

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
MIC 201: Introduction to Microorganisms
(Syllabus of theoretical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

UNIT:1	General classification and mode of reproduction in Bacteria	(8 Hrs)
UNIT:2	Occurrence ,General classification , Morphology, Mode of Reproduction and Economic Importance of : Yeasts and Moulds	(7 Hrs)
UNIT:3	Occurrence ,General classification , Morphology ,Mode of Reproduction and Economic Importance of : Algae, Protozoa and Helminths	(8 Hrs)
UNIT:4	Occurrence ,General classification , Morphology, Mode of Reproduction and Economic Importance of : Virus	(7 Hrs)

Text book:Microbiology : Pelczar M J, Chan E C S and Kreig N R Tata Mc Grow Hill





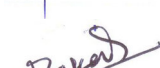
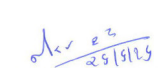





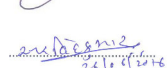
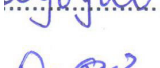

Reference Books:

- 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/ Cole
- 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

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
MIC 201: Introduction to Microorganisms
(Syllabus of Practical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

- 1 Motility study by Hanging drop and Agar stab
- 2 Micrometry
- 3 Observation of Bacterial growth
- 4 Observation of yeast growth on Glucose Yeast Extract Agar
- 5 Staining of yeast and demonstration of budding
- 6 Observation of fungi growth on Rose Bengal Agar
- 7 Mounting of fungi (Aspergillus, Mucor) and demonstration of sporangium and conidium
- 8 Study of permanent slides

Board of Studies(Microbiology)

1	Dr.S.R.Dave		8	Dr.Pradip Acharya	
2	Dr.S.A Bhatt		9	Mrs.Preeti Shukla	
3	Dr.Rakesh Patel		10	Dr.Niraj Seth	
4	Dr.Devayani Tipre		11	Dr.Pratik Shilpakar	
5	Dr.Nupur Modi		12	Mr.Arvind Dungarachiya	
6	Dr.Nikhil Bhatt		13	Dr.Rakesh Soni	
7	Dr.srinivas Duggirala		14	Dr.Haribhai patel	

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II

MIC: 202 Ultrastructure and Growth of Bacteria
(Syllabus of theoretical portion)(With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

Unit 1: Ultrastructure	(8 Hrs.)
1 Surface appendages of bacteria: General nature, arrangement, structure and role of flagella, General nature and significance of pili, prosthecae and stalks	(2 Hrs.)
2 Surface layers of bacteria: General nature and significance of capsule, bacterial cell wall, Cell membrane and Mesosomes	(2 Hrs.)
3 Bacterial cytoplasm and cell organelles: Cytoplasm, cytoplasmic inclusions, nuclear Material	(2 Hrs.)
4 Bacterial endospore: Spore structure, sporulation and spore germination	(2 Hrs.)
Unit 2: Nutrition	(8 Hrs.)
1 Nutritional requirements of bacteria (Energy, electron, carbon, nitrogen, oxygen, sulfur, phosphorus, trace element, vitamins, water)	(2 Hrs.)
2 Nutritional types of bacteria (Phototrophs, Chemotrophs, Autotrophs & heterotrophs, Obligate parasites	(2 Hrs.)
3 Bacteriological media: Types of media, Preparation of media	(1Hr.)
4 Physical condition required for growth	(3 Hrs.)
● Temperature: Psychrophiles, Mesophiles, Thermophiles	
● Gaseous requirements: Aerobic, Anaerobic, Facultative, Microaerophilic, Oxygen toxicity	
● pH (Hydrogen Ion Concentration)	
● Miscellaneous physical requirements: Osmotic pressure	
Unit 3: Growth –I	(7 Hrs.)
1 Generation time and growth rate	(2 Hrs.)
2 Normal growth cycle of bacteria (Lag phase, Logarithmic phase, Stationary phase, Decline / Death Phase)	(2 Hrs.)
3 Synchronous growth	(1 Hrs.)
4 Continuous culture, Diauxic growth	(2 Hrs.)
Unit 4: Growth –II	(7 Hrs.)
1 Total count: Direct microscopic count, Electronic enumeration of cell numbers (Electronic particle counter), Determination of cell dry weight, Turbidimetric method	[3Hrs]
2 Viable count: Plate count method (SPC), Membrane filter count, MPN	(2 Hrs.)
3 Cell activity: Determination of nitrogen content, Substrate utilization, Product formation, Cell Components	(2 Hrs.)

Textbook : **Microbiology:** Pelczar M J, Chan E C S and Kreig N R. Tata McGraw- Hill Edition.






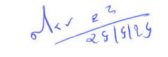


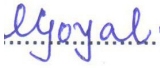
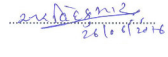



Reference :

- 1 General Microbiology:** Stanier R Y, Ingraham J L, Wheelis M L, Painter P R. Mac Millan Press Inc.
- 2 Microbiology: An introduction:** Tortora G J, Funke B R and Case C L. Pearson Education Inc
- 3 Microbiology: Principles and Explorations:** Black J G. John Wiley & Sons, Inc.
- 4 Microbiology:** Willey J M, Sherwood L M, Woolverton C J. Mac Millan Press Inc.
- 5 Elementary Microbiology:** H. A. Modi, Akta Prakashan.
- 6 Principles of Microbiology:** Atlas R M. Wm. C. Brown Publishers

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
MIC: 202 Ultrastructure and Growth of Bacteria
(Syllabus of Practical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

- 1 Gram staining
- 2 Spore staining: Dorner's method
- 3 Capsule Staining: Hiss's method
- 4 Determination of bacterial growth in liquid or solid medium.
- 5 Determination of bacterial growth at different pH.
- 6 Determination of bacterial growth at different temperature.
- 7 Determination of bacterial growth at different NaCl concentration.

Board of Studies(Microbiology)

1	Dr.S.R.Dave		8	Dr.Pradip Acharya	
2	Dr.S.A Bhatt		9	Mrs.Preeti Shukla	
3	Dr.Rakesh Patel		10	Dr.Niraj Seth	
4	Dr.Devayani Tipre		11	Dr.Pratik Shilpakar	
5	Dr.Nupur Modi		12	Mr.Arvind Dungarachiya	
6	Dr.Nikhil Bhatt		13	Dr.Rakesh Soni	
7	Dr.srinivas Duggirala		14	Dr.Haribhai patel	

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
CHEM-201: Inorganic 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: Coordination Compounds (50% Marks)	(15 Hours)
1.1 Double salts and Coordination compounds	(2 hours)
1.2 Werner's work	(2 hours)
1.3 Types of ligands	(1.5 hours)
1.4 Chelate compound	(0.5 hour)
1.5 Isomerism of coordination compounds	(3 hours)
-Geometrical isomerism	
-Optical isomerism	
-Ionization isomerism	
-Linkage isomerism	
-Coordination isomerism	
1.6 Stability of coordination compounds	(2 hours)
-Step wise and overall formation constants	
1.7 Bonding in coordination compounds	(2 hours)
-Crystal Field Theory	
1.8 Applications of coordination compounds	(2 hours)

References :

- 1 Basic Inorganic Chemistry (Third edition), F.Albert cotton, Geoffrey Wilkinson and Paul L.Gaus., John Wiley and Sons,Inc.,New York., pp.165-185 (1995).
- 2 Concise Inorganic Chemistry (Fifth edition), J.D.Lee., Blackwell Science Ltd.,Oxford., pp.194-236(1996) .

Unit-2: Covalent Bonding and Molecular Orbitals (50% Marks)	(15 Hours)
2.1 Introduction	(1 hour)
2.2 Sidgwick-Powell theory	(1 hour)
2.3 Valence Shell Electron Pair Repulsion (VSEPR) theory	(1 hour)
2.4 Some examples using the VSEPR theory	(2 hours)
-BeCl ₂	
- BF ₃	
-NH ₃	
-H ₂ O	
-PCl ₅	
-SF ₆	
-IF ₇	
2.5 Sigma and pi bonds	(0.5 hour)
2.6 Molecular orbital method	(0.5 hour)
2.7 Linear combination of Atomic Orbitals (LCAO) method	(2 hours)
-s-s combinations of orbitals	
-s-p combinations of orbitals	
-p-p combinations of orbitals	
-p-d combinations of orbitals	
-d-d combinations of orbitals	
- Nonbonding combinations of orbitals	
2.8 Rules for Linear Combination of Atomic Orbitals	(1 hour)
2.9 Examples of molecular orbital treatment for homonuclear diatomic molecules	(4 hours)
-H ₂ ⁺ molecule ion	
-H ₂ molecule	
-He ₂ ⁺ molecule ion	

- He₂ molecule
- Li₂ molecule
- Be₂ molecule
- B₂ molecule
- C₂ molecule
- N₂ molecule
- O₂ molecule
- O₂⁻ molecule ion
- O₂²⁻ molecule
- F₂ molecule

2.10 Examples of molecular orbital treatment for heteronuclear diatomic molecules **(2 hours)**

- NO molecule
- CO molecule
- HCl molecule

References :

- 1 Basic Inorganic Chemistry (Third edition), F.Albert cotton, Geoffrey Wilkinson and Paul L.Gaus., John Wiley and Sons,Inc.,New York., pp.73-124 (1995) .
- 2 Concise Inorganic Chemistry (Fifth edition), J.D.Lee., Blackwell Science Ltd.,Oxford., pp.-72-110(1996)

-----XXX-----XXX-----XXX-----

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
CHEM-201: Inorganic Chemistry
(Syllabus of practical portion) (With Effect from 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

Qualitative analysis of inorganic mixture (45 hours)

Semi-micro method of analysis of mixture of powders containing four radicals excluding soluble PO_4^{3-} , arsenite, arsenate and borate. Mixture may be partly soluble in water and wholly soluble in an acid

Candidate should perform the analysis of following ions

Na^+ , K^+ , NH_4^+ , Mg^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Fe^{2+} , Fe^{3+} , Al^{3+} , Cr^{3+} , Zn^{2+} , Mn^{2+} , Co^{2+} , Hg^{2+} ,
 Pb^{2+} , Cu^{2+} , Sn^{2+} , Ag^+ and S^{2-} , SO_3^{2-} , SO_4^{2-} , CO_3^{2-} , Cl^- , Br^- , I^- , NO_3^- , NO_2^-

-----XXX-----XXX-----XXX-----

GUJARATVIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
PHY-201: PHYSICS
(Syllabus of theoretical portion) (With Effect from 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

UNIT 1 : OPTICS **07 Hours**

- Fermat's Principle of least time
- Law of reflection and Law of refraction using Fermat's principle
- Resolution, Resolving power and Rayleigh's criterion
- Resolving power of Prism
- Plane diffraction grating- Resolving power of Plane diffraction grating
- Introduction of optical instruments (Spectrometer, Simple Microscope, Compound Microscope)

UNIT 2 : SOUND **08 Hours**

Sound wave:

- Introduction, Intensity & its level,
- Loudness & pitch
- Radiation efficiency of a sound source
- Newton's formula and Laplace's correction

Ultrasonic:

- Introduction,
- Piezo electric effect
- Piezo electric oscillator
- Applications of ultrasonic waves

UNIT 3 : X-RAYS **07 Hours**

- Discovery of X-rays
- Production of X-rays
- Origin of X-rays

- Properties of X-rays
- Diffraction of X-rays
- Bragg's law & crystal structure
- Crystallography by powder method
- Applications of X-rays

UNIT 4 : OSCILLATION

08 Hours

- Equation of displacement, velocity & acceleration
- Combination of two S.H.M. having same time period but different phase (Algebraic method & Graphical method)
- Particular case of Phase differences
- Lissajous figures, their demonstration using CRO
- Uses of Lissajous figures
- Combination of more than two S.H.M (Graphical method)

Reference :

- 1 Optics and atomic Physics by D. P. Kandelval, Himalaya Publishing house
- 2 Optics by Ajoy Ghatak (TMH edition)
- 3 Engineering Physics By R. K. Gaur and S. L. Gupta
- 4 Mechanics, Wave motions & Heat by Francis Weston Sears, (Addision Wesley Publication)
- 5 A text book of Oscillation, Wave & Acoustics By M. Ghosh, D. Bhattacharya (S. Chand)

GUJARATVIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
PHY-201: PHYSICS
(Syllabus of practical portion) (With Effect from 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

- 1 To determine the resolving power of prism.
- 2 To determine Cauchy's constant A and B using given formula and also find out with graph.
- 3 To determine the wavelength of sodium light using plane diffraction grating.
- 4 Find out the refractive index of different liquids using convex lens.
- 5 To verify the Stefan Boltzman's fourth power law using AC source.
- 6 To study the error and analyze the given data having errors and propagated also to find the percentage errors of the given problems.
- 7 To study nuclear radioactive decay using simulation.
- 8 Determination of Miller Indices
- 9 Simple Pendulum
- 10 To find out absorption coefficient of liquid with the help of photovoltaic cell.

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
ENG-201:ENGLISH
(Syllabus of theoretical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

Objectives:

- 1 To read different kinds of simple material to find out information contained in it.
- 2 To familiarize students with vocabulary used in the passages
- 3 To acquaint students with vocabulary having multiple meanings.
- 4 To familiarize students with the functions of some of the tenses.
- 5 To orient students towards electronic communication.
- 6 To develop among students the academic skills of locating books and journals.

Unit 1: Comprehension (Weightage – 40%)

12 Hours

- 1 To Sir, with Love by E. R. Braithwaite
- 2 My Struggle for an Education by Booker T. Washington
- 3 Samples of Invitation Cards
- 4 Samples of Notices

NB: Teacher should provide at least three samples of invitation cards and notices each.

Comprehension Pattern:

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

NB: Short questions as well as short notes should be informative in nature.

Unit 2: Vocabulary (Weightage – 10%)

2 Hours

- 1 Antonyms/Synonyms (Based on the comprehension texts only)
- 2 Homophones
- 3 Homonyms

NB: Teacher should provide a list of homophones and homonyms for the students.

Unit 3: Grammar (Weightage – 20%) 5 Hours

- 1 Pronouns (Detailed Study)
- 2 Present Perfect Tense
- 3 Present Perfect Continuous Tense
- 4 Past Perfect Tense
- 5 Past Perfect Continuous Tense

Unit 4: Writing Skills (Weightage – 30%) 3 Hours

- 1 Writing Emails
- 2 Describing an Experiment

NB: Only those experiments are to be considered which students undertake in their laboratory.

Unit 5: Academic Skills: Reference Skills 3 Hours

- 1 Accessing Books and Journals in a Library
- 2 Using Index of a book to locate specific information

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

Seminar/Presentation 5 Hours

Reference :-

- 1 Achar, Deeptha et al. Eds. *English for Academic Purposes Book – 1*. Gandhinagar:University Granthnirman Board, 2011.
- 2 Achar, Deeptha et al. Eds. *English for Academic Purposes Book – 1*. Hyderabad: Orient BlackSwan, 2012.
- 3 Achar, Deeptha et al. Eds. *English for Academic Purposes Book – 2*. Gandhinagar:University Granthnirman Board, 2011.
- 4 Achar, Deeptha et al. Eds. *English for Academic Purposes Book – 2*. Hyderabad: Orient BlackSwan, 2013.
- 5 Tickoo, M. L. et al. Eds. *I Am The People: English Reader*. Delhi: CBSE, 1996.
- 6 Wren, P. C. and H. Martin. *High School English Grammar and Composition. (Gujarati)*. Trans. Dr. Usha Upadhyay and Jegeesha Upadhyay. New Delhi: S. Chand, 2013.

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II
EC-201: Biofertilizers
(Syllabus of theoretical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

UNIT:- 1	(16 Hours)
1 Bio fertilizers-Introduction	(4Hours)
-Nitrogen fixers, phosphate solubilizers,	
-Nutrient trans locators, organic matter decomposers, growth accelerators	
2 Bio fertilizers-Marketing and prospects for commercialization	(4Hours)
3 Potential demand and current status of bio fertilizer production in India	(4Hours)
4 Microbiological techniques .	(4Hours)
- Staining of microorganisms	
- motility of bacterial cells	
UNIT:- 2	(15 Hours)
1 Production technology	
- Isolation of Rhizobium from nodules	(2 Hours)
- Isolation and culturing of Azotobactoeer	(2 Hours)
- Isolation and culturing of Azospirillum	(2 Hours)
- Isolation and culturing of Acetobacter	(2 Hours)
- Isolation and culturing of phosphate Solubilizing bacteria	(2 Hours)
2 Mass Production of bacterial biofertilizers	(2 Hours)
3 Quality control of biofertilizers	(2 Hours)
4 Field applications of biofertilizers)	(1 Hour)

Reference Books

- 1 An introduction to biofertilizers and biopesticides,;Dr. M.S. Vora, H.N.Shelat & Dr. R.V. Vyas
- 2 Bioferlizers in agriculture and forestry 3rd revised edition, Subbarao N.S. (1993). Oxfard and IBH publishing co.pvt. Ltd., NewDelhi.
- 3 Biofertilizers :Subbarao N.S.
- 4 Biofertilizers & Organic Farming : Vyas and H.A.modi
- 5 General Microbiology: R Y Stanier, Adelberg E A and J L Ingraham, Mac Millan Press Inc.

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II

FC-201: ENVIRONMENTAL STUDY (पर्यावरण शिक्षण)
(Syllabus of theoretical portion) (With Effect From 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=30, Credit=02)

એકમ ૧	પર્યાવરણમાં જૈવિક વિવિધતાનો પરિચય જૈવિક વિવિધતા એટલે શું? જૈવિક વિવિધતાના પ્રકારો: પરિસ્થિતિ તંત્રની વિવિધતા, જાતિઓની વિવિધતા અને જનીનીય વિવિધતા, જૈવિક વિવિધતાનું મહત્વ, તેની સામેના ભયસ્થાનો ગુજરાતની કુદરતી સંપત્તિ: વન્ય સંપત્તિ, પ્રાણી સંપત્તિ, મત્સ્ય સંપત્તિ, ખનીજ સંપત્તિ, મેન્ગ્રોવ.	૧૦ કલાક
એકમ ૨	કુદરતી સ્ત્રોતો: જમીન અને જંગલો જમીન નિર્માણ અને તેના પર અસર કરતા પરિબળો, જમીન એટલે શું? તેના વિભાગો: સપાટીની જમીન અને અંતઃ જમીન, જમીનની સ્થાનિક પર્યાવરણ પર અસરો, જમીનના ગુણધર્મો: જૈવિક ગુણધર્મો, ભૌતિક ગુણધર્મો અને રાસાયણિક ગુણધર્મો. જમીનનું વર્ગીકરણ, ગુજરાતમાં જમીનના પ્રકારો, જમીન અને પાણીનો સંબંધ, જમીન અને હવાનો સંબંધ, જમીનના સેન્દ્રીય પદાર્થો, જમીનમાં ખનીજ તત્ત્વો તેનું વર્ગીકરણ અને કાર્યો, જમીન પ્રદુષણ અને સમસ્યાઓ: જમીન ધોવાણ, જમીનની અમ્લીયતા અને ખારાશ, જમીનની ખારાશની સમસ્યા, પડતર જમીન, રણીકરણ, જમીન સંરક્ષણ, સજીવ ખેતી, સજીવ ખેતીના પાંચ પગથિયા. જંગલોનું મહત્વ, જંગલ વિનાસના કારણો અને તેને નિવારવાના ઉપાયો.	૧૦ કલાક
એકમ ૩	ઊર્જા ઊર્જાના વિવિધ ઉપયોગો અને ઇતિહાસ, ઊર્જા એટલે શું? તેના સ્ત્રોત અને પ્રકાર, અખૂટ અને ખૂટી જાય તેવા ઊર્જાસ્ત્રોત નો તફાવત. (અ) ઊર્જાના સ્વરૂપો: યાંત્રિક ઊર્જા, ઉષ્મા ઊર્જા, રાસાયણિક ઊર્જા, ગુરુત્વાકર્ષણીય ઊર્જા, નાભીય ઊર્જા, સૌર ઊર્જા, વિદ્યુત ઊર્જા.	૧૦ કલાક

- (બ) ઉર્જાના સ્ત્રોતો: સૂર્ય, સમુદ્રીય ભરતી-ઓટ, દરિયાઈ મોજા, પવન, જલસ્થિતિમાન, ભૂઉષ્મીય ઉર્જા, કોલસો ખનીજ તેલ, કુદરતી વાયુ, વિખંડન, સંલયન, બાયોમાસ.
- (ક) ઉર્જા અને પર્યાવરણો સંબંધ: વિવિધ ઉર્જાસ્ત્રોતોના ઉપયોગથી પર્યાવરણ પર થતી માઠી અસરો, ઉર્જા બચત અને ઉર્જા સંરક્ષણ.
- (ડ) વિવિધ બિનપરંપરાગત ઉર્જા સાધનો: બાયોગેસ પ્લાન્ટ, સૂર્ય કુકર, પ્રેશર કુકર, ગેસીફયાર, સોલાર ફોટોવોલ્ટીક પંપ, પવનચક્કી, સોલર ગ્રીન હાઉસ, વિન્ડટર્બાઇન, લાકડાં સુકાવવાનું સુકવણી ઘર, સોલર ડ્રાયર, સોલર સ્ટીલ, સોલર વોટર હીટર.

Reference:




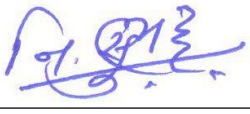
- 1 પર્યાવરણ સાથી
- 2 પર્યાવરણ અધ્યયન (પર્યાવરણના અભ્યાસનું બહુવિદ્યાશાખીય સ્વરૂપ) –એ.જે.ભરૂચા

GUJARAT VIDYAPEETH : AHMEDABAD
M.D. Gramseva Mahavidyalaya, Sadra, Dist: Gandhinagar
Department of Microbiology
B.Sc. Semester-II

FC-201: ENVIRONMENTAL STUDY (पर्यावरण शिक्षण)
(Syllabus of theoretical portion) (With Effect from 1st July, 2016)
(External Evaluation: 60% + Internal Evaluation: 40%)
(Total Teaching Hours=45, Credit=02)

૧. પર્યાવરણ શિક્ષણ વિષયનું પ્રાયોગિક કાર્ય ફિલ્ડ વર્ક/ પાણી, ઉર્જા તથા જમીન સંદર્ભે સર્વે / પ્રોજેક્ટ વર્ક દ્વારા કરાવવામાં આવશે.
૨. પાણીનું પૃથકરણ
૩. જમીનના નમુના લેવાની પદ્ધતિ

Board of Studies

અનુ. નં.	નામ	
૧	ડો. ધવલભાઈ વાઘેલા	
૨	ડો. પ્રકાશ કે. પટેલ	
૩	ડો. મનીષભાઈ ગોર	
૪	ડો. કૌશિક આર. પટેલ	
૫	ડો. નિખિલ ભટ્ટ	
૬	ડો. હરીભાઈ પટેલ	