

**KRANTIGURU SHYAMJI KRISHNA
VERMA KACHCHH UNIVERSITY,
KACHCHH**

Syllabus

Effective from June 2016

B.Sc. SEMESTER-I

SUBJECT: ENVIRONMENT SCIENCE

Paper no.	Name
CEES-101	Basic of Plants and Animals Science-1
CEES-102	Basics of Chemistry
CEES-103	Biostatistics and its applications- 1

B.Sc. SEMESTER I & II - MARINE SCIENCE

SYLLABUS FOR ENVIRONMENT SCIENCE SEMESTER - I

TYPE OF SUBJECT	SUBJECT CODE/ PAPER NO.	SUBJECT/ PAPER NAME	ASSESM ENT TYPE	CRED IT	BRIEF INTRODUCTION OF SUBJECT
CORE ELECTIVE-1	CEES-101	Basic of Plants and Animals Science-1	Theory	04	Students will learn about basic concepts of Biology and related subjects.
			Practical	03	Practical related to Biological science.
CORE ELECTIVE-2	CEES-102	Basics of Chemistry	Theory	04	Students will learn about basic fundamentals of Chemistry.
			Practical	03	Practical related to Chemistry.
CORE ELECTIVE-3	CEES-103	Biostatistics and its applications	Theory	04	Introductory portion of statistics related to biology, data analysis and other fundamentals of biostatistics.
			Practical	03	Practical related to Biostatistics.
CORE COMPULS ORY	CCEN 001	COMPULSORY ENGLISH	Theory	03	English literature and Grammar.
Foundatio n Course	FC001	Fundamentals of Environment Science	Theory	01*	—

KSKV Kachchh University, Bhuj - Kachchh
Environment Science Syllabus as CBCS System
Semester I
CORE ELECTIVE-I (CEES-101) Basic Plants and Animals
Science-1

Total Marks : 60

UNIT-1

Biology: Definition, Relation to other branches.

Classification: Definition, Types of Classification (Natural, Artificial, Phylogenetic), Whittaker's system of five kingdom classification, Eichlar's system of plant classification, General animal classification (up to phylum).

Taxonomy: Definition, Hierarchy, Binomial nomenclature, principles of taxonomy,

UNIT-2

Morphology of root, stems and leaves:

Root: Definition, functions and Types of root system (tap and adventitious root system).

Stem: Definition, functions and types of stem (aerial, semi underground, underground).

Leaves: Definition, functions and types of leaf (simple, compound- pinnately & palmately leaves).

Morphological adaptations of roots, stems and leaves:

Roots: Tap root- food storage (Carrot, radish, Beet root), Support (Maize, Banyan tree), Breathing (Aviceinnia), Symbiosis (legume plant roots), Adventitious roots- food storage (Sweet potato).

Stem: Food storage (Potato, ginger, amorphophallus), Protection (Carissa, Pomegranate, Rose), Vegetative propagation (Grass-runner, Eichhornia- Offset, Fern- Stolon), Support (Passion flower), Photosynthesis (Cactus, Muehlenbeckia)

Leaves: Food storage (Onion, Garlic), Support (Smilax, Pea plant, Bignonia, Clematis), Protection (Cactus), Vegetative propagation (Bryophyllum), Insectivorous plants (Nepenthes, Drosera)

UNIT-3

Photosynthesis: Definition, Light reaction, Dark reaction, Factors affecting photosynthesis.

Respiration: Definition, Glycolysis, Krab's cycle, electrone transport system, Factors affecting respiration.

Germination: Definition, Types of dormancy, Methods for overcome dormancy.

UNIT-4

Morphological and anatomical adaptation of Hydrophytes, xerophytes, Halophytes and Mesophytes

Soil: Definition, Soil profile, Soil erosion, Pedogenesis.

KSKV Kachchh University, Bhuj - Kachchh

Paper No. CEES101 Basic of Plants and Animals Science-1

(PRACTICALS)

1. Identification and classification of lower plants from Specimens/ Charts/ Photographs/ Slides.
Schizophyta: Bacteria; Algae: Laminaria, Ulva; Fungi: Mucor, Agarics; Lichen: Usnea, Parmelia ; Bryophyta: Riccia, Marchentia; Pteridophyta: Fern
2. Identification and describe given from specimens/ photographs/ Charts: Tap root- Any dicot root, Adventitious root- any monocot plant, Simple leaf-Shoe flower, Unipinnete- Fern, Bipinnete- Acacia, Tripennete- Moringa ; Unifoliate- Lemon, Bifoliate- Balanites, Trifoliate- Bel, Multifoliate- Alstonia.
3. Identify and describe: Roots: Tap root- food storage (Carrot, radish, Beet root), Support (Maize, Banyan tree), Breathing (Avicennia), Symbiosis (legume plant roots), Adventitious roots- food storage (Sweet potato).
4. Identify and describe: Food storage (Potato, ginger, amorphophallus), Protection (Carissa, Pomegranate, Rose), Vegetative propagation (Grass-runner, Eichhornia- Offset, Fern- Stolon), Support (Passion flower), Photosynthesis (Cactus, Muehlenbeckia).
5. Identify and describe: Leaves: Food storage (Onion, Garlic), Support (Smilex, Pea plant, Bignonia, Clematis), Protection (Cactus), Vegetative propagation (Bryophyllum), Insectivorous plants (Nepenthes, Drosera)
6. To demonstrate effect of light intensity, light type on Photosynthesis. (Wilmot's bubbler experiment).
7. To demonstrate process of respiration by respirometer.
8. To study anatomical features of given specimens: Hydrophyte: Hydrila or any available, Halophyte: Avicennia or any available, Xerophytes: Nerium or any available, Mesophyte: Sunflower or any available.

References:

1. College botany vol 1 by Das, Dutta and Ganguli ; New India Pub.
2. College botany vol 2 by Das and Ganguli ; New India Pub.
3. Ecology and environment by P.D.Sharma Rastogi Pub..

4. Plant Physiology By V. Verma

The Structure of the Question Paper for the University exam

Semester I (Environment Science) Paper no : CEES 101

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1	a	Short question (No internal Option)	05
Unit I	b	Descriptive Questions with Internal Option	10
Question 2	a	Short question (No internal Option)	05
Unit II	b	Descriptive Questions with Internal Option	10
Question 3	a	Short question (No internal Option)	05
Unit III	b	Descriptive Questions with Internal Option	10
Question 4	a	Short question (No internal Option)	05
Unit IV	b	Descriptive Questions with Internal Option	10

Note: Short questions may include: one to two line question/ definition/ drawing small figures/ filling the blanks/ multiple choice question/ match the pairs etc)

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**KSKV Kachchh University, Bhuj - Kachchh
Environment Science Syllabus as CBCS System
Semester I
CORE ELECTIVE-I (CEES-102) Basics of Chemistry**

Total Marks : 60

UNIT – I

Structure of atom, Bohr's model, concept of orbital, electron configuration
classification of elements on the basis of electron configuration,
periodic tables and periodic properties,

UNIT – II

Nature of chemical bonds, ionic compounds, Unit cell, structure of binary diatomic compounds,
covalent bond, hybridization.

Introduction to molecular orbital theory, coordinate linkage, structure of complex compounds,
chemistry of alkali and alkaline earth metals.

Comparative accounts of main group and transition elements and occurrence of their compounds
in hydrosphere and lithosphere.

UNIT – III

General states of matter, properties of gases and gas laws, Kinetics & thermodynamics and
thermo chemistry of chemical reactions.

Polymers – classification, process of polymerization and some important polymers.

Chemistry involved in volumetric and gravimetric methods of estimations.

Role of metal complexes in chemical analysis and in biological systems.

UNIT – IV

Chemistry of dyes; colours and constituents, types of dyes, criteria of good dyes, process of dyeing. Concept of environment friendly dyes,

Chemistry of drugs; anti malaria, sulfa, analgesic.

Classification and nomenclature of organic compounds.

Preparation and reactions of alkanes, alenes and alkynes.

Structure, properties and reactions of benzene, phenol, aniline.

KSKV Kachchh University, Bhuj - Kachchh

Paper No. CEES102 Basics of Chemistry

(PRACTICALS)

1. Identification of inorganic salts.
2. Identification of Organic compounds.
3. Estimation of hardness of water from given Samples.
4. Acid - Base titration.

References

1. Biochemistry by Dulsy Fatima , L.M.Narayanan , R.P.Meyyan , N.Arumugam, Pillai.
- 2.** Biochemistry and Biophysics by Annie Ragland,N.Arumugam,
- 3.** Fundamentals of Biochemistry by N.Arumugam
4. Chemistry of Organic Compounds by Chittaranjan Bhakta
5. Physical Chemistry by Alberty Silbey, Amp, Bawendi
6. A Textbook Of Physical Chemistry Vol. 1) by Kapoo Macmillan India Ltd.

Semester I (Environment Science) Paper no : CEES 102

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1 Unit I	a	Short question (No internal Option)	05
	b	Descriptive Questions with Internal Option	10
Question 2 Unit II	a	Short question (No internal Option)	05
	b	Descriptive Questions with Internal Option	10
Question 3 Unit III	a	Short question (No internal Option)	05
	b	Descriptive Questions with Internal Option	10
Question 4 Unit IV	a	Short question (No internal Option)	05
	b	Descriptive Questions with Internal Option	10

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**KSKV Kachchh University, Bhuj - Kachchh
Environment Science Syllabus as CBCS System
Semester I
CORE ELECTIVE-I (CEES-103) Bio-Statistics and Its
Applications-1**

Total Marks : 60

Unit-1

1. PRIMARY AND SECONDARY DATA: Concept of primary and secondary data, Methods of data collection, direct and indirect inquiry. Inquiry and questionnaire source of secondary data.
2. CLASSIFICATION AND GRAPHS: Concept of classification, types and importance of classification. Discrete and continuous series for univariate and bivariate data. Graphs: (i) Histogram (ii) Frequency Polygon (iii) Frequency curve (iv) Ogive curve(v) Pie Chart. Obtain the measure of central tendency (mean and mode) quartiles, deciles and percentiles from the above graphs.

Unit-2

1. MEASURE OF CENTRAL TENDENCY: Arithmetic Mean, Weighted Mean, Geometric Mean, Harmonic Mean Median, Mode, Quartiles, Deciles and Percentiles from group and ungroup data.
2. MEASURE OF DISPERSION: Range, Quartile deviation, Mean deviation, Standard deviation, Coefficient of variance.

Unit-3

1. LINEAR CORRELATION: Concept of linear correlation between two variable scatter diagram, bivariate frequency table, Karl Pearson's formula for correlation coefficient. Spearman's rank correlation. Calculation of correlation coefficient from ungrouped and grouped bivariate data. Coefficient of determination and its interpretation.

2. REGRESSION: Concept of Regression, Principle of least squares, line of regression, coefficient of determination and its interpretation. Use of regression in forecasting.

Unit-4

NORMAL CURVE: Concept, Equation and Characteristics of Normal curve, Measures of Divergence from Normality, Cause of Lack of Symmetry of Frequency curve, Use of Normal curve.

KSKV Kachchh University, Bhuj - Kachchh

Paper No. CEES103 Biostatistics and its applications-1

(PRACTICALS)

PRACTICALS:

THE PRACTICALS FOR THE COURSE PAPER IS DERIVED FROM THE ABOVE SYLLABUS

References:

1. Intro. To Biostatistics & Research Methods by Rao P. S. S. Sundar, Richard J. Publisher : Phi Learning
2. A Textbook Of Biostatistics by Annadurai B New Age International Publishers Ltd.-New Delhi
3. Manual Of Biostatistics by Jp Baride Jaypee Brothers Medical Publishers.-New Delhi
4. Introduction To Bio-Statistics, S. Chand publication

**The Structure of the Question Paper for the
University exam**

Semester I (Environment Science) Paper no : CEES 103

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1	A	Short question (No internal Option)	05
Unit I	B	Descriptive Questions with Internal Option	10
Question 2	A	Short question (No internal Option)	05

Unit II	B	Descriptive Questions with Internal Option	10
Question 3	A	Short question (No internal Option)	05
Unit III	B	Descriptive Questions with Internal Option	10
Question 4	A	Short question (No internal Option)	05
Unit IV	B	Descriptive Questions with Internal Option	10

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Syllabus

Effective from June 2016

B.Sc. SEMESTER II

SUBJECT: ENVIRONMENT SCIENCE

Paper no.	Name
CEES-204	Basic of Plants and Animals Science-2
CEES-205	Environmental Biology and Evolution
CEES-206	Environmental Pollution-1

**KSKV Kachchh University, Bhuj – Kachchh
Environment Science Syllabus as CBCS System
Semester II**

CORE ELECTIVE-II (CEES-204) Basic of Plants and Animals Science-2

Total Marks : 60

UNIT-1

Population Ecology: Definition, Monospecific & Polyspecific population.

Basic concept of Population ecology: Population Characteristics (Size & density, dispersion, Age structure, Natality, Mortality).

Population dynamics: Theory of Population growth (exponential growth curve, logistic growth curve), Population ecology and evolution (r- selected & k-selected).

UNIT-2

Ecological Succession: Definition, Cause of succession, basic types of succession, general process of succession, hydrosere.

Nutrient cycle in ecosystem: Atmospheric cycles- Carbon cycle ; Edaphic cycle- Nitrogen cycle.

UNIT-3

Metabolic processes of animals: Definition, Comparative study of Digestion, Respiration, Circulation, Excretion, Nervous and Reproductive system (from Protozoa to Mammals)

UNIT-4

Animal Interaction and associations: Mutualism, Commensalism, Parasitism, Predation, Amensalism.

Defensive Adaptation: Mimicry, Camouflage.

Pollination: Definition, types (Self Pollination, Cross Pollination), biotic and abiotic agents of pollination, Role of animals in pollination.

Seed dispersal: Definition, role of animals in seed dispersal.

KSKV Kachchh University, Bhuj - Kachchh

Paper No. CEES204 Basic of Plants and animals Science-2

(PRACTICALS)

1. Estimation of density of Plant community by using quadrat methods.
2. Estimation of abundance of Plant community by using quadrat methods.
3. Estimation of frequency of Plant community by using quadrat methods.
4. Study of Carbon cycle through photographs/ Charts.
5. Study of Nitrogen cycle through photographs/ Charts.
6. Study of animal association through specimens/ photographs/ charts.-Mutualism, Commensalism, Parasitism, Predation. (any two examples of each)
7. Study of animal adaptation from specimen/ photographs/ charts- Mimicry, Camouflage (Any two examples of each).

References:

1. College Botany Vol.1 by Das, Dutta and Ganguli, New India Pub.
2. College Botany Vol.2 by Das and Ganguli, New India Pub.
3. Ecology and environment by P.D.Sharma Rastogi Pub..
4. Chordate Zoology by E.L. JORDAN & P.S. VERMA
5. Chordate Zoology E. L. Jordan and P. S. Verma. Reprint 2003. S. Chand .and Company Ltd, Ram nagar, New Delhi - 110 055.
6. A Text book of Zoology R. D. Vidyarthi and P. N. Pandey S. Chand and Company Ltd, Ram nagar, New Delhi - 110 055.

The Structure of the Question Paper for the University exam

Semester II (Environment Science) Paper no : CEES 204

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Questi on No.	Sub Questio	Question Type	Mark
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Question 1	A	Short question (No internal Option)	05
Unit I	B	Descriptive Questions with Internal Option	10
Question 2	A	Short question (No internal Option)	05
Unit II	B	Descriptive Questions with Internal Option	10
Question 3	A	Short question (No internal Option)	05
Unit III	B	Descriptive Questions with Internal Option	10
Question 4	A	Short question (No internal Option)	05
Unit IV	B	Descriptive Questions with Internal Option	10

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**KSKV Kachchh University, Bhuj – Kachchh
Environment Science Syllabus as CBCS System
Semester II**

CORE ELECTIVE-II (CEES-205) Environmental Biology and Evolution

Total Marks : 60

UNIT-1

Ecology: Definition, Branches, Scopes, relation to other divisions of science

Autecology and Synecology: Definition

Ecosystem: Concept & structure of ecosystem, kinds of ecosystem, functions of ecosystem, biotic and abiotic component of ecosystems.

UNIT-2

Food chain (Definition, grazing & detritus food chain), food web, trophic structure, ecological pyramids, energy flow in ecosystem- single chain model

Productivity of ecosystem: Definition, primary and secondary productivity.

UNIT-3

Ecosystem: Definition & types (terrestrial & aquatic ecosystem)

Terrestrial ecosystem: Desert ecosystem, grassland ecosystem, forest ecosystem (evergreen & deciduous forest).

Aquatic ecosystem: Fresh water ecosystem, pond ecosystem, river ecosystem.

Marine ecosystem: Ocean water ecosystem, estuarine ecosystem.

UNIT-4

Origin and Evolution of life on Earth: Definition of Evolution, Origin of Earth, Early geographical condition of Earth, Spontaneous generation, Biogenesis and Abiogenesis, Miller's Experiment, Chemical Evolution and Origin.

Habitat: Definition, Concept of habitat. Ecological adaptations: Definition, xeric adaptation in plants and animal. Aquatic adaptations of plants, arboreal adaptation in animals.

KSKV Kachchh University, Bhuj - Kachchh

Paper No. CEES205 Environmental biology & evolution

(PRACTICALS)

1. To study the physical characteristics- texture of given soil sample.
2. To study the soil profile from the given soil sample.
3. To study the moisture content of the given soil sample.
4. To study the nitrate content of the given soil sample.

5. To study the pH value of the given soil sample.
6. To study the food chain and food web through photographs/ charts.
7. To study the xeric adaptation of the plants through specimens/ photographs/ charts.
8. To study the hydrophytic adaptation of the plants through specimens/ photographs/ charts.
9. To study the arboreal adaptation of the animals through specimens/ photographs/ charts.

References:

1. Ecology and environment by P.D.Sharma Rastogi Pub
2. Basics of ecology by Pradhan N.C ; Anmol Pub.
3. Basic of environment science by Srivastav S. Anmol Pub.
4. Environmental ecology by Trivedi P.R ; Akashdeet Pub.
5. Origin and evolution of vertebrates by Arora R Anmol pub
6. Origin of life by Arora R. ; Anmol pub

Semester II (Environment Science) Paper no : CEES 205

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
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Question 1	A	Short question (No internal Option)	05
Unit I	B	Descriptive Questions with Internal Option	10
Question 2	A	Short question (No internal Option)	05
Unit II	B	Descriptive Questions with Internal Option	10
Question 3	A	Short question (No internal Option)	05
Unit III	B	Descriptive Questions with Internal Option	10
Question 4	A	Short question (No internal Option)	05
Unit IV	B	Descriptive Questions with Internal Option	10

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KSKV Kachchh University, Bhuj – Kachchh
Environment Science Syllabus as CBCS System
Semester II
CORE ELECTIVE-III (CEES-206) Environmental Pollution-1

Total Marks : 60

UNIT - I

Concept and scope of environmental chemistry. Definition and description of various terms:- contaminant, pollutant, receptor, sink, aerosols, particulates, pathways of pollutants, TLV, COD, BOD, chemical toxicology, hazardous chemicals, carcinogens.

UNIT -II

Properties of water; Water quality, Water quality standards (Indian and International standards), water resources, origin and types of water pollutions/pollutants, their impacts on environment.

UNIT III

Waste water sampling techniques, Analysis of waste water - organic and inorganic substances, physical characteristics and biological contamination

UNIT IV

Waste water treatment - Preliminary, primary, secondary and tertiary; removal of suspended and dissolved solids, nitrogen and phosphorous, advance biological and chemical methods for water treatment.

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Paper No. CEES206 Environmental Pollution-1

(PRACTICALS)

1. To study different instruments and techniques used in Water sample.

2. To estimate alkalinity of given water sample.
3. To Estimate acidity of given water sample.
4. To Estimate Total hardness of given water sample.
5. To Estimate DO of given water sample.
6. To Estimate BOD of given water sample.
7. To Estimate COD of given water sample.

References:

1. Water pollution : problems and prospects by Prabhakar ; Anmol Pub.
2. Pollution monitoring and control by Prabhakar ; Anmol Pub.
3. Recent advantage in environmental ecology 15 vol.(set) by A.P.Diwan ; Anmol Pub.
4. Environmental pollution by Katyal ; Anmol Pub.
5. Environmental air pollution by P.R.Trivedi Akashdeet Pub.
6. Noise pollution by P.R.Trivedi Akashdeet Pub.

Semester II (Environment Science) Paper no : CEES 206

Total Mark: 60 (Total 4 units each carries 15 Marks)

Total Number of Question: 04

Question No.	Sub Question	Question Type	Mark
Question 1 Unit I	A	Short question (No internal Option)	05
	B	Descriptive Questions with Internal Option	10
Question 2 Unit II	A	Short question (No internal Option)	05
	B	Descriptive Questions with Internal Option	10
Question 3 Unit III	A	Short question (No internal Option)	05
	B	Descriptive Questions with Internal Option	10
Question 4 Unit IV	A	Short question (No internal Option)	05
	B	Descriptive Questions with Internal Option	10

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