivation of Henderson-Hasselbach equation
- pOH of buffer formed from weakbase and its salt including derivation of Henderson - Hasselbach equation
- Action of buffer solutions in adjustment of pH during addition of acid or Base
- Buffer standards
- Importance of buffer solutions

1.8 Numericals based on topics 1.3 to 1.7 (3hours)

References :-

3 Quantitative Chemical Analysis(sixth edition), Daniel C. Harris, W.H. Freeman(Publisher)

Unit-2: Physical properties and molecular structure (50% Marks) (15 Hours)

2.1 Additive and constitutive properties (1hour)
2.2 Molar volume:
- Additivity of molar volume
- Calculation of approximate molar volumes of given compound (2hours)
2.3 Surface tension:
- Definition, unit
- Derivation of formula of relative surface tension of liquid
- Use of stalagmometer in determination of relative surface tension of liquid
- Numericals (2hours)
2.4 Parachor:
- Relation between parachor, surface tension and molarvolume
- Calculation of approximate parachor of given compound
- Application of parachor
- Numericals (2hours)
2.5 Viscosity:
- Definition, unit
- Derivation of formula of relative viscosity of liquid
- Use of Ostwald’s viscometer in determination of relative viscosity of given liquid
- Numericals (2hours)
2.6 Molar refraction: (2hours)
   - Definition and applications
   - Molar refraction of mixture
   - Measurement of refraction index by Abbe refractometer
   - Numerical

2.7 Optical activity: (2hours)
   - Definition, measurement by polarimeter
   - d / (+) / dextro, l /(-) / levo concept
   - Numericals

2.8 Dipole moment, its measurement and its application (2hours)

References:

**GUJARATVIDYAPEETH : AHMEDABAD**  
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar  
Department of Microbiology  
B.Sc. Semester-I  
CHEM-101: Physical Chemistry  
(Syllabus of practical portion) (With Effect from 1st July, 2016)  
(External Evaluation: 60% + Internal Evaluation: 40%)  
(Total Teaching Hours=45, Credit=02)

### (A) Solution preparation

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
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<tbody>
<tr>
<td>(1) Percentage solution: %v/v, %w/v</td>
<td>3</td>
</tr>
<tr>
<td>(2) Preparation and standardization of sodium hydroxide solution (approximately 0.1 N)</td>
<td>3</td>
</tr>
<tr>
<td>(3) To determine normality of given HCl/HNO₃ solution using standard sodium hydroxide solution</td>
<td>3</td>
</tr>
<tr>
<td>(4) Preparation and standardization of hydrochloric acid solution (approximately 0.1 N)</td>
<td>3</td>
</tr>
<tr>
<td>(5) To determine normality of given NaOH/KOH solution using standard hydrochloric acid solution</td>
<td>3</td>
</tr>
<tr>
<td>(6) Preparation of molar and normal solution of H₂SO₄</td>
<td>3</td>
</tr>
<tr>
<td>(7) Preparation of molar and normal solution of Na₂CO₃</td>
<td>3</td>
</tr>
</tbody>
</table>

### (B) Experiments of Physical chemistry

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) To measure the density of a given liquid by R.D. Bottle</td>
<td>3</td>
</tr>
<tr>
<td>(2) To determine the relative surface tension of a liquid with respect to water at room temperature by Stalagmometer</td>
<td>3</td>
</tr>
<tr>
<td>(3) To determine the surface tension of methyl alcohol, ethylalcohol and n-hexane at room temperature and calculate the atomic parachors of carbon, hydrogen and oxygen</td>
<td>6</td>
</tr>
<tr>
<td>(4) To determine the relative viscosity of a liquid with respect to water at room temperature by Ostwald's viscometer</td>
<td>3</td>
</tr>
<tr>
<td>(5) To determine the composition of a given mixture consisting of two miscible liquids, A and B by viscosity measurement</td>
<td>6</td>
</tr>
<tr>
<td>(6) To determine the refractive index of a given liquid and find its specific and molar refractivities</td>
<td>3</td>
</tr>
</tbody>
</table>
UNIT 1: VECTORS
- Introduction: Scalars and vectors, Addition of vectors, Subtraction of vectors, Scalar (Dot) product, Vector (Cross) product, Unit vector, Position vector
- Triple Scalar Product & its applications
- Triple Vector Product & its applications
- Classification of vectors: Pseudo vector, Polar vector, Pseudo scalar, Real scalar, Free vector, Bound vector

UNIT 2: LASER
- Introduction: Absorption, Spontaneous and Stimulated (Induced) Emission of Radiation
- Basic principle and operation of a laser
- Pumping and Population Inversion
- Solid State laser - its construction and working (Ruby laser- its construction and working)
- He-Ne laser- its construction and working
- Applications/Uses of Laser

UNIT 3: D.C. CIRCUITS AND ELECTRONICS
D. C. Circuits:
- R-C D. C. circuit (charging and discharging of capacitor)
- R-L D.C. circuits (growth and decay of current)
Diode circuits:
- The p-n junction
- The unbiased diode
- Forward and Reverse biased diodes – its characteristics
- Rectifier circuits: half wave, full wave & bridge rectifiers
- Filters- Series inductor filter and Shunt capacitor filter
- Zener effect and Avalanche effect
- Zener diode & its characteristics
- Logic Gate(AND, OR, NOT, NAND and NOR)

UNIT 4: THERMODYNAMICS
- Introduction: Thermodynamic laws (only definition), Entropy and disorder
- Carnot Theorem
- Principle & working of Refrigerator, Phase diagram, triple point,
Kelvin temperature scale

- Clausius- Clapeyron’s Equation

Reference:

5. Modern electronics instrumentation and measurement techniques by Helfrick and Cooper, PHI
1. To use a multimeter for measuring (a) resistance, (b) AC & DC voltages (c) DC current (d) capacitance (e) temperature
2. To determine the value of capacitors.
3. To study the decay of capacitor.
4. To determine the value of inductor.
5. To study half wave rectifier with and without filter.
6. To study full wave rectifier with and without filter.
7. To study bridge rectifier with and without filter.
8. To study the characteristics of Zener diode.
9. To study various logic gates.
10. To determine the wavelength of LASER light.
11. Thermocouple
12. Thermistor
13. RTD
Objectives:

1. To read simple passages to find out information contained it.
2. To familiarize students with vocabulary used in the passages.
3. To familiarize students with the functions of tenses generally used in daily life.
4. To help students in writing short descriptive paragraphs based on pictures.
5. To develop among students the academic skill of referencing.

Unit 1: Comprehension (Weightage – 40%)  

1. The Kite Maker by Ruskin Bond
2. The Portrait of a Lady by Khushwant Singh
3. Print Advertisement – Admission Announcement
4. Print Advertisement – Sales Advertisement

Comprehension Pattern:

1. Short questions
2. Fill in the blanks
3. Multiple choice questions based on the text

*NB: Short questions as well as other exercises should be informative in nature.*

Unit 2: Vocabulary (Based on the text only) (Weightage – 10%)  

1. Antonyms/Synonyms
2. Match words with their meanings

Unit 3: Grammar (Weightage – 20%)  

Noun: Number and Gender

Articles
Simple Present Tense
Present Continuous Tense
Simple Past Tense
Past Continuous Tense
Subject-Verb Agreement

NB: Unit 3 should be done along with Unit 1 so that students can see how these grammatical categories actually work to produce meaning.

Unit 4: Writing Skills (Weightage – 20%) 3 Hours

1 Picture Reading (Use of Simple Present Tense and Present Continuous Tense)

NB: Use at least five pictures in the classroom for demonstration as well as practice.

Unit 5: Academic Skills: Reference Skills (Weightage – 10%) 2 Hours

Types of dictionaries
Functions of a dictionary
How to use a dictionary?
Optimum utilization of dictionary
Dictionary and pronunciation
How to use a thesaurus?
Online dictionaries and thesaurus
Inbuilt dictionaries in Word Processors
Mobile dictionaries
Guessing meaning from the context

NB: This unit is not to be asked in the examination.

Seminar/Presentation 5 Hours
Reference :-


GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-I
EC-101: Nomenclature in Chemistry
(Syllabus of theoretical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

--------------------------------------------------------------------------------------------------------

Unit-1: Nomenclature in inorganic chemistry (50 % Marks) (15 Hours)

1.1 Naming of binary nonmetal-nonmetal compounds
e.g., BrF, SiCl₄, SCl₆, XeO₂, AsBr₃, Cl₂O₃, As₄O₁₀ etc.
(2hours)

1.2 Naming of cations
  e.g., Fe²⁺, Fe³⁺, Co²⁺, Co³⁺, Cu⁺, Cu²⁺, Au⁺, Au³⁺ etc.
  (1hour)

1.3 Naming of anions
  e.g., Br⁻, BrO₃⁻, BrO₂⁻, BrO⁻, BrO₄⁻, CrO₄²⁻, Cr₂O₇²⁻ etc.
  (1hour)

1.4 Naming of ionic compounds
  e.g., Cu₂S, CuS, BCl₃, CrCl₃etc.
  (2hours)

1.5 Naming acids
  e.g., HClO₃, H₃PO₃, HClO₄, HBrO₃, HNO₂, HBrO etc.
  (2hours)

1.6 Naming acid salts
  e.g., NaHS, NaHCO₃ etc.
  (1hour)

1.7 Naming hydrates
  e.g., CuSO₄·5H₂O, FeSO₄·7H₂O etc.
  (1hour)

1.8 Naming of peroxide and persalts
  e.g., H₂O₂, Na₂O₂, K₂S₂O₈
  (1hour)

1.9 Nomenclature of coordination compounds
  (4hours)

Reference books


Unit-2: Nomenclature of organic compounds (50 % Marks) (15 Hours)

2.1 Naming of alkanes (1 hour)
2.2 Naming of alkenes (1 hour)
2.3 Naming of alkynes (1 hour)
2.4 Naming of aromatic hydrocarbons (1 hour)
2.5 Naming of aldehydes (1 hour)
2.6 Naming of ketones (1 hour)
2.7 Naming of carboxylic acids and its derivatives (acid chlorides, acid anhydrides, amides, esters) (4 hour)
2.8 Naming of amines (1 hour)
2.9 Naming of phenols (1 hour)
2.10 Naming of alcohols (1 hour)
2.11 Naming of ethers and crown ethers (1 hour)
2.12 Naming of bicyclic compounds (1 hour)

References:

Unit-1: Air pollution (50% Marks) (15 Hours)

1.1 Introduction (1 hour)
1.2 Air pollutants
   1.2.1 Carbon monoxide (CO)
       - Sources and sinks of CO pollution (2 hours)
       - Control of CO pollution
   1.2.2 Nitrogen oxides (NOx)
       - Sources and sinks of NOx pollution (2 hours)
       - Control of NOx pollution
   1.2.3 Hydrocarbons and photochemicals smog
       - Control of hydrocarbons and photochemicals smog (2 hours)
   1.2.4 Sulphur dioxide (SO2)
       - Sources of SO2 pollution (2 hours)
       - Control of SO2 pollution
   1.2.5 Acid rain (2 hours)
   1.2.6 Particulates
       - Sources of particulates (2 hours)
       - Control of particulates

1.3 Effect of atmospheric pollution and historical events (1 hour)
1.4 Environmental policies and Laws (India) (1 hour)

Unit-2: Water pollution (50% Marks) (15 Hours)

2.1 Aquatic environment (2 hours)
2.2 Water pollutants
   - Organic pollutants (1 hour)
   - Inorganic pollutants (1 hour)
   - Sediments (1 hour)
   - Radioactive materials (1 hour)
   - Thermal pollutants (1 hour)
2.3 Drinking water supplies (1 hour)
2.4 Trace elements in water (1 hour)
2.5 Drinking water quality parameters and standards (WHO, BIS) (1 hour)
2.6 Domestic waste water treatment
   - Primary treatment (2 hours)
   - Secondary treatment: aerobic and anaerobic treatment (2 hours)
2.7 Water reuse and recycling (1 hour)
References

2. Chemistry for Environmental Engineering and Science (fifth edition), Sawyer, McCarty and Parkin, Tata McGraw-Hill Publisher Co.Ltd

Board of Studies (Chemistry)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Vishal Bhat</td>
<td></td>
<td>28-05-2016</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Pradeep Shrivastav</td>
<td></td>
<td>28-05-2016</td>
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<tr>
<td>3</td>
<td>Dr. Suresh Patel</td>
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<td>28-05-2016</td>
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<tr>
<td>4</td>
<td>Dr. Yogesh S. Patel</td>
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<td>28-05-2016</td>
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<tr>
<td>5</td>
<td>Dr. Mallika Surve</td>
<td>Malika</td>
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<td>6</td>
<td>Dr. S. Shukla</td>
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<td>28-05-2016</td>
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<td>7</td>
<td>Dr. Mohan S. Shukla</td>
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<td>28-05-2016</td>
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<tr>
<td>8</td>
<td>Dr. Hari Shankar Patel</td>
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</tbody>
</table>
UNIT 1: SENSORS AND ITS CHARACTERIZATIONS 07 Hours

What are Sensors / Transducers? Importance of Sensors, Principles of sensor, static characteristics, dynamic characteristics, Characterizations- electrical, mechanical, high temperature etc.

(i) **Thermal Sensor**: Thermocouple, thermistor, RTD,

(ii) **Optical Sensor**: Photo resistor, photo diode, photo voltaic cell, photo multiplier tube.

(iii) **Vacuum gauge**: Pirani gauge, Penning gauge & Mcleode gauge

UNIT 2: BIOSENSORS 08 Hours

Introduction, applications of biosensor, generation of biosensors, glucose biosensor, urea biosensor.

**Biological Sensing Elements**

Introduction, Enzymes, Examples of Enzyme Biosensors, Tissue Materials, Microorganism, Mitochondria, antibodies, Nucleic Acid, Receptors.

UNIT 3: IMMOBILIZATION TECHNIQUES OF BIOLOGICAL COMPONENT AND ITS APPLICATION 07 Hours

Adsorption, Microencapsulation, Entrapment, Cross Linking, Covalent Bonding, Modified electrodes, Examples of applications of different immobilization methods.

UNIT 4: SENSOR OPERATING PRINCIPLES 08 Hours

Reference electrode, Calomel Electrode, practical aspects of ion
selective electrodes, Measurements and calibration, examples of ion electrode: Glass Electrode, solid state type, liquid ion exchange membrane type, glass sensing electrode, Combined Electrode, solid state electrode, screen printed electrode, amperometric sensors, voltametric sensors.

Reference:

1. Sensors and Transducers D.Patranabis, Prentice hall of India
2. Heat and Thermodynamics, Mark W. Zemansky and Richard Dittman
5. Biosensors, Tran Minh Canh, Chapman and Hall
એકમ ૧    મંગલપ્રસિદ્ધ  

1.1  પ્રાઇમ્યુલર ત્રણમાં?

1.2  સ્વાભાવિક પ્રતિષ્ઠા

શાસ્ત્રીય પ્રતિષ્ઠા - યુગ: સત્ય, અહીંસા, અસ્તેય, થીલાથી, અપરિમુકત રેલાણની પરિસ્થિતિ પ્રમાણે ઉભરીને પ્રતિ ની નીદામન: અસ્તેય, સભ્યતાને આધાર, જાતને સામેલ, અવાદ, અમ્મુશયતા લિખાણ, સ્વભાવ

1.3  ઘનત્રણમાં પ્રતિષ્ઠા મહત્વ

એકમ ૨    રચનામાં કાયદો  

2.1  રચનામાં કાયદો વેટેલો લેટો?

2.2  રચનામાં કાયદોની પ્રસ્તુતિ

2.3  ભાઈ:

ભાઈના પ્રભાવ

વારવારક અને કદર વારવારની પરિસ્થિતિ,

ભાઈનું મહત્વ (સંમતનું ગૌરવ, ગરીબો અને પ્રીતિની જવાબોરી, 

ગ્રામીંધન માટ ભાઈ, ભાઈ અને પરાવર્તન, ભાઈ અને આલોચય)

2.4  વ્યસન મુક્તિ

વ્યસન વેટેલો લેટો?

વ્યસનની પ્રકાર, વ્યસનની આલોચય પર

અસર, વ્યસનની સામાજિક અસર

વ્યસન મુક્તિના કાયદોને

એકમ ૩    આચારની ડિઝાઇન

3.1  આચારની ડિઝાઇન અને લેના મહત્વ

3.2  કુંભમાં સમૂહજિવનનો આચાર

3.3  શૈક્ષક સંસ્થાઓમાં સમૂહજિવનનો આચાર

3.4  જાયર સ્થાયીના રમ-રભાલ અને સ્વાભાવ
3.5 સામાન્ય વિશેક
અધકમ 4
ઉજ્જ અને તેનું મહત્વ:

4.1 ઉજ્જ અટલે શું?
4.2 ઉજ્જ ના સ્વરૂપ: આંદ્રિક ઉજ્જ, ઉક્તા ઉજ્જ, સાધારણ ઉજ્જ,
ગુરુવારિય ઉજ્જ, નાલી ઉજ્જ, સૌર ઉજ્જ, દીક્ષિત ઉજ્જ
4.3 ઉજ્જ ના સૌર્ય: પુનર્યાપ્ત અને પુનર્યાપ્ત ઉજ્જ સૌર્ય
4.4 ઉજ્જ બયાત અને ગાંધીનાઓ
4.5 બીનપંપરાગત ઉજ્જના સાધનો: સ્યુર્જુક્કર, સોલાર હટર, સોલાર
ઉદ્યોગ, પવનચાર, સૌર તળાવ, સૌરલાઈટ, બાયોગેસ,
બાયોમાસ વગેરે
4.6 ઉજ્જ સંરક્ષણ

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1. સમૂહ જીવનના આયાર, બબ્લીયાર મહિતા
2. આંત્રિક ગાંધી, ગાંધી
3. જેલ શા માટ, ગાંધી
4. સમાનો તકાખી: પુનર્યાપ્ત ઉજ્જ, પાંચમી આવૃત્તિ, ટ્રાઇક્સ, વડોદરા.
5. મેગાઅલાંડાત - ગાંધી
6. રષ્ણાદેર કાશ્મીરી આંત્રિકના સંકલ્પનાઓ: દેશધાનલાં શાહ
7. રષ્ણાદેર કાશ્મીરી: તેનું રહસ્ય અને સ્વાભાવિક - ગાંધી
8. પદ્ધતિ સાધી- રમેશ સાયલિયા, CEE
9. ગાંધીના પાવન પુસ્તકો- લાત્સસાઘ મહંદ્રિ હેસાઈ
10. "યુપ નહિ રહેવાથ" (તોલ્સ્ટોઇ ના નિબંધઓનો અનુવાદ) નવગણન પુસ્તકાંક મંડિર, અમેરિકા
એકમ ૧  પયાવરણ નો પરિયાય

(અ)  પયાવરણ: પયાવરણ એ શું? પયાવરણના પ્રકારો: પઠીક પયાવરણ, જીવિક પયાવરણ, સામાજિક કે સંક્રમિત પયાવરણ, જીવારવણા, જીવારવણા વિવિધ વિભાગો, જીવમંડળ: સાચીય જીવમંડળ, જીિતય જીવમંડળ.

(બ)  પયાવરણ વિભાગ: પયાવરણ તંત્ર, પયાવરણ તંત્ર નિયમો, પયાવરણ તંત્ર તંત્ર લક્ષ્યો: વહનક્કશમતા, નવભાવસ્થા, ઇછાકલાપ, પયાવરણ તંત્ર તંત્ર ઉપનૂ પ્રવાસ અને પોષક તં તંનુ વચન, પોષકની કે પરિચિતીય પલાસ્થી: જીવારવણા પલાસ્થી, જીવારવણા પલાસ્થી, ઉજવન પલાસ્થી, પયાવરણ તંન જીયા માધ્યમ.

(ક)  પયાવરણ તંત્ર ઘતકો: અજ્ઞીવિક ઘતકો, જીવિક ઘતકો, પયાવરણ તંત્ર તંત્ર સ્વસ્થીય અને તાજથબદી: સહજાબ, પયાવરણ તંત્ર ની પલાસ્થી અને સરકારી ચીટરો.

એકમ ૨  પયાવરણ ના સંદેશાતો અને સંરક્ષણ

(અ)  પયાવરણની સંદેશાતો: પયાવરણની મૂળ સંદેશાતો, પયાવરણની સંદેશાતો સામાજિક પરિયોજનાઓ: વાય પયાવરણની સંદેશાતો, સંક્ષિપ્ત પયાવરણ તંત્ર, સામાજિક વનક્કશ્મતા ક્ષેત્ર, સંસાદ વેટમંડલ રાષ્ટ્ર, રાષ્ટ્ર વિસ્તરણ.

(બ)  સામાજિક વન વયસ્થા, સામાજિક વનક્કશ્મતા, શીખી આંધોલન, પૃથી શિશુ સમાગમ, સેંબર ૨૧, ટાઈ વિક્સ અંગે વિશ્વ શિશુ સમાગમ.

એકમ ૩  કુદરતી સ્પોર્ટો: જીયા અને હવા

(અ)  જીયા: જીયા માટે વન, વાંધના ગુણાધિમાત્રા, વાંધના સ્પોર્ટો: જીયામાં ભોલા વાંધના વગહોરણ, સુખાલ્ત જીયાના રાજ્ય, તથા
પાણી, શું પાણી, જીવિક ઘોરો, ઘરમાં પીવાનું પાણી શું રાખવાની સામાન્ય રીતો, પાણી અને રોગો, ગુજરાતની રહીમબાદ, ગુજરાતમાં પાણીની સમસ્યા: વર્ષાના વધતા પ્રમાણ, પીવાના પાણીમાં ક્લ્યુસેલ્યનું પ્રમાણ, કૃષી જળનો વેપાર, પીવાના પાણીનો વેપાર, શર પ્રકૃતિ, પાણીની સમસ્યાનાં સમાધાન ઉપાયો

(વ) હવા: હવાનું મહત્વ, વાતાવરણ, વાતાવરણ બંધારણ, વાતાવરણની સ્તર રચના, વાતાવરણ મહત્વ, આવોહાવા અને હવામાન, વાતાવરણ દ્રાક્ષ્ય, પવન અને તેના પ્રકાર, પ્રાણીનું, હવાની વિશેષતાઓ, જીવન અને હવાનો સંબંધ, વાયુ પ્રકૃતિ, ઓઝોન સ્તર, ગ્રીનહોઉસ અસર અને તેની પદાર્થવર્ષણ પર અસરો, વાયુ પ્રકૃતિ અટકાવવાના ઉપાયો.

Reference:
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2. પદાર્થવર્ષણ અથવા ઘરધારણ (પદાર્થવર્ષણ અથવા ઘરધારણને પ્રદૂષણની વધારણા સૌથી) - ઔ.જ.માટા
GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-I
FC-102: ENVIRONMENTAL STUDY (પરસ્પરરાશી શિક્ષણ)
(Syllabus of theoretical portion) (With Effect from 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

1. પરસ્પરરાશી શિક્ષણ વિષયનું પાયાલા કાફ વ્યાકરણ / પાણી, ઉભા તથा જમીન સંદભ સર્વ / સુાને વ્યાકરણ વર્ગ દ્વારા કરવવામાં આવે. 
2. પાણીનું પ્રધાનકર્મ
3. પદાર્થ (Planton) કલેક્શન પદ્ધતી
4. સંક્ષેપ્ત ઉર

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