1.3.2 Courses included experiential learning

R.R. Lalan College - Bhuj

(Experimental Learning Courses)

Botany

Semester – I Syllabus for the Practical (Botany-101)

1. Study of virus T-phase & TMV through chart/ Photograph
2. Study of Permanent slide/ Chart/ Photograph of Bacterium
3. Study of Nostoc (Vegetative, Heterocyst and Akinetes) through class work material.
4. Study of Vegetative and reproductive structure of Spirogyra through class work Material and permanent slide.
5. Study of Vegetative and reproductive structure of Mucor through class work Material and permanent slide.
6. Study of Riccia: Morphology, WM of Rhizoids, WM of Sporophyte through class work material & Permanent slides of Thallus VS, Thallus VS passing through Antheridia, Archegonia and Sporophyte
7. Study of Cell cycle through Chart/ Photograph
8. Study of Plant cell through Chart/ Photograph
9. Study of Cell division: Mitosis & Meiosis (Permanent slides)
10. Study of Mitosis – Onion root tip
11. Study of Nucleic acids through Chart/ Photograph/ Model
12. Study of Morphology as per theory.
13. Study of Taxonomy as per theory.
14. Visits to field: Students are expected to submit Field Report \ Specimen \ Collection
15. Journal

Semester – II Syllabus for the Practical(Botany-102)

1. Study of Selaginella: Morphology, Reproduction(Spore bearing organs) (Excluding anatomy)
2. Study of Cycas: Morphology, Reproduction(Spore bearing organs) Transfusion tissue in leaflet VS & Inverted Omega shaped arrangement of vascular bundle in Rachis TS (Excluding anatomy) through Class Work material & Permanent slides
3. Study of Root & Shoot apex through Chart/ Permanent slide
4. Study of normal secondary growth :- Sunflower Stem & Root (single stain)
5. Study of Nymphoea petiole (Ecological adoptive characters)
6. Study of Casuarina stem
7. Study of Avicennia leaf
8. Study through chart : Photosynthetic pigment containing structure (Chloroplast)
9. Demonstration practical of photosynthesis – NAMES of experiments
10. Demonstration practical of water relations (Osmosis, Diffusion, Imbibition & Plasmolysis)
11. To measure pH of given soil samples
12. Study of Medicinal plants as per theory
13. Study of Food plants as per theory
14. Study of Natural Rubber as per theory
15. Journal / Submission

KSKV Kachchh University, Bhuj - Kachchh

Botany Syllabus as CBCS System

Semester III (w.e.f. June 2016)

Name of the Course: **Cryptogamic Botany**

Code: USCEBO - **303 [PRACTICAL]**

1 Oedogonium: Mounting of vegetative thallus, Cap cell, Macrandrous Antheridia, Oogonium, Dwarf male (Nannandrium) + permanent slides

2 Ectocarpus: Mounting of Thallus, Uni & Plurilocular sporangia + permanent slides

3 Batrachospermum: Mounting of vegetative thallus, Cystocarp. Permanent slides of Antheridia, Archegonia & Cystocarp

4 Claviceps: Mounting of Conidia, Permanent slides of ClavicepsAscogonium (Stroma) VS,Ascospore, Specimen of Ergot

5 Puccinia: Mounting of Uredospore and Teleutospore, Permanent slides of Uredospore, Teleutospore (Teliospore), Pycniospore (Spermatiospore / Spermatia) and aecidiospore.

6 Anthoceros: Specimen of Thallus, Sporophyte TS; Permanent slides or charts of V.S. of thallus, Reproductive organs, LS of Sporophyte

7 Funaria:- Mounting of Antheridia, Archegonia, Peristomial teeth.
Specimen:- Funaria gametophyte with sporophyte
Permanent slides of Antheridia, Archegonia, Sporophyte LS

8 *Equisetum:* Specimenof sporophytic plant
Permanent slides:*Equisetum* cone L.S. & T.S.
Mounting of *Equisetum* spores from cone.

9 *Adiantum*: Specimenof sporophytic plant
Permanent slide of T.S. Passing through sori of *Adiantum* leaflet, Mounting of sporangia of *Adiantum*

Suggested Readings:

(i) Practical Botany Vol. I by Bendre & Kumar, Rastogi publication.

KSKV Kachchh University, Bhuj - Kachchh

Botany Syllabus as CBCS System

Semester III (w.e.f. June 2016)

Name of the Course : **Gymnosperms,Systematic Botany&Cyto-genetics**

Code: **USCEBO - 304 [PRACTICAL]**

1 Study of Pinus:
- Mounting of Pollengrain
- T.S. of Pinus needle.
- Specimens: Male cone, Female cone, Needle
- Permanent slides: Ovule, Needle, male cone L.S.

2 Study of Aestivation (As per Theory)

3 Study of Buds (Types & modifications) (As per Theory)

4 Study of Adhesion & Cohesion in flower (As per Theory)

5 Study of Cruciferae

6 Study of Caesalpiniaceae

7 Study of Rubiaceae

8 Study of Convolvulaceae

9 Study of Euphorbiaceae

10 Study of Poaceae

11 Study of Palmae

12 Study through Model / Chart / Computer (Picture/ Photograph)
- (i) U.S. of Plant cell
- (ii) U.S. of Plant cell wall
- (iii) U.S. of Plant cell ER
- (iv) U.S. of Plasma membrane
- (v) Microbodies (Peroxisome, Glyoxisome)
- (vi) Cytoskeleton

13 Study through Model / Chart / Computer (Picture/ Photograph) as per syllabus
Mono & Dihybrid ratio, Complementary Supplementary genes

14 Cytoplasmic inheritance in Mirabilis

15 Male sterility in Maiz

Suggested Readings:

(i) Practical Botany vol. I & II By Bendre and Kumar, Rastogi publication

KSKV Kachchh University, Bhuj - Kachchh

Botany Syllabus as CBCS System

Semester IV (w.e.f. June 2016)

Name of the Course : **Anatomy, Embryology, Physiology & Biochemistry**

Code: **USCEBO - 405 [PRACTICAL]**

1. Study of Epidermal tissue system: Multilayered epidermis e.g. Ficus & Nerium leaf
2. Study of Epidermal tissue system: Stomata: Dicot & Monocot
3. Study of Epidermal tissues: Different types of trichomes and hairs. [Fresh material / Charts]
4. Study of Mechanical Tissue system
5. Study of secretary Tissue system.: Glands , Nectaries
6. Study of secretary Tissue system.: Resin and oil ducts
7. Study of secretary Tissue system : Laticiferous ducts, Hydathodes
8. Study of Anomalous primary growth in Nyctanthes stem
9. Study Double stain temporary preparation of Anomalous secondary growth in Salvadora stem & Tinospora aerial root
10. Study of Male structure of anther
    (i) Pollen grains
    (ii) To Study of pollen germination
11. Study female structures
    a. Ovules through Permanent slides / charts
    b. embryosac through Permanent slides / charts
12. Demonstration practical Conduction of water through xylem.
13. Demonstration of Transpiration
    a. Stomatal transpiration by four leaves method
    b. Compare the rate of transpiration from leaf surfaces by Cobalt Chloride method
    c. Demonstrate the rate of transpiration by using Potometer
14. To demonstrate anaerobic respiration in germinated seeds
15. Histochemical test of;
    a. Carbohydrate (starch, glucose and Lignin
    b. Lipid.

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Botany Syllabus as CBCS System

Semester IV (w.e.f. June 2012)

Name of the Course : **Ecology, Plant Resources & Applied Botany**

Code: **Botany- 406 [PRACTICAL]**

Unit – 1 : Plant Ecology :

Study through Fresh material/ Chart / Picture / Model / Specimens of Inter specific interactions

(i) Study of soil (As per Theory)
(ii) Positive Interaction
(iii) Negative interaction

Unit – 2 : Ecosystem :

Study through Chart / Picture / Model / Specimens Inter specific interactions

(i) Heterotrophic nutrition in plant specimens
(ii) Food chains & food web
(iv) Ecological pyramids
(v) Flow of energy
(vi) Bio-Geochemical Cycles

Unit – 3: Plant Resources:

Study through Chart / Picture / Model / Specimens Inter specific interactions
Botanical names, family, morphology, sources & economic importance.

(i) Plant fibers – Jute, Coir
(ii) Oils – Groundnut, Coconut
(iii) Perfumes & Cosmetics – Citronella, Jasmine
(iv) Dyes – Curcuma, Indigofera
(v) Insecticides – Neem, Nicotiana
(vi) Ornamental plants – Seasonal : Aster, Celosia
-- Perrenial: Acalypha, Dieffenbachia
-- Caeti/Snccculent – Opuntia, Agave
-- Climbers – Bougainvillea, Quisqualis

Unit – 4: Applied botany (Advance techniques in Botany)

Study through Chart / Picture / Model / Specimens Inter specific interactions

(i) Remote Sensing
(ii) Horticulture
(iii) Floriculture
(iv) Bonsai
(v) Plant tissue Culture
(vi) Hydroponics

KSKV Kachchh University, Bhuj - Kachchh
T.Y. B.Sc. (Botany) Syllabus as CBCS System
Semester V (w.e.f. June 2016)
Name of the Paper : **Plant Diversity (PRACTICAL)**
Code: USCEBO-507

Study through Class work material and Permanent slide.

1 Study the External feature and structure of thallus, Reproductive Organs of Oscillatoria
2 Study the External feature and structure of thallus, Reproductive Organs of Chara
3 Study the External feature and structure of thallus, Reproductive Organs of Sargassum
4 Study the External feature and structure of thallus, Reproductive Organs of Polysiphonia
5 Study the External feature and structure of thallus, Reproductive Organs of Phytopthora
6 Study the External feature and structure of thallus, Reproductive Organs of Aspergillus
7 Study the External feature and structure of thallus, Reproductive Organs of Ustilago
8 Study the External feature and structure of thallus, Reproductive Bodies of Pellia
9 Study the External feature and structure of thallus, Reproductive Bodies of Notothyllus
10 Study the External feature and structure of thallus, Reproductive Bodies of Sphagnum
11 Study the External feature and structure of thallus, Reproductive Bodies of Isoetes
12 Study the External feature and structure of thallus, Reproductive Bodies of Marselia
13 Types of Stele through permanent slides
14 Types of Fossils through Specimens

KSKV Kachchh University, Bhuj - Kachchh

T.Y. B.Sc. (Botany) Syllabus as CBCS System

Semester V (w.e.f. June 2016)

Name of the Paper : **Systematic Botany, Angiosperms, Embryology and Anatomy (PRACTICAL)**

Code: USCEBO-508

1	Preparation of Herbarium
2	Study of Taxonomy as per syllabus (Families)
3	To dissect out globular embryo
4	To dissect out heart shape embryo
5	To remove mature dicot embryo
6	L.s. of maize grain showing monocot embryo
7	L.s. of ovule showing nuclear /cellular/ helobial endosperm
8	Demonstration of Microtomy & Methods of Slide preparation
9	Study of anomalous secondary growth in Achyranthus
10	Study of anomalous secondary growth in Bougainvillea
11	Study of anomalous secondary growth in Carrot
12	Submission
13	Visit/ Excursion
14	Journal

4.3.2 Bio-pesticides
4.3.3 Bio-fertilizers
4.3.5 Medical Mushrooms

Sem V Botany USCEBO-509 Practical

1	To test germinability of seeds with tetrazolium
2	To demonstrate Geotropism by Clinostat
3	Measurement of Growth using Auxanometer
4	To study the effect of Gibberalic acid on plant growth
5	To determine the value of RQ of different respiratory substrates
6	To test the presence of Protein
7	Separation of Amino acids in a mixture by Paper Chromatography
8	Study through Chart/ Photograph: Chromosomal Mutation
9	Study through Chart/ Photograph: Gene Mutation
10	Study through Chart/ Photograph: Lac & Tryptophan operon
11	Study through Chart/ Photograph: r-DNA technology
12	Study through Chart/ Photograph: Development of Transgenic Plant: Bt Cotton
13	Study through Chart/ Photograph: Concepts of PTC - Embryogenesis
14	Study through Chart/ Photograph: Industrial Botany
15	Preparation of Crude Bio-pesticide (any one) & Herbal Drug (any one)
16	Excursion/ Project work-report
17	Journal

KSKV Kachchh University, Bhuj - Kachchh

T.Y. B.Sc. (Botany) Syllabus as CBCS System

Semester VI(w.e.f. June 2016)

Name of the Paper : **Ecology, Environment & Human Welfare(PRACTICAL)**

Code: USCEBO-610

1. To determine the minimum size of the quadrat by species area curve.
2. To prepare a list of common plants occurring in the grassland community
3. To determine the frequency and frequency classes of various species occurring in a givenarea by quadrate method
4. To determine the abundance/ relative abundance and density/ relative density of variousspecies occurring in a given area by quadrate method
5. To determine the frequency, frequency classes and relative frequency of various speciesoccurring in a given area by belt transect method.
6. To charting of different species in the grassland.(Chart method)
7. To determine frequency, density and abundance of various species shown on graph paper.
8. To study following ecological instruments:
   8.1 Anemometer
   8.2 Psychrometer
   8.3.Hygrometer
   8.4 Maximum and Minimum Thermometer
   8.5 Dry and Wet Bulb Thermometer
   8.6 Rain guage
9. Comparison of dissolved oxygen content of polluted and non-polluted water by idometric titration method.
10. Test for the presences of carbonate, nitrate, deficiency of replaceable bases.
11. Visit to National Parks and/ or Sanctuary and/or Nursery to study its management. Report to be submitted during practical exam.
12. Case study from literature

KSKV Kachchh University, Bhuj - Kachchh

T.Y. B.Sc. (Botany) Syllabus as CBCS System

Semester VI(w.e.f. June 2016)

Name of the Paper :**Gymnosperms, Phytogeography & Applied Botany (PRACTICAL)**

Code: USCEBO-611

1. Study of Ginkgo: Reproductive organs
2. Study of Ephedra: Reproductive organs
3. Study of Fossils as per theory (Specimen/ Chart/ Photograph)
4. To prepare map showing major plant communication/ Biomes of Gujarat and write major Plant species
5. To prepare map showing major pant communities/ Biomes of India and write major Plant species
6. To prepare map showing major plant communities/ Biomes of World and write major Plant species
7. Preparation of male flowers for hybridization
8. Preparation of female flowers for hybridization
9. Study of different methods of plant breeding through chart/ Model/ Photograph/ Specimen as per theory
10. Visit to a garden to study the principle and materials used in gardening and landscape. Report to be submitted during practical exam
11. Visit to a nursery to study its management. Report to be submitted during practical exam

KSKV Kachchh University, Bhuj - Kachchh

T.Y. B.Sc. (Botany) Syllabus as CBCS System

Semester VI(w.e.f. June 2016)

Name of the Paper :**Analitical Techniques & Research Methodology(PRACTICAL)**

Code: USCEBO-612

To Study Principle, Structure and functioning of 1 to 9;

1	pH meter
2	EC meter
3	Colori meter
4	Water bath
5	Spectrophotometer
6	Centrifuge
7	Oven
8	Stirrer
9	Micro pipette
10	To study various types of Microscope/ methods of Microscopy through Chart/ Photograph
11	Separation of Chlorophyll by paper Chromatography
12	Separation of Amino Acids by Paper Chromatography
13	Study of TLC through chart/ photograph
14	Solve the examples of Mean, Median & Mode
15	Dissertation work based on unit-4

Chemistry

Kutch University: B. Sc: SEMESTER: I (ONE)

BASIC CHEMISTRY PRACTICAL

(Paper CECH-101 P)

Marks: External Evaluation: 30, Internal Evaluation: 20 . Total 50

Q.1 Inorganic Qualitative analysis: **(10 Marks)**

Water soluble or insoluble salt be given for analysis. 15 Single salts to be analyzed.

(01) Bromide (Br^{-1}) :	Na^{+1}, K^{+1} , NH_4^{+1} , Sr^{+2}
(02) Chloride (Cl^{-1}) :	Na^{+1}, K^{+1}, NH_4^{+1}, Cu^{+2}, Cd^{+2}, Mg^{+2}, Ba^{+2}, Sr^{+2}, Mn^{+2}, Ni^{+2}, Co^{+2}.
(03) Iodide (I^{-1}) :	Na^{+1}, K^{+1}, NH_4^{+1}
(04) Chromate (CrO_4^{-2}) :	Na^{+1}, K^{+1}, NH_4^{+1}
(05) Dichromate ($Cr_2O_7^{-2}$) :	Na^{+1}, K^{+1}, NH_4^{+1}
(06) Nitrate (NO_3^{-1}) :	Pb^{+2}, Cu^{+2}, Co^{+2}, Ni^{+2}, Ba^{+2}, Sr^{+2}, Na^{+1}
(07) Carbonate (CO_3^{-2}) :	Cu^{+2}, Cd^{+2}, Bi^{+2}, Zn^{+2}, Ni^{+2}, Mn^{+2}, Ca^{+2}, Ba^{+2}, Sr^{+2}, Mg^{+2}, Na^{+1}, K^{+1}, NH_4^{+1}
(08) Phosphate (PO_4^{-3}) :	Cu^{+2}, Fe^{+2}, Al^{+3}, Zn^{+2}, Mn^{+2}, Ni^{+2}, Co^{+2}, Ba^{+2}, Ca^{+2}, Sr^{+2}, Mg^{+2}, Na^{+1}, K^{+1}, NH_4^{+1}
(09) Sulphate (SO_4^{-2}) :	Cu^{+2}, Al^{+3} , Zn^{+2}, Mn^{+2}, Ni^{+2}, Fe^{+2}, Mg^{+2}, Na^{+1}, K^{+1}, NH_4^{+1}.
(10) Sulfide (S^{-2}) :	Zn^{+2}, Cd^{+2}, Sb^{+2}

Q.2 : Volumetric exercise : **(10 Marks)**

Single step titrations: One of the two standard solutions to be prepared by students. The following exercise may be set.

Aim: for example: Prepare 0.08 N, 100 ml solution of Succinic acid and use it to find out the strength of given solution of NaOH in terms of Normality, gm/lit and Molarity.

1) **0.05 N to 0.1 N Succinic acid Vs x N NaOH / KOH**
2) **0.05 N to 0.1 N Oxalic acid x N KOH / NaOH**
3) **0.01 M EDTA Vs $CaCl_2$ .2 H_2O / Hardness of water.**
4) **0.01 M EDTA Vs x M $NiSO_4.7H_2O$**
5) **0.01 M EDTA Vs x M $ZnCl_2$**
6) **0.05 – 0.1 N Oxalic acid / Pot oxalate / Sodium Oxalate Vs x N $KMnO_4$**
7) **0.05 – 0.1 $Na_2S_2O_3$ Vs x N I_2 solution**
8) **0.05 – 0.1 N $Na_2S_2O_3$ Vs x N $CuSO_4$**
9) **0.05 – 0.1 N $KMnO_4$ Vs xN Ferrous Ammonium Sulphate or $FeSO_4.7\ H_2O$**
10) **0.05 / 0.1 N $K_2Cr_2O_7$ Vs x N $FeSO_4$.7H2O or FAS using internal indicator.**

Q.3 Five short questions related to practicals only. **5 Marks**

Q.4 Certified journal : **5 Marks**

Note: Student shall not be allowed to appear in the examination if he does not produce certified journals.

Kachchh University: B. Sc: SEMESTER: II (TWO)
GENERAL CHEMISTRY PRACTICAL

Max Marks: 30 Duration: 4 Hours

Marks: External Evaluation: 30, Internal Evaluation: 20. Total 50

Q.1: Organic Spotting: (15 compounds to be identified) **10 Marks**

Compounds containing one Functional group be given:
Acids: Acetic acid, Oxalic acid, Succinic acid, Benzoic acid, Salicylic acid,
Phenol: Phenol, α- Naphthol, β- Naphthol
Base: Aniline, p-Toluidine.
Neutral: Liquids : Nitro benzene, Benzaldehyde, Ethyl acetate, Methyl acetate,Acetone, Methanol , Ethanol, Bromobenzene, Chloroform, Benzene.
Solids: Benzamide, Naphthalene, Urea, Thiourea, m-Dinitrobenzene, Acetanilide, Glucose,

Q.2 Inorganic TWO STEP Volumetric Analysis: **10 Marks**

Standard solution to be given to the students:

(1) **Use of 0.05 N – 0.1 N Na_2CO_3 to determine the strength of given xN HCl and thence xN NaOH**

(2) **Use of 0.05 N – 0.1 N Oxalic acid to determine the strength of xN $KMnO_4$ and thence x N $FeSO_4.7H_2O$ / x N FAS . 6 H_2O**

(3) **Use of 0.05 N – 0.1 N $KMnO_4$ to determine the strength of given solutions of x N FAS. 6 H_2O and thence x N $K_2Cr_2O_7$.**

(4) **Determination of Acetic acid in Commercial Vinegar using 0.1 M NaOH . NaOH to be standardized using 0.1 N Succinic acid**

(5) **To determine the strength of each component in a mixture of $NaHCO_3$ + Na_2CO_3 using 0.1 N HCl .**

(6) **To determine the strength of each component in a mix of Oxalic acid + H_2SO_4 using 0.02 M $KMnO_4$ and 0.1 M NaOH.**

(7) **To determine the strength of each component in a mixture of $H_2C_2O_4.2H_2O$ + $K_2C_2O_4.H_2O$ using 0.1 M NaOH and 0.02 M $KMnO_4$ solution.**

Q.4	**Five short questions related to practicals only.**	**5 Marks**
Q.5	**Certified journal :**	**5 Marks**

Note : Student shall not be allowed to appear in the examination if he / she does not produce certified journals.

KACHCHH UNIVERSITY : BHUJ
SEMESTER : III (THREE) (Paper CECH-303 P)
CHEMISTRY PRACTICALS (wef June 2016)
Marks : External Evaluation : 30 , Internal Evaluation : 20 . Total 50
One exercise from each part to be set for examination .

(A) INORGANIC MIXTURE : (Four radicals) . [20]

(01)	$ZnS + (NH_4)_2CO_3$	(02)	$ZnS + NiCO_3$	(03)	$ZnS + MgCO_3$
(04)	$ZnS + MnCO_3$	(05)	$ZnCO_3 + Al_2(SO_4)_3$	(06)	$MgCO_3 + Al_2(SO_4)_3$
(07)	$(NH_4)_2CO_3 + K_2SO_4$	(08)	$CaCO_3 + NaHSO_4$	(09)	$K_2SO_4 + Na_2SO_4 + (NH_4)_2SO_4$
(10)	$KCl + MgCl_2 + NaCl$	(11)	$FeSO_4 + Al_2(SO_4)_3 + (NH_4)_2SO_4$	(12)	$KCl + SrBr_2$
(13)	$KBr + NaBr + NH_4Br$	(14)	$BaCl_2 + SrBr_2$	(15)	KBr + NH4Cl
(16)	$MgCl_2 + KI$	(17)	$SrBr_2 + KI$	(18)	$(NH4)_2SO_4 + MgCl_2$
(19)	$CuSO_4 + KBr$	(20)	$SrCO_3 + KCl$	(21)	$BaCO_3 + NH_4Cl$
(22)	$CrCl_3 + (NH_4)_2SO_4$	(23)	$K_2SO_4 + K_2CO_3 + KCl$	(24)	$Pb(NO_3)_2 + KNO_2$
(25)	KBr + KCl + KI	(26)	$NaNO_2 + Sr(NO_3)_2$	(27)	$KNO_2 + NH_4NO_3$
(28)	$K_2CrO_4 + (NH_4)_2SO_4$	(29)	$K_2CrO_4 + NH_4Cl$	(30)	$MnCl_2 + ZnSO_4$
(31)	$NaNO_3 + KBr$	(32)	$Sr(NO_3)_2 + CaCl_2$	(33)	$BaCl_2 + Sr(NO_3)_2$
(34)	$Ca(NO_3)_2 + MgSO_4$	(35)	$NH_4Cl + KCl + MgCl_2$	(36)	$K_2SO_4 + NH_4Br$

(B) JOURNAL : [5]

(C) VIVA : [5]

KACHCHH UNIVERSITY : BHUJ
SEMESTER : III (THREE) (Paper CECH-304 P)
CHEMISTRY PRACTICALS (wef June 2016)
Marks : External Evaluation : 30 , Internal Evaluation : 20 . Total 50
One exercise from each part to be set for examination.

(A) ORGANIC SPOTTING : [10]

15 substances to be identified and reported in journals.

Acids : Citric acid, Tartaric acid, Phthalic acid, Cinnamic acid, Benzoic acid, Salicylic acid , Anthranilic acid, p-Nitro benzoic acid.

Phenols : α-Naphthol, β- Naphthol, o-Nitro phenol, p-Nitro phenol

Base : p-Toluidine, Diphenyl amine, o-Nitro aniline, m- Nitro aniline and p-Nitro aniline

Neutral Liquids : Acetone, Benzaldehyde, Bromobenzene, Chloroform, Ethanol, Ethyl acetate, CTC, Chlorobenzene, Nitrobenzene

Neutral Solids : Naphthalene, Anthracene, Glucose, Acetanilide, Banzamide.

(B) GRAVIMETRIC ANALYSIS : [14]

Pure aq. Solution of the concerned metallic ion is to be given.

(1) Iron as Ferric Oxide . Salt : $FeSO_4$ **OR** Ferrous Ammonium Sulphate

(2) Ni as $Ni(DMG)_2$. Salt : $NiCl_2$ **OR** $NiSO_4$

(3) Ba as $BaSO_4$. Salt : $BaCl_2$

(4) Mn as $Mn_2P_2O_7$. Salt : $MnCl_2$ **OR** $MnSO_4$

(D) VIVA : [3]

Viva will be asked during practical exam and will be related to the practicals.

(E) JOURNALS : [3]

Journals should be signed periodically and finely Certified.

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KACHCHH UNIVERSITY : BHUJ
SEMESTER : IV (FOUR) (Paper CECH-405 P)

CHEMISTRY PRACTICALS (wef June 2016)

Marks : External Evaluation : 30 , Internal Evaluation : 20 . Total 50

One exercise from each part to be set for examination .

(A) PHYSICAL CHEMISTRY : **[24]**

01 Conductometry :

1. Determination of the strength of HCl by titrating it against standard solution of NaOH
2. Determination of strength of HCl and Acetic acid in a given mixture of acids by titrating against 0.1 N NaOH

02 Adsorption :

1. Determination of degree of adsorption of a given organic acoid on activated Charcoal.

03 Distribution Law :

1. To study partition co-efficient of Benzoic acid between Water and Benzene
2. To study partition co-efficient of Acetic acid between Water and Chloroform

(B) VIVA : **[3]**

Viva will be asked during practical exam and will be strictly based on the practicals.

(C) JOURNAL : **[3]**

Journals should be signed periodically and finely Certified.

KACHCHH UNIVERSITY : BHUJ
SEMESTER : IV (FOUR) (Paper CECH-406 P)

CHEMISTRY PRACTICALS (wef June 2016)

Marks : External Evaluation : 30 , Internal Evaluation : 20 . Total 50

One exercise from each part to be set for examination .

(A) VOLUMETRIC ANALYSIS : **[12]**

1. Determination of amount of Zinc ion by EDTA
2. Determination of amount of Ni ion by EDTA method
3. Determination of Nitrite (KNO_2) by Oxidation method using KMnO4
4. Hardness of water

(B) ORGANIC ESTIMATION : **[12]**

To find out the amount of Aniline, Phenol, Glucose , Amide , Carboxylic acid in the given solution by volumetric analysis

(C) VIVA : **[3]**

Viva will be asked during practical exam and will be strictly based on the practicals.

(D) JOURNAL : **[3]**

Journals should be signed periodically and finely Certified.

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PRACTICALS

KACHCHH UNIVERSITY : BHUJ
B.Sc. SEMESTER : V (FIVE) CHEMISTRY PAPER : VII (wef June 2016)
Paper Code NO. : CECH-507 P (INORGANIC CHEMISTRY): M. M. : 30

(A) Inorganic Qualitative Analysis : (24 M)

Analysis of inorganic mixture containing six radicals only (Either 3+3 or 2 + 4 or 4+2) . Minimum of **10 (TEN)** mixtures to be done and reported in journal . Arsenic element not to be given in any form. No negative marking for wrong detection of Sodium ion .
Examples of some mixtures : (i) $FeCl_3 + KNO_2 + NaNO_3$ (ii) $CuCl_2 + KI + CdCO_3$

(B) Journal (3 M)

(C) Viva (3 M)

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PRACTICALS

KACHCHH UNIVERSITY : BHUJ
B.Sc. SEMESTER : V (FIVE) CHEMISTRY PAPER : VIII (wef June 2016)
Paper Code NO. : CECH-508 P (ORGANIC CHEMISTRY) M. M. : 30

(A) Organic Separation and Organic spotting : (20M)

Binary Organic Mixture : Separation of two components from the mixture . Water soluble compound included. Identification of both of the components by Lassign test, Physical & Chemical methods, determination of MP/BP and preparation of derivative of any one compound of the mixture. Minimum of SEVEN solid mixtures and three liquid mixtures to be done and reported in journal..

Chemical compounds :
Water insoluble Solids : Benzoic acid , Cinnamic acid, Salicylic acid, Phthalic acid, α-Naphthol, β-Naphthol, α- Naphthyl amine, p-Toluidine, meta and para- Nitro anilines, Diphenyl amine, m-Dinitrobenzene, Acetanilide, Naphthalene, Anthracene,
Water soluble solids : Succinic acid, Oxalic acid, Tartaric acid, Citric acid, Urea, Thiourea, Acetamide
Liquids : Low BP : Acetone, Benzene, Chloroform, Ethyl acetate, Methyl aceate , Ethanol, Methanol, CTC
High BP : Nitrobenzene, Aniline , Chloro benzene, Bromo benzene.
Few examples of Mixtures :

Solids : (1) Benzoic acid + Naphthalene (Type: Acid + Neutral), (2) Salicylic acid + α-Naphthol (Acid + Phenol) , (3) Succinic acid + m-Dinitrobenzene (Water soluble acid + insoluble neutral) etc

Liquid Mix : L + L : Benzene + Aniline , Acetone + Nitrobenzene etc

S + L : Benzoic acid + Acetone , Succinic acid + Ethyl acetate etc

(B) Organic Preparation : **(5M)**

Preparation by single stage method . This exercise is for preparation of derivatives only for part (A) .

(1) p-Bromo acetanilide from Acetanilide (Bromination)
(2) Tri Bromo aniline from Aniline (Bromination)
(3) Tribromo phenol from Phenol (Bromination)
(4) p-Nitro acetanilide from Acetanilide (Nitration)
(5) m-Dinitrobenzene from Nitrobenzene (Nitration)
(6) Benzoic acid from Benzaldehyde (Oxidation)

(C) Viva and Journal : **(5M)**

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PRACTICALS

KACHCHH UNIVERSITY : BHUJ
B.Sc. SEMESTER : V (FIVE) CHEMISTRY PAPER : IX (wef June 2016)
Paper Code NO. : CECH-509 P (PHYSICAL CHEMISTRY) M. M. : 30

(A) Physico chemical Exercise : **(24 M)**

One exercise be given from the following to the candidate at the examination :

(a) Chemical Kinetics :

(1) To study reaction between
  (a) $K_2S_2O_8$ and KI (a = b)
  (b) $HBrO_3$ and KI (a = b ; a ≠ b)
  (c) H_2O_2 and HI (a = b ; a ≠ b)
(2) To determine the energy of activation and temperature coefficient of hydrolysis of Methyl acetate or Ethyl acetate

(b) Conductometry :

(1) To titrate the mix of strong acid + weak acid against strong base
(2) To titrate the mix of strong base + weak base vs strong acid

(c) pH metry :

(1) To titrate strong acid against strong base
(2) To titrate a mixture of strong acid + weak acid against strong base

(d) Potentiometry :

(1) To titrate strong acid against strong base
(2) To titrate Fe^{+2} against $K_2C_2O_7$

PRACTICALS

KACHCHH UNIVERSITY: BHUJ
B.Sc. SEMESTER: VI (SIX) CHEMISTRY PAPER: X (wef Nov- 2016)
Paper Code NO. : CECH-610 P (STRUCTURAL CHEMISTRY) M. M. : 30

(A) Inorganic Gravimetric : **(17 M)**

Gravimetric determination of the metal after removing one impurity metal

(1) $BaCl_2$+$FeCl_3$+HCl (Estimation of Ba as $BaSO_4$,after removal of Iron)
(2) $MnCl_2$ + $CuCl_2$ + HCl (Estimation of Mn as $Mn_2P_2O_7$, after removing Copper)
(3) $FeSO_4.(NH_4)_2SO_4$ + $CuSO_4$ + H_2SO_4 (Estimation of Iron as Fe_2O_3)
(4) $Al_2(SO_4)_3$+ $CuSO_4$ + H_2SO_4 (Estimation of Al as Al_2O_3 , after removing Copper)
(5) Analysis of Brass (Cu Volumetrically and Zn gravimetrically)
(6) Analysis of German Silver (Cu volumetrically and Ni as Gravimetrically)

(B) Inorganic Volumetric analysis : **(10 M)**

(1) Estimation of Fe^{+3} by EDTA
(2) Determination of Bi^{+3} by EDTA
(3) %age purity of H_2O_2 by Iodometric method
(4) Estimation of Cl^{-1} by Silver nitrate (Mohr's method)
(5) Estimation of Zn^{+2} & Cd^{+2} in a mixture by EDTA
(6) Estimation of Ca^{+2} & Mg^{+2} in a mixture by EDTA

(C) Journal + Viva : **(3 M)**

PRACTICALS

KACHCHH UNIVERSITY: BHUJ
B.Sc. SEMESTER: VI (SIX) CHEMISTRY PAPER : XI (wef Nov- 2016)
Paper Code NO. : CECH-611 P (ANALYTICAL CHEMISTRY) M. M. : 30

(A) Physico-Chemical Exercise:

One exercise be given from the following to the candidate at the examination: (24M)

(a) Colorimetry :

(1) To study Beer's law and to determine the concentration of (i) Cu^{+2} (ii) CrO_4^{-2}
(iii) Fe^{+3} in unknown solution.

(b) Distribution law :

(1) To study the distribution of Ammonia between Water and Chloroform
(2) To study the distribution of Ammonia between Water and Carbon tetra chloride

(c) Thermo chemistry :

(1) To determine the heat of solution of an organic acid (Benzoic acid, Salicylic acid, Succinic acid)

(B) Journal : **(3 M)**
(C) Viva : **(3 M)**

PRACTICALS

KACHCHH UNIVERSITY: BHUJ

B.Sc. SEMESTER: VI (SIX) CHEMISTRY PAPER : XII (wef Nov- 2016)

Paper Code NO. : CECH-612 P (APPLIED CHEMISTRY) M. M. : 30

(A) Organic Estimation : (17M)

(1) To find out Mol. Wt of Organic acid by titrimetry method
(2) To find out basicity of organic acid by titrimetry method
(3) To find out the %age purity of the sample of organic acid
(4) To find out the amount of Acetone in the given solution by iodine method
(5) To find out amount of Ethyl acetate by hydrolysis method
(6) To find out saponification value of an oil.
(7) To find out %age purity of Ethyl acetate by hydrolysis method

(B) Chromatography : (7 M)

(1) Separation of 1^{st} and 2^{nd} groups ions
(2) Separation of Dyes
(3) Separation of Amino acids by asceding paper chromatography and TLC

(C) Journal : (3 M)

(D) Viva : (3 M)

GEOLOGY

PRACTICAL 101 :

- **Study of the physical properties of the common rock forming minerals** –Talc, Gypsum, Muscovite, Biotite, Calcite, Fluorite, Apatite, Orthoclase, Microcline, Plagioclase, Quartz, Amethyst, Chalcedony, Agate, Bloodstone, Flint, Jasper, Opal, Topaz, Corundum.

PATTERN OF QUESTION PAPER FOR SEMESTER-END PRACTICAL EXAM

KSKV Kutch University: BHUJ

B.Sc. Semester 1 (ONE)

SUBJECT: GEOLOGY

(PRACTICALS)

Total Marks: **30** Passing standard: **12 Marks**

Centre: BHUJ **Place:** Shri R. R. Lalan College, Bhuj

QUESTION PAPER

Q-1 **Identify** the **Mineral specimen** megascopically in **Group no. 1** to **20** . Give their physical properties, chemical composition, crystal system and at least two uses.

(1 SP X 20 GP X 1 Mark =20 Marks)

Q.2 Certified Journal and Viva Voce **(10 Marks)**

PRACTICAL 202:

- **Study of modes of fossilization:** Petrifaction, Carbonization or Distillation, Replacement, Moulds and Casts, Imprints, Tracks and Trails, Preservation of Original hard parts of the organisms.
- **Megascopic study of typical Igneous rocks:** Granite, Porphyritic Granite, Graphic granite, Basalt, Pegmatite.
- **Megascopic study of typical Sedimentary rocks:** Conglomerate, Breccia, Sandstone, Shale, Limestone.
- **Megascopic study of typical metamorphic rocks**. Quartzite, Marble, Schist, Gneiss.

PATTERN OF QUESTION PAPER FOR SEMESTER-END PRACTICAL EXAM

KSKV Kutch University: BHUJ

B.Sc. Semester 2 (TWO)

SUBJECT: GEOLOGY

(PRACTICALS)

Total Marks: **30** Passing standard: **12 Marks**

Centre: BHUJ **Place:** Shri R. R. Lalan College, Bhuj

QUESTION PAPER

Q-1 With the help of neat sketch describes **Mode of preservation of fossil specimen** in **Group no.1 to 4.** **(1 SP X 4 GP X 3 Mark =12 Marks)**

Q-2 Describe the **Rock specimen** megascopically in **Group no. 5** to **16.** Describe their textures, mineral constituents in the order of abundance, origin and structures if any. **(1 SP X 12 GP X 1 Mark =12 Marks)**

Q.3 Certified Journal and Viva Voce **(06 Marks)**

KSKV Kachchh University, BHUJ

B.Sc. Semester 3 (THREE)

SUBJECT : GEOLOGY

(PRACTICAL - 303)

Total Marks: **50** Passing standard: **20 Marks**

1. **Study of the physical properties of the common rock forming minerals**: Beryl, Garnet, Asbestos, Hornblende, Augite, Tourmaline, Olivine, Baryte, Halite, Magnesite, Aragonite, Dolomite.

2. **Megascopic identification of typical rocks**: Granite, Syenite, Gabbro, Dolerite, Rhyolite, Trachyte, Andesite, Obsidian, Pumice, Scoria (Volcanic Tuff), Pitchstone, Grit, Kaolin clay, Bentonite, Slate, Phyllite, Quartzite.

(PRACTICAL - 304)

Total Marks: **50** Passing standard: **20 Marks**

1. Sections and Descriptions of Geological Maps with Horizontal and Inclined continuous One series strata with Inliers, Outliers and Igneous Intrusions.
2. Drawing of contours depicting typical landforms.
3. Outcrop filling problems of Horizontal and Inclined strata.
4. Geometrical solutions of simple structural problems– width of Outcrop, True Thickness and Vertical Thickness.

KSKV Kachchh University, BHUJ

B.Sc. Semester 4 (FOUR)

SUBJECT : GEOLOGY

(PRACTICAL-405)

Total Marks : **50** Passing standard : **20 Marks**

1. Drainage basin analysis.
2. Identification of Landforms.
3. Construction of Subsurface hydrogeological profile.
4. Use of Clinometer and Brunton Compass.

(PRACTICAL-406)

Total Marks : **50** Passing standard : **20 Marks**

1. Classification of crystals in to Cubic, Tetragonal and Orthorhombic System. Study of Elements of Symmetry.

2. Study of the physical properties of the Ores: Magnetite, Hematite, Limonite, Siderite. Ilmenite, Chromite, Pyrolusite, Pyrite, Chalcopyrite, Galena, Sphalerite Malachite, Azurite, Bauxite.

Note: Compulsory field work in a suitable geological area to study the elementary aspects of field geology.

KSKV Kachchh University, BHUJ

B.Sc. Semester 5 (FIVE)

SUBJECT: GEOLOGY

(PRACTICAL - 507)

Total Marks: **50** Passing standard: **20 Marks**

1. **Study of the physical properties of the common rock forming minerals:**
   - Leucite, Nepheline, Sodalite, Scapolite, Enstatite, Hypersthene, Bronzite, Wollastonite, Tremolite, Actinolite, Serpentine, Andalusite, Sillimanite, Kyanite, Topaz, Staurolite, Sphene, Epidote, Stilbite, Netrolite, Haulandite, Apophyllite, Scolecite, Kaolin, Aragonite.

2. **Study of the following minerals in thin sections:**
   - Quartz, Orthoclase, Microcline, Plagioclase, Muscovite, Biotite, Hornblende, Hypersthene, Augite, Olivine, Tourmaline, Calcite, Sphene, Garnet, Apatite. Chlorite, Staurolite, Kyanite, Sillimanite, Andalusite, Tremolite, Diopside, Nepheline.

(PRACTICAL - 508)

Total Marks: **50** Passing standard: **20 Marks**

1. **Study of the physical properties of the following rocks:**
   - Anorthosite, Pyroxenite, Schrol Rock, Greisen Rock, Luxullianite, Norite. Dunite, Dolerite, Pitchstone, Andesite, Breccia, Grit, Oolitic and Pisolitic Limestone, Phyllite, Schist-Different Varieties, Granulite, Peat, Lignite, Bituminous, Anthracite, China Clay, Fire Clay, Laterite.

2. **Study of the following rocks in thin sections:**
   - Granite, Syenite, Gabbro, Dolerite, Rhyolite, Trachyte, Basalt, Conglomerate, Sandstone, Limestone – fossiliferous, Quartzite, Marble, Mica-schist, Gneiss. Hypersthene granite, Diorite, Picrite, Andesite, Limburgite, Sillimanite garnet gneiss, Andalusite schist, Actinolite schist.

(PRACTICAL - 509)

Total Marks: **50** Passing standard: **20 Marks**

1. **Study of the physical properties of the Ores:**
   - Stibnite, Rutile, Psilomelane, Cassiterite, Corundum, Wolframite, Azurite,
2. **Classification of crystals** in to Hexagonal, Monoclinic and Triclinic System. Study of their Elements of Symmetry
3. **Stereographic projection** of Hexagonal, Monoclinic and Triclinic System.

KSKV Kachchh University, BHUJ

B.Sc. Semester 6 (SIX)

SUBJECT: GEOLOGY

(PRACTICAL-610)

Total Marks : **50** Passing standard : **20 Marks**

1. Study of invertebrate and plant fossil specimen representing important phyla belonging to different geological eras - with diagrams.

(PRACTICAL-611)

Total Marks: **50** Passing standard: **20 Marks**

1. Section and description of geological maps with structural features such as unconformity, overlap, faulting, folding, inliers, outliers and igneous intrusions.
2. Outcrop problems with one series of strata with inlier, outlier and faulting.

(PRACTICAL-612)

Total Marks: **50** Passing standard: **20 Marks**

1. Clinographic and Stereographic projections of simple crystals of Cubic, Tetragonal and Orthorhombic systems.
2. Graphic solutions of structural problems.
3. Identification of suitable site for construction of Dams and Tunnels.

Note: Compulsory field work in a suitable geological area to study the elementary aspects of field geology.

Mathematics

➢ **INTERNAL EVALUATION SCHEME:**

❖ **Theory:**

1.	Internal Continuous and Comprehensive Evaluation (CCE) will be conducted by the department. The total weightage for CCE will be 30 %.
2.	CCE Marking Scheme for Theory: For each paper, 30 % of CCE may be further distributed as under. This list is not exhaustive and new parameters can be added : a) Unit Test / Internal Examination (MCQ or Discriptive) b) Seminar c) Assignments d) Attendance The Department Head will be final authority for finalizing the distribution of internal evaluation marks in every semester, but the total theory internal marks per paper have to be 30.

❖ **Practical:**

CCE Marking Scheme for Practical : Any one or more of the parameters from Lab Performance/ Lab attendance / Internal practical Test / Journal / Viva etc. can be used, but the total internal practical marks per paper will be 20 Marks.

➢ **INTERNAL EVALUATION SCHEME:**

❖ **Theory:**

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❖ **Practical:**

CCE Marking Scheme for Practical : Any one or more of the parameters from Lab Performance/ Lab attendance / Internal practical Test / Journal / Viva etc. can be used, but the total internal practical marks per paper will be 20 Marks.

Physics

Elasticity
Stress; Strain; Elasticity and plasticity; Elastic modulus; The force constant.

Ref. : University Physics (6th Edition) By sears, Zemansky, and Young
(Chapter 10, Art. 10.1 to 10.5)

Unit – IV

Electronics
Introduction; P N junction; Forward biased P N Junction; Reverse biased P N Junction; Current Voltage characteristics of a semiconductor diode; Current voltage equation for P N unction diode; Resistance of a semiconductor diode; Break down mechanisms; Zener diode; Zener diode as voltage regulator; P N junction diode as a rectifier; Single phase full wave rectifier; Single phase full wave bridge Rectifier; Filters.

Ref. : Elements of electronics by Bagde and Singh
(Chapter 2, Art. 2.1, 2.2, 2.4 to 2.11, 2.13 to 2.16)

US CEPH – 101 PRACTICALS

1) To find L.C. of and to take measurements by Micrometer Screw, Travelling Microscope and Spectrometer
2) Moment of inertia of a Flywheel
3) Damping co-efficient, relaxation time and quality factor of a simple Pendulum
4) Refractive index of liquid using parallax method
5) Calibration of spectrometer
6) Melde's Experiment
7) Analysis of error
8) Value of capacitance
9) Frequency of A.C. emf by Series resonance
10) P-N junction diode as Half wave and Full wave rectifier (calculation of ripple factor and % regulation)
11) Deflection magnetometer
12) P-N junction diode characteristic

Optics

Introduction; Coherent sources; Interference in thin film; interference due to reflected and transmitted light; Colors of thin films; Fringes produced by a wedge shap; Newton's rings; Determination of the wavelength of sodium light using Newton's rings; Refractive index of a liquid using Newton's rings.

Ref. : Optics by Subrahmanym & Brijlal (S.Chand Publication)
(Chapter 8, Art. 8.1, 8.3, 8.15 to 8.17, 8.19, 8.21, 8.23 to 8.25)
Optics by Ajoy Ghatak

Unit-IV

Nuclear Physics

The law of radiation decay; Radioactive growth and decay; Ideal equilibrium; Transient and secular equilibrium; Radioactive series; Radioactive isotopes of lighter element; Artificial radioactivity; Determination of the age of the earth; Carbon Dating.

Ref. : Nuclear physics (An Introduction) By S.B. Patel
(Chapter 2, Art. 2.3, 2.6 to 2.13)

Sun and Its Radiation

Introduction; Astronomical background; General description of the Sun; Solar structure; Sun's outer layers; Composition; Visible feature on the sun; More about sun's outer atmosphere; Temperature of the corona; Solar activity and sunspot cycles.

Ref.: An Introductory course on space science and Earth's Environment
by S. S Degaonkar
(Chapter 1, Art. 1.1 to 1.10)

US CEPH – 202 PRACTICALS

1) Resonater.
2) Verification of Steafan's 4^{th} power law.
3) Decay constant of condenser.
4) Newton's rings.
5) Newton's law of cooling.
6) Least square method.
7) Value of inductance
8) Frequancy of A.C. emf by Parallel resonance.
9) Full wave voltage doubler. (calculation of V_o/V_m and % regulation)
10) Zener diode characteristic.
11) Vibration magnetometer.
12) Low resistance by projection method.

Unit-III

Optics

Fresnel Diffraction: Introduction; Huygens-Fresnel Theory; Fresnel's Assumptions; Rectilinear Propagation of Light; Zone Plate; Action of a zone plate for an incident spherical wave front; Difference between a zone plate and a convex lens; Distinction between Interference and Diffraction; Fresnel and Fraunhoffer Types of diffraction; Diffraction at a Circular Aperture; Mathematical Treatment of Diffraction at a circular Aperture; Intensity at a Point away from the centre.

Fraunhoffer Diffraction: Introduction; Fraunloffer Diffraction at a Single Slit; Fraunhoffer Diffraction at Double Slit; Interference and Diffraction.

Ref. : A Textbook of OPTICS by Subrahmanyam, Brijlal, Avadhanulu
S. Chand & Company Ltd., New Delhi. Twenty fourth Revised Edition 2010
(Chapter 17, Art. 17.1 to 17.8; Chapter 18, Art. 18.1, 18.2, 18.4, 18.5)

Unit-IV

Atmospheric Physics

Composition of Planetary atmospheres; Evolution of atmospheres; Earth's neutral atmosphere; Composition of air at the surface; Atmospheric divisions; Other divisions; Pressure and density variations; Static Atmosphere; Dynamic atmosphere; Density and Temperature distribution models; Energetic of the lower atmosphere; Thermodynamics of dry air; Entropy and potential temperature; Heat budget of the atmosphere; Atmospheric circulation; General principles; Coriolis force and angular momentum; Classes of Winds; Basics equations for large scale flow; General atmospheric circulation; Wind pattern with altitude; Thermospheric winds; Acoustic and internal gravity waves.

Ref. : An introductory course on Space Science and Earth's atmosphere
by S. S. Degaonkar.
(Chapter 3, Art. 3.3, 3.4, 3.6 to 3.9)

US CEPH – 303 PRACTICALS

(1) Flatness of plate by Newton's rings
(2) Thickness of a glass plate and radius of curvature of convex lens by optical lever
(3) Resolving power of Telescope
(4) 'L' by Maxwell's Bridge
(5) Study of Transformer
(6) Caushy's Constants
(7) Experimental check up by Multimeter
(Power supply, resistor, Transistor, Diode, Capacitor)
(8) Absorption co-efficient of Liquid by photocell.

Unit-IV

Electronics

Electronic Devices: FET; MosFET; UJT; LED; SCR; Tunnel Diode; Solar cell.

D.C. Bias and Stabilization: Introduction; Factors which cause shift of the Operating point; Stability factor; Fixed Bios circuit; Collector to Base Bios; Emitter Bias; Bias Compensation; Thermal Runaway; Thermal Resistance; Condition for thermal Stability.

Ref.: Elements of Electronics by Bagde and Singh
(Chapter 4, Art. 4.1 to 4.10)
Principles of Electronics by V.K. Mehta and Rohit Mehta. S. Chand & Company

US CEPH – 304 PRACTICALS

(1) Study of X-ray diffraction pattern
(2) 'g' By bar pendulum
(3) Logic Gates
(4) High R by Leakage
(5) Characteristics of FET
(6) Hartman Formula
(7) Permeability of Free space
(8) Numerical Differentiation

Diffraction of X-rays: Determination of Crystal Structure; Bragg's law; Bragg's law in one dimension; Bragg's law in three dimension; Characteristics features of Bragg's law.

Ref.: Fundamentals of Solid state physics by Saxena Gupta Saxena
(Chapter 1, Art. 1.1 to 1.18; Chapter 2, Art. 2.1, 2.2)
Rudiments of Material Science by S.O. Pillai & Sivakami Pillai

Unit-IV

Optics

Resolving Power: Resolving Power; Rayleigh's Criterion; Limit of Resolution of the Eye; Limit of resolution of a Convex lens; Resolving power of optical instruments; Criterion for Resolution according to lord Rayleigh; Resolving power of a Telescope; Resolving power of a microscope; Ways of increasing resolution; Magnification versus Resolution.

Fiber optics : Introduction; Optical fiber; Necessity of Cladding; Optical fiber System; Optical Fiber Cable; Total internal reflection; Propagation of light through and optical fiber; Critical Angle of Propagation; Acceptance Angle; Fractional refractive index; Numerical aperture; Fiber optic Communication system; Merits of Optical Fiber.

Ref.: A Textbook of OPTICS by Subrahmanyam, Brijlal, Avadhanulu
S. Chand & Company Ltd., New Delhi. Twenty fourth Revised Edition 2010
(Chapter 19, Art. 19.1 to 19.10; Chapter 24, Art. 24.1 to 24.6, 24.21, 24.22)

US CEPH – 405 PRACTICALS

(1) Wavelength of prominent Lines of Hg spectrum by Grating
(2) Wavelength of light by Edser's diffraction pattern
(3) Double refraction in calcite prism.
(4) Characteristics of UJT
(5) Figure of merit of Ballistic Galvanometer.
(6) e/m by Thomson's Method
(7) Resonance pendulum
(8) Numerical Interpolation

8

Unit-IV

Plasma

Introduction; composition and characteristics of a plasma; Collisions; Surface phenomena; Transport phenomena; Diffusion and Mobility: Ambipolar diffusion; Viscosity: Conductivity; Recombination; Ohm's law; Gas Discharge; Comparison of Various natural and Man-made plasmas; Plasma diagnostics; Plasma waves and instabilities; Space plasma.

Ref. : Elements of Plasma Physics By S. N. Goswami
(Chapter 1, Art. 1.1 to 1.14)

US CEPH – 406 PRACTICALS

(1) Y- By Koening's Method
(2) Study of Electron Diffraction pattern
(3) C_1/C_2 by Desauty's Method
(4) h- Parameters
(5) Transistor Amplifier
(6) Measurements by C.R.O
(7) Nand Gate as universal gate
(8) Numerical solution of secular Determinant

Motion of a rigid body : Angular momentum and kinetic energy; The inertia tensor; Euler's equations of motion; Torque-free motion.

Ref. : Introduction to Classical Mechanics by R.G. Takwale & P.S. Puranik
(Chapter 10, Art. 10.2 to 10.5)

Unit-III

Classical Mechanics

Variational Principle : Lagrange's and Hamilton's Equations : Configuration space; Some techniques of calculus of variation; Applications of variational principle; Hamilton's principle; Hamilton's equations of motion; Some applications of the Hamiltonian formulation; Phase space; Comments on the Hamiltonian formulation.

Ref. : Introduction to Classical Mechanics by R.G. Takwale & P.S. Puranik
(Chapter 11, Art. 11.1 to 11.4 & 11.10 to 11.13)

Unit IV

Quantum Mechanics

General Formalism of Quantum Mechanics: Linear Vector Space; Linear Operator; Eigenfunctions and Eigenvalues; Hermitian Operator; Postulates of Quantum Mechanics; Simultaneous Measurability of Observables; General Uncertainty Relation; Dirac's Notation

Ref. : Quantum Mechanics (Second Ed.) by G. Aruldhas
(Chapter 3, Art. 3.1 to 3.8)

US CEPH – 507 PRACTICALS

(1) Acceleration due to Gravity by Keter's Pendulum (Variable Knife Edges)

(2) e/k by Power Transistor

(3) Stefan's Constant of Radiation

(4) Febry Parot Etalon – Determination of thickness of air film

(5) Michelsion Interferometer – to determine the wavelength of light

(6) I – V Characteristics of Solar Cell – to find Fill Factor and Fill Voltage

(7) To Study the Edser – Butler Bands

(8) Eigenvalues and Eigenfunctions of a Matrix

Unit-III

Solid State Physics

Atomic Cohesion and crystal binding : Cohesion of atoms; Primary bonds; Covalent bond; The metallic bond; The Ionic bond; Secondary bonds; The Van-der walls bond; The hydrogen bond; The Cohesive energy; Ionic crystals; The Repulsive overlap energy; Nobel gas crystal; Atomic radii verses lattice constant; Elastic constants of crystals; Elastic stress; Elastic strain; Dilation; Elastic compliance and stiffness constant; Elastic energy density; Application to cubic crystals; Bulk modulus and compressibility; Elastic waves in cubic crystal; Propagation of waves in the [100] direction.

Ref. : Elements of Solid State Physics by J. P. Srivastava
(Chapter 2, Art. 2.1 to 2.8.1)

Unit-IV

Solid State Physics

Free Electron Theory of metals : Drude model; Electrical conductivity of metals; Thermal conductivity of metals; The Fermi- Dirac distribution function; The Sommerfeld model; The Density of states; The Free Electron gas at 0 K; Energy of Electron Gas at 0 K; The Electron Heat Capacity; The Sommerfeld theory of Electric conduction in metals; The Hall Coefficient (R_H); Matthiessen's Rule; Thermoelectric Effects; Thermoelectric power; The Thomson Effect; The Peltier Effect; Kelvin (Thomson) Relations.

Ref. : Elements of Solid State Physics by J. P. Srivastava
(Chapter 6, Art. 6.1, 6.3 to 6.8.4)

US CEPH – 508 PRACTICALS

(1) Hysterisis by Magnetometer

(2) Comparison of Capacities by Mixture Method

(3) Measurement of Phase and Frequency by C.R.O.

(4) Hartley Oscillator – Measurement of Frequency by C.R.O.

(5) Series Resonance – Determination of Band Width and Q – Factor

(6) To study the CE Amplifier Circuit

(7) Characteristics of GM Tube

(8) To Design a Logic Circuit

Unit-III

Resonance : Definition of Q, the factor of merit; Series Resonance; Band width of the series resonant circuit; Parallel resonance or anti resonance; Currents in anti resonant circuits; Band width of anti resonant circuits.
Ref. : Networks, Lines and Fields by John D. Ryder
(Chapter 2, Art. 2.1 to 2.4, 2.6, 2.8)

Amplitude Modulation : Introduction; Amplitude modulation; Amplitude modulation index; Modulation index for Sinusoidal AM; Frequency spectrum for Sinusoidal AM; Average power for Sinusoidal AM; Effective voltage and current for Sinusoidal AM.
Ref. : Electronic Communications by Dennis Roddy, John Coolen
(Chapter 8, Art. 8.1 to 8.7)

Unit-IV

Digital Electronics

Number Systems and Codes : Hexadecimal numbers; Hexadecimal - Binary conversions; Hexadecimal - to - decimal conversion.
Ref. : Digital Computer Electronics by Albert Paul Malvino (Second Edition)
(Chapter 1, Art. 1.8 to 1.10)

More Logic Gates : NOR gates; De Morgan's First theorem; NAND gates; De Morgan's Second theorem; Exclusive OR gates.
Ref. : Digital Computer Electronics by Albert Paul Malvino (Second Edition)
(Chapter 3, Art. 3.1 to 3.5)

Boolean Algebra and Karnaugh Maps : Boolean relations; Sum - of - Products method; Algebraic simplification; Karnaugh maps; Pairs, Quads and Octets; Karnaugh simplifications; Don't Care Conditions.
Ref. : Digital Computer Electronics by Albert Paul Malvino (Second Edition)
(Chapter 5, Art. 5.1 to 5.7)

Arithmetic – Logic Units : Binary addition; Binary subtraction; Half adders; Full adders; Binary adders.
Ref. : Digital Computer Electronics by Albert Paul Malvino (Second Edition)
(Chapter 6, Art. 6.1 to 6.5)

Memories : Roms; Proms and Eproms; Rams; A small TTL Memory; Hexadecimal Addresses.
Ref. : Digital Computer Electronics by Albert Paul Malvino (Second Edition)
(Chapter 9, Art. 9.1 to 9.5)

US CEPH – 509 PRACTICALS

Project Work / Field Visit

Unit-III

Electromagnetism

Special Techniques : Laplace's equation; The method of images.

Ref. : Introduction to electrodynamics by D. J. Griffiths
(Chapter 3, Art. 3.1, 3.2)

Electromagnetic Induction : Hysteresis; Maxwell's equations; Decay of free charge; Potentials of electromagnetic field; More about the Lorentz gauge condition; Field energy and field momentum.

Ref. : Electromagnetics (2nd Ed.) by B.B. Laud.
(Chapter 5, Art. 5.7 to 5.12)

Unit-IV

Electromagnetism

Electromagnetic Waves : Plane waves in non conducting media; Polarization; Energy flux in a plane wave; Radiation Pressure and momentum; Plane waves in a conducting medium; The Skin effect.

Ref. : Electromagnetics (2nd Ed.) by B.B. Laud.
(Chapter 6, Art. 6.1 to 6.6)

US CEPH – 610 PRACTICALS

(1) Acceleration due to Gravity by Keter's Pendulum (Variable Knife Edges)

(2) To Determined Coefficient of Thermal Conductivity of Rubber Tube

(3) To Determined Decay Constant by Thermocouple

(4) Viscosity by Log Decrement Method

(5) Michelsion Interferometer – to determine the wavelength Difference

(6) Refractive Index by Total Internal Reflection

(7) Dielectric Constant of a Liquid

(8) Planck's Constant by LEDs

Unit-IV

Nuclear Energy : Introduction; Neutron induced fission; Asymmetrical fission – mass yield; Emission of delayed neutrons by fission fragments; Energy released in the fission of ^{235}U; Fission of lighter nuclei; Fission chain reaction; Neutron cycle in a thermal nuclear reactor; Nuclear reactors.

Ref. : Nuclear Physics by S. B. Patel
(Chapter 6, Art. 6.1 to 6.9)

Nuclear Physics in Other Areas of Physics : Introduction; The technique of NMR; Some experiments with NMR; The Mossbauer effect; Some experiments using Mossbauer effect.

Ref. : Nuclear Physics by S. B. Patel
(Chapter 9, Art. 9.1 to 9.5)

US CEPH – 611 PRACTICALS

(1) Mutual Inductance by Ballistic Galvanometer

(2) Passive Filters

(3) Colpitt Oscillator – Measurement of Frequency by C.R.O.

(4) Parallel Resonance – Determination of Band Width and Q – Factor

(5) Series Voltage Regulator

(6) Half Adder and Full Adder

(7) Wavelength of a LASER Light

(8) Numerical Integration

Unit-IV

Biophysics

Sources of Bioelectric Potentials : What is Biophysics? Resting and Action Potentials; Propagation of Action Potentials; The Bioelectric potentials; The Electrocardiogram (ECG); Electroencephelogram (EEG); Electromyogram (EMG); Other Bioelectric potentials.

Ref. : Bio Medical Instrumentation and measurements by L. Cromwell (Chapter 3, Art. 3.1, 3.2, 3.3, 3.3.1 to 3.3.4)

Electrodes : Biopotential Electrodes; Micro Electrodes; Body Surface Electrodes.

Ref. : Bio Medical Instrumentation and measurements by L. Cromwell (Chapter 4, Art. 4.2, 4.2.1, 4.2.2)

C.R.O.

Cathode Ray Oscilloscope : Cathode Ray Oscilloscope; Cathode Ray tube; Deflection systems; Mathematical expression for electrostatic deflection sensitivity; Electromagnetic deflection system; Magnetic deflection in C.R. Tube; Uses of CRO.

Ref. : Electronics and Radio Engineering (Eighth Ed.) by M. L. Gupta (Chapter 36, Art. 36.1, 36.2, 36.7, 36.8 to 36.10, 36.20)

US CEPH – 612 PRACTICALS

Project Work / Field Visit

Zoology

KSKV Kutch University, BHUJ

B.Sc. Semester I (ONE)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 101

(PRACTICALS)

Practical 1 :	To study Phylum Protozoa: Amoeba, Paramoeicium, Polystomella/Foraminifer, Euglena, Opalina, Vorticella.
Practical 2 :	To study Phylum Porifera: Leucosolenia, Euspongia, Grantia.
Practical 3 :	To study Phylum Coelenterata: Hydra, Obelia, Physalia, Aurelia, Gorgonia, Coral and Sea anemone.
Practical 4 :	To study Phylum Platyhelminthes: Planaria, Liverfluke, Tape worm.
Practical 5:	To study Phylum Nematoda : Enterobius, Ascaris.
Practical 6:	To study Phylum Annelida: Earthworm, Nereis, Aphrodite, Arenicola, Sabella, Leech.
Practical 7:	To study external characters of Earthworm (Through chart/multimedia)
Practical 8:	To study Digestive system of Earthworm & Mounting of Spermatheca, setae and Septal Nephridia (Through chart/multimedia)
Practical 9:	To study Nervous system of Earthworm (Through chart/multimedia)
Practical 10:	To study Reproductive system of Earthworm (Through chart/multimedia)
Practical 11:	Study of Compound Microscope
Practical 12:	Study of cell organelles –Nucleus, Endoplasmic reticulum, Ribosomes and mitochondria (Through charts/pictures)
Practical 13:	Study of genetic problems i). Monohybrid cross ii). Dihybrid cross iii). Blood group (Problem solving)

Journal / Submission

- **Note:** This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester II (TWO)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 202
(PRACTICALS)

Identification and Classification of Non –chordates (Up to class).

The basic aim to introducte the animal diversityand identification skill of student.

Practical 1: To study Phylum Arthropoda : Apus, Cyclops, Balanus, Sacculina, Prawn, Crab, Lobster, Scorpion, Daphnia, Spider, Rat-flea.

Practical 2: To study Phylum Mollusca : Chiton, Dentalium, Pila, Aplysia, Unio, Octopus, Sepia, Cowry, Oyster

Practical 3: To study Phylum Echinodermata: Brittle star, Sea urchin, Sea cucumber, Feather star, Starfish.

Practical 4: To study Phylum Hemichordata: Balanoglosus

Practical 5: To study histological permanent slides/sections (Through charts/slides) T.S. mammalian Stomach , Intestine, Liver, Pancreas.

Practical 6: Structure of Human Tooth (V.S. Molar)

Practical 7: To study type of teeth (Incisor, Canine, Premolar, molar) & Dental formulae (eg. Man Rabit, Dog, Elephant, Horse)

Practical 8: Mammalian Skin and its derivatives (eg. Sweat gland, Claw, Nail, Hoof, Horn and Hair)

Field Report

Journal / Submission

- **Note:** This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester III (THREE)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 303

(PRACTICALS)

Identification and classification upto order giving reasons (Practical 1-2)

Practical 1: Classification of Class Amphibia: Frog, Bufo, Hyla, Salamander, Icthyophis, Axolotal larva.

Practical 2: Classification of Super Class Pisces: Shark, Rohu, Ray fish, Mudskipper, Cat fish, Hippocampus, Eel, suckerfish. (Along with classification scientific name, short description and habitat should be given)

Practical 3: Type study (Chordata). Study of Shark **(Scoliodon sorrakowah) (Using charts/multimedia/models)**

3.1 Study of external characteristics of shark

3.2 Study of digestive system of shark

3.3 Study of circulatory system of shark

3.4 Study of Nervous system of shark

3.5 Mountings (Membranous labrynth and Ampulla of Lorenzini)

Practical 4: Study of scales in fishes (through charts/slides)

Practical 5: Study of fins in fishes (Through charts and specimens)

Practical 6: To study poisonous and non poisonous snakes (Through charts, keys and specimens – as per theory) Cobra, Krait, saw scaled viper, Russel's viper, Checkered keel back, rat snake.

Local excursion/self study – with report

Journal submission

Instructions:

- ***The Zoological excursion is compulsory to study the ecosystem, Animal behavior and their life style for the students.***
- Excursion report is mandatory for all the students and marks will be calculated in practical examination
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester III (THREE)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 304

(PRACTICALS)

Study through charts and/or nearby ecosystem visit Practical 1 to3

Practical 1: Study of wetland ecosystem

Practical 2: Study of Forest ecosystem

Practical 3: Study of Marine ecosystem

Practical 4: Plotting of important national Parks and Sanctuaries on map.

Practical 5: Study of wildlife tools: Binoculars, Tranquilizers (Guns and darts), Radio transmitters and receivers.

Practical 6: Study of collection and identification of common animals pugmarks.

Practical 7: Study of selected endangered animals (using IUCN or wildlife act categories) of India

Practical 8: Study of selected endangered animals of Gujarat (using IUCN or wildlife act categories)

Practical 9: Study of biostatistics-mean, median, mode. (with the practical examples and problem solving)

Practical 10: Basics of biostatics: Standard deviation (by problem solving).

Field Visit report

Journal / Submission

Instructions:

- **The Zoological excursion is compulsory to study the ecosystem, Animal behavior and their life style for the students.**
- Excursion report is mandatory for all the students and marks will be calculated in practical examination
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester IV (FOUR)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 405

(PRACTICALS)

Identification and classification upto order giving reasons (Practical 1-3)

Practical 1: Classification of Reptiles: Calotis, house lizard, gecko, Cobra, rat snake, Saw scaled viper, Chameleon, Crocodile, Tortoise,Turtle,Varanus, Mabuya, spiny tailed lizard

Practical 2: Classification of Aves: Pigeon, Sparrow, Kite, Vulture, Hoopoe, Green bee eater, Goose, Partridge, Crane, Kingfisher, Parakeet, Owl, Crow, Lapwing, Swift.

Practical 3: Classification of Mammals: Hedgehog, Flying fox, Human, Dog, Blue-whale, Blue bull, Elephant, Dugong, Squirrel, Indian hare, Pangolin

Practical 4: Study of external characters of Calotis

Practical 5: Study of Digestive system of Calotis

Practical 6: Study of Circulatory system of Calotis

Practical 7: Mounting (Pectin and Hyoid apparatus)

Practical 8: Study of human parasites: *Plasmodium vivex*, Liver fluke, Anopheles and culex mosquitoes, tape worm, mites, hair louse. *(Short description, type of parasite/host and its parasitic effects for each)*

Practical 9: To solve the problems of sex linked inheritance Eye color in drosophila

Practical 10: To solve the problems of sex linked inheritance Colorblindness in Human

Practical 11: To solve the problems of sex linked inheritance Hemophilia in Human

Local field excursion – Report submission

Journal Submission

Instructions:

- ***The Zoological excursion is compulsory to study the ecosystem, Animal behavior and their life style for the students.*** Excursion report is mandatory for all the students and marks will be calculated in practical examination
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester IV (FOUR)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 406

(PRACTICALS)

Practical 1: Study of Arboreal adaptations with suitable examples

Practical 2: Study of Aquatic adaptations with suitable examples

Practical 3: Study of Cursorial adaptations with suitable examples

Practical 4: Study of Fossorial adaptations with suitable examples

Practical 5: Study Parental care in different animals with suitable examples

Practical 6: Study of various types of feets in birds

Practical 7: Study of various types of beaks in birds

Practical 8: Marking various zoogeographic zones on the map. *(Using world map)*

Practical 9: Zoogeographic distribution of mammalian fauna on map. *(Using world map)*

Practical 10: To study the embryonic developments of
i). Egg type ii). Cleavage iii). Blastulation and Gastrulation
(Using permanent slides and/or charts)

Local field excursion – Report submission
Journal Submission

Instructions:

- ***The Zoological excursion is compulsory to study the ecosystem, Animal behavior and their life style for the students.*** Excursion report is mandatory for all the students and marks will be calculated in practical examination
- This is compulsory to record laboratory work in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester V (FIVE)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 507

(PRACTICALS)

Identification and classification upto order giving reasons (Practical 1-2)

Practical 1: Study of Phylum Cephalochordata (Amphioxus)

Practical 2: Study of Phylum Urochordara (Ascidia, Salpa, Doliolum, Pyrosoma, Oikopleura

Practical 3: Study of phylum Cyclostomata (Lamprey, Hagfish)

Practical 4: Type study (Chordata). Study of Pigeon (*Columba livia*)

(Using charts/multimedia/models)

4.1 Study of external characteristics of Pigeon

4.2 Study of digestive system of Pigeon

4.3 Study of respiratory system of Pigeon

4.4 Study of Nervous system of Pigeon

4.5 Study of Reproductive system of Pigeon

Practical 5: Study of structure and types of feathers in birds (through charts/slide preparation)

Practical 6: Study of Marine mammals: Whale, dolphin, dugong (Through charts and specimens)

Practical 7: To study Comparative anatomy of Heart

Practical 8: To study comparative anatomy of Brain

Practical 9: To study comparative anatomy of Kidney

Journal / Submission

Note: This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester V (FIVE)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 508

(PRACTICALS)

Practical 1: Study of Marine ecosystem

Practical 2: Plotting of Mangrove distribution on Maps (Gujarat and India)

Practical 3: Study of selected intertidal animals and their characters

(Fiddler crab, Trocus, Neries, Sabella, Hermit crab, barnacles, sea anemone)

Practical 4: Study of different types of marine turtle.

Practical 5: Study of some important fauna of Kachchh.

(GIB, Spiny tailed lizard, Wolf, Flamingoes and any other relevant may be added).

Practical 6: Study of Variations using said experiment/example

Practical 7: Study of various dinosaurs. (Brontosaurus, Triceratops, Tyranosaurus, Dimetrodon, Stegosaurus, Pteranodon, Ichthyosaurus, Iguanodon).

Using photographs or models.

Practical 8: Preparation of human Karyotyping.

Practical 9: Studying types of mutation using diagrams (chromosomes and mutation diagrams).

Field Visit report

Journal / Submission

Note: This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester V (FIVE)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 509

(PRACTICALS)

Practical 1: Detection of Carbohydrates: Monosaccharides – Glucose and Fructose
Disaccharides - Lactose, Maltose and Sucrose

Practical 2: Detection of Proteins – Albumin and Casein

Practical 3: Preparation of atomic models of Carbohydrates. (as done in practical)

Practical 4: Preparation of atomic models of Proteins. (as done in practical)

Practical 5: Preparation of various graphs for effect of temperature on enzymatic action.

Practical 6: Preparation of various graphs for effect of pH on enzymatic action.

Practical 7: Preparation of various graphs for effect of enzyme and substrate concentration on enzymatic action.

Practical 8: Study of various instruments/ Tools and techniques.

Journal submission

Note: This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester VI (SIX)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 610

(PRACTICALS)

Practical 1: Study of external characteristics of cockroach

Practical 2: Study of digestive system of cockroach

Practical 3: Study of Nervous system of cockroach

Practical 4: Temporary mountings of salivary glands, cornea of compound eyes.

Practical 5: Estimation of Total solids (TS), Total dissolved solids (TDS) & total suspended solids (TSS) from water sample.

Practical 6: Estimation of Dissolved oxygen in given water sample.

Practical 7: Study of various sampling methods for field studies.

Practical 8: Study of parts of immune system – T. S through Lymph node, T.S through spleen & Structure of antibody. (Through charts and slides)

Practical 9: Visit to a local polluted site/ Solid waste centre/ Effluent Treatment plant and report writing. (***Self study***)

(Practical -9 report carries separate marks. Student should have his/her own representation of ideas based on the actual visit and should not be merely a copy)

Journal / Submission

Note: This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester VI (SIX)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 611

(PRACTICALS)

Practical 1: Study of social structure of honey bee. (Using specimen/chart/photograph)

Practical 2: Study of modern and traditional bee keeping methods. (by charts /specimens)

Practical 3: Study of Bombax mori and life cycle (by charts /specimens)

Practical 4: Study of economically important freshwater fishes of Gujarat/India. (by charts /specimens)

Practical 5: Study of economically important marine fishes of Gujarat/India. *(by charts /specimens)*

Practical 6: Methods of processing and preservation of fish. *(by charts /specimens)*

Practical 7: Study of some modern and traditional fishing gears. *(by charts /specimens)*

Practical 8: Study of Classical organ culture technique *(by charts)*

Journal / Submission

Note: This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

KSKV Kutch University, BHUJ

B.Sc. Semester VI (SIX)

SUBJECT: ZOOLOGY

PAPER NO : USCEZO 612

(PRACTICALS)

Practical 1: To study the position and function of endocrine glands in human body.

Practical 2: Determination of blood clotting time of own blood.

Practical 3: Determination of your own bleeding time.

Practical 3: Preparation of blood smear.

Practical 4: Preparation of haemin crystal from own blood.

Practical 3: To study neuro muscular coordination and reflexes. (through various activities)

Practical 4: Study of habituation using maze experiment.

Practical 5: Study of different types of nests.

Practical 6: Study of structure of different type of muscles (through slides/diagrams)

Practical 7: Observation of different type of some common animal behavior /displays. (Self study).

Journal submission

Note: This is compulsory to record laboratory work (all practicals) in the journal. The journal is to be certified by the incharge concerned and the Head of the Department. Certified journal should be produced while appearing at the time of Practical examination.

Psychology

K. S. K. V. Kachchh University, Bhuj

B.A. Semester- V

Subject: Psychology **Paper Code:** CEPS516A

Paper Name: Experimental Psychology (Only for Regular Student)

Name of course	Semester	Core/Open/ Allied/Practical /Project	Course/Paper code	Course/Paper Title	Credit	Internal Marks	External Marks	Total Exam Marks	External Exam Time Duration
B.A.	V	CORE	CEPS516A	Experimental Psychology	03	30	70	100	

Course Objectives:

This course should help Students:

1. The Course will familiarize students with the basic psychological process and studies relating to the factors which influence them. It will also focus come important application areas of Psychology.
2. Learn to use Psychology and other information sources.

Course Outline:

[Any **Five** Practical are to performed and reported to Journal, Five Practical is compulsory) [નીચેનામાંથી કોઈ પણ પાંચ પ્રયોગો સેમેસ્ટર દરમિયાન કરવા જરૂરી છે તેમજ તેનું પ્રાયોગિક કાર્ય પૂર્ણ કરી જર્નલમાં પરિણામ ચર્ચા અને તારણ, સંદર્ભ સુધી લખવું જરૂરી છે. જો પાંચ પ્રયોગ પૂર્ણ કરેલ હોય તો જ વિદ્યાર્થિની જર્નલ યુનિવર્સિટીની પરીક્ષા માટે માન્ય રહેવાં પામશે.)

1. Make Learning (Trial and Error Learning) (પ્રયત્ન અને ભૂલ દ્વારા શિક્ષણ)
2. Whole v/s Part Method of Learning (સમગ્ર વિરૂદ્ધ વિભાગ પદ્ધતિ દ્વારા શિક્ષણ)
3. Mental Fatigue (માનસિક થાક)
4. Measurement of Illusion by Muller – Lyer of Vertical Method using the Method of average error (સરેરાશ ભૂલની પદ્ધતિ દ્વારા મ્યુલર લાયરની વડે દ્રષ્ટિ ભ્રમનું માપન)
5. Judging Emotion from Photographs (ફોટોગ્રાફ પરથી આવેગ નિર્ધારણ)
6. Span of Attention (ધ્યાન વિસ્તાર)
7. Immediate Memory Span (તાત્કાલિક સ્મૃતિ વિસ્તાર)
8. Sinha's Anxiety Test (સિંહાની ચિંતા કસોટી)

IMPORTANT INSTRUCTION:

Allocation of Hours for Practical

(i)Experimental Explanation 20 Hours
Practical Performance 40 Hours
(ii) Personal Guidance 20 Hours
Fieldwork and Report Writing 40 Hours

- **Marking Scheme for Practical course: (100 Marks)**
- **A. Internal 30 Marks**
- **B. External (University Exam) 70 Marks**

(1) Scheme for Experiment

K. S. K. V. Kachchh University, Bhuj

B.A. Semester- VI

Subject: Psychology **Paper Code:** CEPS622A

Paper Name: Experimental Psychology (Only for Regular Student)

Name of course	Semester	Core/Open/ Allied/Practical /Project	Course/Paper code	Course/Paper Title	Credit	Internal Marks	External Marks	Total Exam Marks	External Exam Time Duration
B.A.	VI	CORE	CEPS622A	Experimental Psychology	03	30	70	100	

Course Objectives:

This course should help Students:

1. The Course will familiarize students with the basic psychological process and studies relating to the factors which influence them. It will also focus come important application areas of Psychology.
2. Learn to use Psychology and other information sources.

Course Outline:

[Any **Five** Practical are to performed and reported to Journal, Five Practical is compulsory) [નીચેનામાંથી કોઈ પણ પાંચ પ્રયોગો સેમેસ્ટર દરમિયાન કરવા જરૂરી છે તેમજ તેનું પ્રાયોગિક કાર્ય પૂર્ણ કરી જર્નલમાં પરિણામ ચર્ચા અને તારણ, સંદર્ભ સુધી લખવું જરૂરી છે. જો પાંચ પ્રયોગ પૂર્ણ કરેલ હોય તો જ વિદ્યાર્થિની જર્નલ યુનિવર્સિટીની પરીક્ષા માટે માન્ય રહેવાં પામશે.)

1. Division of Attention (ધ્યાન વિભાજન)
2. Studies of Suggestion through Progressive Weight Methods (ક્રમિકરીતે વધતા જતા વજન દ્વારા સૂચનનો અભ્યાસ)
3. Meaningfulness and Learning (અર્થપૂર્ણતા અને શિક્ષણ)
4. Problem Solving (સમસ્યા ઉકેલ)
5. Mirror - Drawing
6. Compression of Control and Free Association (નિયંત્રિત અને અનિયંત્રિત પદ્ધતિ દ્વારા સાહચર્યની તુલના)
7. Fluctuations of Attention (ધ્યાન વિચલન)
8. Comparative study of the Method of Rank order and paired Comparison though Color Preference (ક્રમાંક અને યુગ્મતુલના પદ્ધતિ દ્વારા રંગ પસંદગી)

IMPORTANT INSTRUCTION:

Allocation of Hours for Practical

(i)Experimental Explanation 20 Hours
Practical Performance 40 Hours
(ii) Personal Guidance 20 Hours
Fieldwork and Report Writing 40 Hours

- **Marking Scheme for Practical course: (100 Marks)**