KRANTIGURU SHYAMJI KRISHNA VERMA KACHCHH UNIVERSITY, KACHCHH

Syllabus

Effective from June 2016

B.Sc. SEMESTER I

SUBJECT: MARINE SCIENCE

Paper no.	Name
CEMS-10	An Introduction to Marine Biology, Ecology and Evolution
CEMS-102	Fundamentals of Marine Chemistry-1
CEMS-103	Bio-Statistics and Its applications

B.Sc. SEMESTER I & II – MARINE SCIENCE

SYLLABUS FOR MARINE SCIENCE SEMESTER – I

TYPE OF SUBJECT	SUBJECT CODE/ PAPER NO.	SUBJECT/ PAPER NAME	ASSESMENT TYPE	CREDIT	BRIEF INTRODUCTION OF SUBJECT
CORE ELECTIVE-1	CEMS-101	An Introduction to Marine Biology, Ecology and Evolution	Theory	04	Students will learn about basic concepts of Marine Biology and Ecology as well as will gain information about Evolution
			Practical	03	Practical related to Biology, Ecology and environment
CORE ELECTIVE-2	CEMS-102	Fundamentals of Marine Chemistry-1	Theory	04	Students will learn about basic fundamentals of Chemistry of Ocean Environment.
			Practical	03	Practical related to Chemistry.
CORE ELECTIVE-3	CEMS-103	Bi0statistics 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 COMPULSORY	CCEN 001	COMPULSORY ENGLISH	Theory	03	English literature and Grammar.
Foundation Course	FC001	Fundamentals of Environment Science	Theory	01*	—

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Marine Science Syllabus as CBCS System
Semester I
CORE ELECTIVE-I (CEMS-101) Introduction to Marine Biology, Ecology and Evolution

Total Marks : 60

UNIT-1

- Introduction to Marine Biology: Definition, Relation to other branches of Biology.
- Classification: Definition, types (Natural, Artificial and Phylogenetic classification systems), R.H. Whittaker's five kingdom classification system, Eichler's system of Plant classification, General Animal classification (up to Phyllum).
- Taxonomy: Definition, History, Binomial Nomenclature, Principles of taxonomy, Hierarchy.

UNIT-2

- 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, Deep sea vent Hypothesis, Thermosynthesis, Panspermia.

UNIT-3

- Marine Ecology: Definition, Structure, Biotic and Abiotic components, Marine food chain and food web, trophic structure and Ecological pyramids, Energy flow in ecosystem.

UNIT-4

- Population Ecology: Definition, Concept of Population Ecology.
- Population Growth and factors affecting population growth, Dispersion of organisms
- Animal Associations: Mutualism , Commensalism, Parasitism , Predation

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Paper No. CEMS101 Introduction to Marine Biology, Ecology and Evolution (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 classification of lower plants from Specimens/ Charts/ Photographs/ Slides.
   Gymnosperm: Cycus, Pinus; Angiosperm: Sunflower, Maize.
3. Identification and classification of Invertebrate Animals (up to phylum) from specimens/ Charts/ Photographs/ Slides.
   Protozoa: Amoeba, Paramoecium; Porifera: Sponges ; Coelenterata: Coral, Jellyfish ; Platyhelminthus: Planeria, Tapeworm ; Nemethelminthus: Ascaris, Round worm ; Annelida: Sabella, Nereis ; Arthropoda: Crab, Prawn ; Mollusca: Octopus, gastropod ; Echinodermata: Starfish, Sea urchin.
4. Identification and classification of Vertebrate Animals (up to phylum) from specimens/ Charts/ Photographs/ Slides.
   Oeistychthus: Rohu, Catla ; Chondrichthus: Shark, Ray Fish ; Amphibia: Frog, Salamander ; Reptilia: Turtle, Sea Snake ; Aves: Sea gull, Flamingo; Mammals: Whale, Dolphin.
5. Demonstration of Miller's Experiments by Charts/ Photographs/ Models.
6. Demonstrationof Marine food chain and Food web by using Charts/ Photographs/ Models.
7. Demonstration of Ecological Pyramids by using Charts/ Photographs/ Models.
8. Study of positive animal interaction; Mutualism (As per syllabus), Commensalism (As per syllabus) from Charts/ Photographs/ Specimens.
9. Study of negative animal interaction; Parasitism (As per Syllabus), Predation (As per Syllabus) from Charts/ Photographs/ Specimens.

Reference Books:

1. Elements of ecology (3rd edn) 1982 – Tail, R.V.
2. An introduction to marine sciences, 1988 – Meadows, P.S. & Campbell, J.J.
3. Textbook of marine ecology, 1989 – Nair, N.B. & Thampy, D.M.
4. Marine biology, 1984 Thurman, H.V. and Webber, H.H.
5. The ecology of rocky coasts, 1964 – Lewis, J.R.
6. The shore environment, 1980 – Irvine, J.H., Price, D.E.C. and Farnham, W.F.
7. The invertebrates (5th Edn.), 1986 – Barnes, R.D.

The Structure of the Question Paper for the University exam

Semester I (Marine Science) Paper no : CEMS 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 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	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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Marine Science Syllabus as CBCS System
Semester I
CORE ELECTIVE-II (CEMS-102) Introduction to Marine Chemistry-1

Total Marks : 60

Unit-1

- Basic Chemistry- Atoms and their structure, Bohr's Model.
- Classification of Elements on the basis of electron Configuration, Periodic table and their Properties.
- Chemical Bonds- Ionic and Covalent Bonds

UNIT-2

- Chemical properties of water and seawater, Elemental composition of seawater, ions, gases, and neutral species
- constant composition rule – geothermal vents, rivers, sediments in the control of the composition of seawater.

UNIT-3

- Chemical processes in oceans – pH and buffering capacity of seawater – nutrients and biogeochemical cycles – measurement of salinity

UNIT-4

- Basic properties and processes in estuarine chemistry.

- Organic processes in estuaries-conservative and non conservative behavior of dissolved constituents during estuarine mixing-process of heavy metals in estuarine sediments.

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Paper No. CEMS102 Fundamentals of Marine Chemistry-1

(PRACTICALS)

1. Estimation of Dissolved Oxygen from given sample.
2. Estimation of Biological Oxygen Demand (BOD) from given sample.
3. Estimation of Chemical Oxygen Demand (COD) from given sample.
4. Identification of radicals from given sample.(Acidic group elements)
5. Identification of radicals from given sample.(Acidic group elements)
6. Identification of radicals from given sample.(Alkaline group elements)
7. Identification of radicals from given sample.(Alkaline group elements)

Reference Books:

1, Introduction to marine chemistry, 1981 – Riley, J.P. and Chester, R.
2. Seawater: Its composition, properties & behaviour, 1989 – The Open University.
3. Marine Chemistry (Vol.2), 1970 – Martin, D.F.
4. Chemical oceanography, 1992 – Millero and saha, M.L.
5. The chemistry of the atmosphere and oceans, 1978 – Holland, H.D.
6. An introduction to environmental chemistry, 1996 – Andrews et al., Blackwell science.
7. Environmental chemistry, 1994 - De, A.K., Wiley – Eastern Ltd.
8. Chemical Oceanography, 1996 – F.J.Millero

9. The Sea Surface and Global Change, 1997, 2005 – P.S. Liss and R. Duce.

The Structure of the Question Paper for the University exam

Semester I (Marine Science) Paper no : CEMS 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	a	Short question (No internal Option)	05

Unit II	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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Marine Science Syllabus as CBCS System
Semester I
CORE ELECTIVE-I (CEMS-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.

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Paper No. CEMS103 Biostatistics and its applications-1

(PRACTICALS)

PRACTICALS:

THE PRACTICALS FOR THE COURS 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 (Marine Science) Paper no : CEMS 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 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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KRANTIGURU SHYAMJI KRISHNA VERMA KACHCHH UNIVERSITY, KACHCHH

Syllabus

Effective from June 2046

B.Sc. SEMESTER II

SUBJECT: MARINE SCIENCE

Paper no.	Name
CEMS-204	Biology of Marine Organisms-1
CEMS-205	Biological Oceanography
CEMS-206	Fundamentals of Marine Botany-1

B.Sc. SEMESTER I & II – MARINE SCIENCE

SYLLABUS FOR MARINE SCIENCE SEMESTER – II

TYPE OF SUBJECT	SUBJECT CODE/ PAPER NO.	SUBJECT/ PAPER NAME	ASSESMENT TYPE	CREDIT	BRIEF INTRODUCTION OF SUBJECT
CORE ELECTIVE-1	CEMS-204	Biology of Marine Organisms-1	Theory	04	Students will learn about Biology of Marine life and its key role in oceans.
			Practical	03	Practical related to Biology of marine animals.

CORE ELECTIVE-2	**CEMS-205**	**Biological Oceanography**	**Theory**	**04**	**Students will learn about key fundamentals of biological oceanography.**
			Practical	**03**	**Practical related to oceanography.**
CORE ELECTIVE-3	**CEMS-206**	**Fundamentals of Marine Botany-1**	**Theory**	**04**	**Introductory portion of Marine flora and its Importance.**
			Practical	**03**	**Practical related to Marine Botany.**
CORE COMPULSORY	**CCEN 002**	**COMPULSORY ENGLISH**	**Theory**	**03**	**English literature and Grammar.**
Foundation Course	**FC002**	**Basics of Computer**	**Theory**	**01***	**__**

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Marine Science Syllabus as CBCS System
Semester II
CORE ELECTIVE-I (CEMS-204) Biology of Marine Organisms-1

Total Marks : 60

UNIT-1

- Cell: Definition, Brief History, Discovery and Cell theory
- Types of Cells: Typical Plant Cell and Animal Cell ; Classification of Cell on the basis of Nucleus: Akaryotic Cell, Prokaryotic Cell and Eukaryotic Cell.
- Cell Organelles: General account of Plasma membrane, Endoplasmic reticulum, Mitochondria, Chloroplast, Nucleus.

UNIT-2

- Cell Division: Definition, Cell cycle, Mitosis and Meosis
- Tissue: Definition ; Types of animal tissue- Epithelial tissue, Connective tissue, Muscular tissue and Neural tissue.

UNIT-3

- Digestion and Digestive System: Definition, Comparative study of digestive system in Invertebrates (From Phyllum Protozoa to Echinodermata) and Vertebreta (From class Chondrychthus to Mammals), General study of digestive enzymes.
- Respiration and Respiratory System: Definition, Comparative study of respiratory system in Invertebrates (From Phyllum Protozoa to Echinodermata) and Vertebreta (From class Chondrychthus to Mammals), Brief account of Haemoglobin and haemocyanin, General process of transportation of CO_2 and O_2

UNIT-4

- Cieculation and Circulatory System: Definition, Comparative study of circulatory system in Invertebrates (From Phyllum Protozoa to Echinodermata) and Vertebreta (From class Chondrychthus to Mammals), Comparative study of Heart: Two Chambered, Three Chambered and Four Chambered
- Excretion and Excretory System: Definition, Comparative study of circulatory system in Invertebrates (From Phyllum Protozoa to Echinodermata) and Vertebreta (From class Chondrychthus to Mammals), Classification of organisms on the basis of excretory materials: Ureotelic, Ureotelic and Ammonotelic ; Osmoregulaters, Osmoconfermers, Eurohaline, Stenohaline, Hypertonic, Hypotonic and Isotonic.

KSKV Kachchh University, Bhuj- Kachchh

CORE ELECTIVE-1 (CEMS-204) Biology of Marine Organisms-1

PRACTICALS

1. Comparative study of digestive system of Amoeba, Earthworm and Fish through photographs/ Chart/ Specimens.

2. Comparative study of respiratory system of Amoeba, Earthworm and Fish through photographs/ Chart/ Specimens.
3. Comparative study of Heart: Two chambered, Three Chambered and Four Chambered through photographs/ Chart/ Specimens.
4. Comparative study of Excretory system of Amoeba, Earthworm and Fish through photographs/ Chart/ Specimens.
5. Study of Cell Organelles using Charts/ Photographs: Plasma membrane, Endoplasmic reticulum, Mitochondria, Chloroplast, Nucleus.
6. Study of Animal tissues using Charts/ Photographs/ Slides.

References

1. Biological oceanography 1999 – Lalli, C.M.
2. Oceanography: The past, 1980 – Sears, M and Merimann D. (Eds).
3. Elements of ecology (3rd edn) 1982 – Tail, R.V.
4. An introduction to marine sciences, 1988 – Meadows, P.S. & Campbell, J.J.
5. Textbook of marine ecology, 1989 – Nair, N.B. & Thampy, D.M.
6. Marine biology, 1984 Thurman, H.V. and Webber, H.H.
7. Methods in marine zooplankton ecology, 1984 Omori, W. and Ikeda, T.
8. Methods for the study of marine benthos, 1984 – Holme, N.A. & Melntyre, A.D.
9. The ecology of rocky coasts, 1964 – Lewis, J.R.
10. The shore environment, 1980 – Irvine, J.H., Price, D.E.C. and Farnham, W.F.
11. Life between tidemark on rocky shores, 1972 – Stephenson, T.A. & Stephenson, A.
12. The invertebrates (5th Edn.), 1986 – Barnes, R.D.

The Structure of the Question Paper for the University exam

Semester II (Marine Science) Paper no : CEMS 204

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
Marine Science Syllabus as CBCS System
Semester II
CORE ELECTIVE-II (CEMS-205) Biological Oceanography

Total Marks : 60

UNIT-1

- Sea as a biological environment: Classification of Marine environment (Vertical and Horizontal Zones/ layers of Ocean)
- Intertidal zone, Subtidal zone, Intertitial zone and deep sea zone: their Environment, organisms and their characters/ adaptations.
- Other oceanic environments: Coral reefs, Mangroves, Kelp forest and Hydrothermal vent (Brief Introduction, their environment, their ecological role and their distribution).

UNIT-2

- Planktons, Nectons and Benthos (Brief account of organisms, their characters and distribution)
- Classification of Plankton based on their size, Mode of life and Habitat.
- Phytoplankton and Zooplankton: their characters, methods of collection, estimation of standing crop, wet and dry weight estimations, plankton volume, settling and displacement methods.

UNIT-3

- Plankton Adaptation: Structural Adaptation (Weight, Floatation and increase of surface area) and Physiological adaptation (Specific gravity, Water content and gas vacuoles).

UNIT-4

- Organic production – primary and secondary productions
- Methods of estimation of primary production, factors affecting primary production.
- red tide phenomenon – its causes and effects.

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CORE ELECTIVE-1 (CEMS-205) Biological Oceanography

PRACTICALS

1. Study of distribution of Corals and Mangroves in World through Maps.
2. Study of distribution of Corals and Mangroves in India through Maps.

3. Study of Planktons and Nektons with their characters using Specimens/ Charts/ Photographs/ Slides. (Any three Specimens of Each).
4. Study of Phytoplankton (Eg. Diatoms, Dinoflagellates, Blue green algae and Coccolithophores) using Specimens/ Charts/ Photographs/ Slides.
5. Study of Phytoplankton (Eg. Copepodes, Hydromedusae, Pteropods, Chaetognatha and Planktonic larvae) using Specimens/ Charts/ Photographs/ Slides.
6. Study of Intertidal animals by using Specimens/ Charts/ Photographs. (Any four animals).

References:

1. Biological oceanography 1999 – Lalli, C.M.
2. Oceanography: The past, 1980 – Sears, M and Merimann D. (Eds).
3. An introduction to marine sciences, 1988 – Meadows, P.S. & Campbell, J.J.
4. Textbook of marine ecology, 1989 – Nair, N.B. & Thampy, D.M.
5. Methods in marine zooplankton ecology, 1984 Omori, W. and Ikeda, T.
6. Methods for the study of marine benthos, 1984 – Holme, N.A. & Melntyre, A.D.
7. The ecology of rocky coasts, 1964 – Lewis, J.R.
8. The shore environment, 1980 – Irvine, J.H., Price, D.E.C. and Farnham, W.F.
9. Life between tidemark on rocky shores, 1972 – Stephenson, T.A. & Stephenson, A.
10. Zooplankton Methodology Manual, 2000 - Harris, R., Wiebe, P., Lenz, J., Skjoldal, H.R., Huntley, M. (Eds), ICES Academic Press, San Diego, pp. 684.

The Structure of the Question Paper for the University exam

Semester II (Marine Science) Paper no : CEMS 205

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
Marine Science Syllabus as CBCS System
Semester II

CORE ELECTIVE-III (CEMS-206) Fundamentals of Marine Botany-1

Total Marks : 60

Unit-1

- Classification of Algae by Smith: Classification of Algae with their general characteristics and Examples.
- Distribution of Marine Algae in India and World.
- Plant tissues: Brief account of Simple and Complex Plant tissues.

Unit-2

- Study of Marine phycoflora: General Characteristics and examples of Chlorophyta, Pheophyta and Rhodophyta.
- Sea weeds: Definition, History, Ecological and Economical Importance of Sea weeds.
- Sea grass: Definition, General characters with examples, Morphological and Anatomical Adaptations. Ecological Importance of Sea grass.
- Mangroves: General characteristics and types, Morphological and Anatomical Adaptation of Mangroves.

Unit-3

- Classification , General Characteristics and Life cycle of Ulva (Chlorophyta), Laminaria (Pheophyta) and Gracillaria.

Unit-4

- Utilization and economic Importance of Marine Algae: Marine Algae as Food, Fodder, Medicine and industrial raw material.

CORE ELECTIVE-1 (CEMS-205) Biological Oceanography

PRACTICALS

1. Identification and Classification of locally available Marine algae. (through Specimens/ Photographs/ Charts.
2. To study algal distribution through Map.
3. To study plant tissues- Simple and Complex tissues through Specimens/ Charts/ Photographs.
4. To study Sea grass through Specimens/ Charts/ Photographs. (Any three Sea grass).
5. To study morphological characteristics of *Aviceinnia* through Specimens/ Charts/ Photographs.
6. To study Reproductive characteristics of *Aviceinnia* through Specimens/ Charts/ Photographs.
7. To study classification, characteristics and life cycle of *Ulva* through Specimens/ Charts/ Photographs.
8. To study classification, characteristics and life cycle of *Laminaria* through Specimens/ Charts/ Photographs.
9. To study classification, characteristics and life cycle of *Gracillaria* through Specimens/ Charts/ Photographs.

References:

i. Text book of Algae by O.P.Sharma ; Tata McGraw-Hill Education, 01-Jan-1986.

ii. Myxophyceae, Peridinieae, Bacillarieae, Chlorphyceae Volume 1 , Myxophyceae, Peridinieae, Bacillarieae, Chlorphyceae by G. S. West ; Cambridge University Press 2040

iii. Algae: An Introduction to Phycology by Christiaan Hoek, David Mann, H. M. Jahns, Cambridge University Press, 1995.

iv. Botany for degree students by B.P.Pandey S.Chand Publiocation.

v. Botany for degree students by A.C. Dutta ; Oxford University Press, USA

vi. College Botany-2 by Das, Dutta and Ganguli.

The Structure of the Question Paper for the University exam

Semester II (Marine Science) Paper no : CEMS 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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