DETAILED SYLLABUS OF B.Sc. I YEAR (SEMESTER-II) FOR CERTIFICATE COURSE IN BASIC GEOLOGY

KSKV Kachchh University, Bhuj - Kachchh

(Effective from June 2023-24 UNDER NEP-2020)

SEMESTER II:

Course Outcome

After the completion of the course the students will be able to:

1. Student will be introduced to Minerals and their formation.
2. Basic idea about mineral structure and chemical bonding and mineral classification.
3. Elementary study of physical properties of rock forming minerals and develop ability to identify different minerals in hand specimen.
4. Introduction to different types of rocks and concept of rock cycle
5. Students will be introduced to earthquake science.
6. Understanding origin and types of soils and soil profile.
7. Students will be introduced to geomorphic science and processes acts on earth surface.

SEMESTER 2:
Paper MAJ GEO-201: Elementary Crystallography, Mineralogy and petrology
(Course code: MAJ GEO-201) Credit: 3

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	*SEMESTER*	*COURSE CODE*	*COURSE TITLE*	*THEORY*			
				Credits	*Lectures*	*External*	*Internal*
Certificate Course	*B.Sc. II*	*MAJ GEO-201*	**Elementary Mineralogy and petrology**	**3**	**45**	*40 Marks*	*35 Marks*
UNIT	*TOPIC*						*No.Of Lectures* **(45 hrs)**
Unit 1	**Introduction to Mineralogy** • Definition and characteristics of mineral, rock forming and ore minerals. • Introduction to Dana System of Mineral Classification. • Introduction to Gem minerals.						**15**
Unit 2	**Minerals Properties** • Physical properties of minerals including Isomorphism, Polymorphism, Pseudomorphism, Chatoyancy and Asterism. • Electrical properties of minerals.						**15**
Unit 3	**Introduction to petrology:** • Elementary study of Igneous, metamorphic and sedimentary rocks • Origin and major characteristics of different types of rocks • Rock Cycle.						**15**

Suggested readings

•Rultey's Elements of Mineralogy 26th edition, H.H. Read
•Rultey's Elements of Mineralogy 27th edition, C.D Gribble
•Manual Mineralogy 21st edition, (after James D. Dana), Cornelis Klein, Cornelius S, Hurlbut, Jr.
•Mineral science 22th edition, (after James D. Dana), Cornelis Klein.
•Mineralogy 2nd edition, Dexter Perkins.
•A Text Book of Geology, P. K. Mukherjee, World press.

Note: Students may refer variety of material available online and on web resources for further understanding.

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SEMESTER II:

Paper MAJ GEO-202-P Elementary Mineralogy and petrology

Practical/ Lab course (Course code: MAJ GEO202-P)

Credit: 1

Course Outcome

After the completion of the course the students will be able to:

1. Student will get basic understanding of formation and classification of minerals.
2. It will help them understand and develop skills for identifying minerals in hand specimen.
3. Learn observational skills in lab as well as field and demonstrate the same in journals and exams.
4. At first year basic level, they will learn the preparation of brief reports of their observations in field.

DISCIPLINE SPECIFIC CORE COURSE						
COURSE	***SEMESTER***	***COURSE CODE***	***COURSE TITLE***	***PRACTICAL***		
				Credits	***Lectures***	***INTERNAL/ External***
Certificate Course	**B.SC**	***MAJ GEO-202-P***	**Elementary Mineralogy and petrology**	**1**	**30 hrs**	***25 (15+10) Marks***

- Study of Mineral classification
- 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, Beryl, Garnet, Epidote, Chlorite, Asbestoses, Hornblende, Augite, Tourmaline, Olivine, Halite, Aragonite, Hypersthene.
- Study of types of clay.

Field Report/ Submission

SEMESTER 2:
Paper MAJ GEO-203: Introduction to Physical Geology
(Course code: MAJ GEO-203) Credit: 3

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	*SEMESTER*	*COURSE CODE*	*COURSE TITLE*	*THEORY*			
				Credits	*Lectures*	*External*	*Internal*
Certificate Course	*B.Sc. II*	*MAJ GEO-203*	**Introduction to Physical Geology**	**3**	**45**	*40 Marks*	*35 Marks*

UNIT	*TOPIC*	*No. Of Lectures* (45hrs)
	Earthquake science • Earthquakes– Definition, Mechanism of Earthquakes, • Seismic Waves, Scales of Earthquake, Earthquake Prediction. • Seismograph and Seismogram, • Effect of Earthquake, Seismic Belts, Relation between earthquakes, Volcanoes and Plate Tectonics.	**15**
	Soil • Introduction - Soil. • Basics of weathering. • Soil composition and soil profile. • Classification of soil. • Soil groups of India. • Soil erosion and conservation.	**15**
	Elementary Geomorphology • Definition and Scope • Basic geomorphological concepts. • Different cycles of erosion. • Rejuvenation and its causes. • Tools and Techniques in geomorphology. • Introduction to First, second and third order relief structure.	**15**

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SEMESTER II:

Paper MAJ GEO-204-P Introduction to Physical Geology

Practical/ Lab course (Course code: MAJ GEO-204-P)

Credit: 1

Course Outcome

After the completion of the course the students will be able to:

1. Student will get basic understanding of formation and classification of minerals.
2. It will help them understand and develop skills for identifying minerals in hand specimen.
3. Learn observational skills in lab as well as field and demonstrate the same in journals and exams.
4. At first year basic level, they will learn the preparation of brief reports of their observations in field.

DISCIPLINE SPECIFIC CORE COURSE						
COURSE	***SEMESTER***	***COURSE CODE***	***COURSE TITLE***	***PRACTICAL***		
				Credits	***Lectures***	***INTERNAL/ External***
Certificate Course	**B.SC**	***MAJ GEO-204-P***	**Introduction to Physical Geology**	**1**	**30 hrs**	***25 (15+10) Marks***

- Demarcation of major global seismic belts.
- Identification of seismic zone of India
- Locating earthquake epicenter with the help of provided data.
- Study of soil profile.
- Study of soil map of India
- Identification of geomorphic structures form satellite imageries and toposheets.

Note: Additional practical related to syllabus may be included during class work.

SEMESTER 2:
Paper MIN GEO-205: Elementary Crystallography, Mineralogy and petrology
(Course code: MIN GEO-205) Credit: 3

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	*SEMESTER*	*COURSE CODE*	*COURSE TITLE*	*THEORY*			
				Credits	*Lectures*	*External*	*Internal*
Certificate Course	*B.Sc. II*	*MIN GEO-205*	**Elementary Mineralogy and petrology**	**3**	**45**	*40 Marks*	*35 Marks*
UNIT	*TOPIC*						*No.Of Lectures* **(45 hrs)**
Unit 1	**Introduction to Mineralogy** • Definition and characteristics of mineral, rock forming and ore minerals. • Introduction to Dana System of Mineral Classification. • Introduction to Gem minerals.						**15**
Unit 2	**Minerals Properties** • Physical properties of minerals including Isomorphism, Polymorphism, Pseudomorphism, Chatoyancy and Asterism. • Electrical properties of minerals.						**15**
Unit 3	**Introduction to petrology:** • Elementary study of Igneous, metamorphic and sedimentary rocks • Origin and major characteristics of different types of rocks • Rock Cycle.						**15**

Suggested readings

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SEMESTER II:

Paper MIN GEO-206-P Elementary Mineralogy and petrology

Practical/ Lab course (Course code: MIN GEO206-P)

Credit: 1

Course Outcome

After the completion of the course the students will be able to:

1. Student will get basic understanding of formation and classification of minerals.
2. It will help them understand and develop skills for identifying minerals in hand specimen.
3. Learn observational skills in lab as well as field and demonstrate the same in journals and exams.
4. At first year basic level, they will learn the preparation of brief reports of their observations in field.

DISCIPLINE SPECIFIC CORE COURSE						
COURSE	***SEMESTER***	***COURSE CODE***	***COURSE TITLE***	***PRACTICAL***		
				Credits	***Lectures***	***INTERNAL/ External***
Certificate Course	**B.SC**	***MIN* GEO-206-P**	**Elementary Mineralogy and petrology**	**1**	**30 hrs**	***25 (15+10) Marks***

- Study of Mineral classification
- 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, Beryl, Garnet, Epidote, Chlorite, Asbestoses, Hornblende, Augite, Tourmaline, Olivine, Halite, Aragonite, Hypersthene.
- Study of types of clay.

Field Report/ Submission

SEMESTER 2:
Paper MDC GEO-207: Elementary Crystallography, Mineralogy and petrology
(Course code: MDC GEO-207) Credit: 3

DISCIPLINE SPECIFIC CORE COURSES (MAJOR)							
COURSE	*SEMESTER*	*COURSE CODE*	*COURSE TITLE*	*THEORY*			
				Credits	*Lectures*	*External*	*Internal*
Certificate Course	*B.Sc. II*	*MDC GEO-207*	**Elementary Mineralogy and petrology**	**3**	**45**	*40 Marks*	*35 Marks*
UNIT	*TOPIC*						*No.Of Lectures* **(45 hrs)**
Unit 1	**Introduction to Mineralogy** • Definition and characteristics of mineral, rock forming and ore minerals. • Introduction to Dana System of Mineral Classification. • Introduction to Gem minerals.						**15**
Unit 2	**Minerals Properties** • Physical properties of minerals including Isomorphism, Polymorphism, Pseudomorphism, Chatoyancy and Asterism. • Electrical properties of minerals.						**15**
Unit 3	**Introduction to petrology:** • Elementary study of Igneous, metamorphic and sedimentary rocks • Origin and major characteristics of different types of rocks • Rock Cycle.						**15**

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SEMESTER II:

Paper MED GEO-208-P Elementary Mineralogy and petrology

Practical/ Lab course (Course code: MDC GEO208-P)

Credit: 1

Course Outcome

After the completion of the course the students will be able to:

1. Student will get basic understanding of formation and classification of minerals.
2. It will help them understand and develop skills for identifying minerals in hand specimen.
3. Learn observational skills in lab as well as field and demonstrate the same in journals and exams.
4. At first year basic level, they will learn the preparation of brief reports of their observations in field.

DISCIPLINE SPECIFIC CORE COURSE						
COURSE	***SEMESTER***	***COURSE CODE***	***COURSE TITLE***	***PRACTICAL***		
				Credits	***Lectures***	***INTERNAL/ External***
Certificate Course	**B.SC**	***MDC* GEO-208-P**	**Elementary Mineralogy and petrology**	**1**	**30 hrs**	***25 (15+10) Marks***

- Study of Mineral classification
- 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, Beryl, Garnet, Epidote, Chlorite, Asbestoses, Hornblende, Augite, Tourmaline, Olivine, Halite, Aragonite, Hypersthene.
- Study of types of clay.

Field Report/ Submission

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SEMESTER 2

Course Title: Elementary Crystallography, Mineralogy and petrology

SKELETAL STRUCTURE OF INTERNAL PRACTICAL-*GEO-P-202*

Total Marks: 25 (15 internal + 10 External)

Instructions: Strictly follow the instructions given by examiner(s).	marks
1. **Classify the mineral specimen according to mineral group.**	**As per mineral asked**
2. **Identify the Mineral specimen megascopically using physical properties in Group no. __ to ____.**	**--do--**
3. **Give the chemical composition, crystal system, origin and at least two uses**	**--do--**
4. **Journal submission/field reports and Viva-voce**	**5 marks**

Note: Certified journal will be compulsory for University Practical Examination.

- Excursion/ Project work/ Visit/ Tour/ report and submission of specimens / Charts/ Model/ Fresh Material/ other activity (Given by teacher or as a part of Syllabus) will be mandatory for all the students.