SHIVAJI UNIVERSITY, KOLHAPUR

NATIONAL EDUCATION POLICY (NEP-2020)

SYLLABUS WITH EFFECT FROM JUNE 2023

Bachelor of Science in Geology

A) BASIC INFORMATION

ORDINANCE AND REGULATIONS:-as applicable to Under-Graduate Degree / Program

1. **TITLE :** Subject Geology
   Optional under the Faculty of Science

2. **YEAR OF IMPLEMENTATION**: Revised Syllabus will be implemented from August 2023 onwards.

3. PREAMBLE:-

The revised syllabus includes the foundation, core and applied components of the course/paper. The student should get into the prime objectives and expected level of study with required outcome in terms of basic and advance knowledge at examination level.

4. GENERAL OBJECTIVES OF THE COURSE/ PAPER/:

The course is structured with a view to impart basic as well as advance knowledge of the subject to the students in the light of the present day scenario in earth science.

5. DURATION

- The course shall be a full time course.

6. PATTERN:-

Pattern of Examination will be Semester pattern for Theory papers.. Practical Examination will be on yearly Pattern.

7. ELIGIBILITY FOR ADMISSION :-

As per eligibility criteria prescribed for each course and the merit list in the qualifying examination.

8. MEDIUM OF INSTRUCTION:

The medium of instruction shall be English.

9. STRUCTURE OF COURSE

Model Programme Structure for 3 yrs Bachelor of Science with MEME Options (160 Credits)

Level	SEM	Discipline Specific Core Courses (DSC) (L + P) (Credits)		Discipline Specific Elective Courses (DSE) (L+P) (Credits)		Ability Enhancement Compulsory Courses(AECC) (L+P) (Credits)	Skill Enhancement Courses (SEC) (L+P)	Total Credits
5	I	C1 (DSC1+DSC2)	4 + 2 = 6			AECC-1 English for Communication (4)	SEC-1 (VBC-1) (Democracy, Election & Good Governance) (2)	30
		C2 (DSC1+DSC2)	4 + 2 = 6					
		C3 (DSC1+DSC2)	4 + 2 = 6					
		C4 (DSC1+DSC2)	4 + 2 = 6					
		Total	24					
	II	C5 (DSC3+DSC4)	4 + 2 = 6			AECC-2 English for Communication (4)	SEC-2 (VBC-2) (Constitution of India & Local Self Government) (2)	30
		C6 (DSC3+DSC4)	4 + 2 = 6					
		C7 (DSC3+DSC4)	4 + 2 = 6					
		C8 (DSC3+DSC4)	4 + 2 = 6					
		Total	24					
Exit Option 1 (Level5) : Exit with Certificate Course in Science (with the completion of courses equal to minimum of 60 credits)								

Level	SEM	Discipline Specific Core Courses (DSC) (L + P) (Credits)		Discipline Specific Elective Courses (DSE) (L+P) (Credits)		Ability Enhancement Compulsory Courses(AECC) (L+P) (Credits)	Skill Enhancement Courses (SEC) (L+P)	Total Credits
6	III	C9 (DSC5+DSC6)	4 + 4 = 8			AECC-3 Env. Studies (Theory + Project) (2)	SEC-3 Multidisciplinary (2)	28
		C10 (DSC5+DSC6)	4 + 4 = 8					
		C11 (DSC5+DSC6)	4 + 4 = 8					
		Total	24					
	IV	C12 (DSC7+DSC8)	4 + 4 = 8			AECC-4 Env. Studies (Theory + Project) (2)	SEC-4 Multidisciplinary (2)	28
		C13 (DSC7+DSC8)	4 + 4 = 8					
		C14 (DSC7+DSC8)	4 + 4 = 8					
		Total	24					
Exit Option 2 (Level 6) : Exit with Diploma in Science (with the completion of courses equal to minimum of 116 credits)								

Level	SEM	Discipline Specific Core Courses (DSC) (L + P) (Credits)		Discipline Specific Elective Courses (DSE) (L+P) (Credits)		Ability Enhancement Compulsory Courses(AECC) (L+P) (Credits)	Skill Enhancement Courses (SEC) (L+P)	Total Credits
7	**V**			DSE 1	2 + 2 = 4	AECC-1 English for Communication (4)	SEC-5 Multidisciplinary (2)	22
				DSE 2	2 + 2 = 4			
				DSE 3	2 + 2 = 4			
				DSE 4	2 + 2 = 4			
				Total	16			
	VI			DSE 1	2 + 2 = 4	AECC-2 English for Communication (4)	SEC-6 Multidisciplinary (2)	22
				DSE 2	2 + 2 = 4			
				DSE 3	2 + 2 = 4			
				DSE 4	2 + 2 = 4			
				Total	16			
Exit Option 3 (Level 7) : Exit with three years Bachelor of Science (with the completion of courses equal to minimum of 160 credits) OR Continue studiesfor Bachelor of Science with (Honours / Research) four years Degree Programme)								

Fourth Year OR Level – 8

Level	SEM	Discipline Specific Core Courses (DSC) (L + P) (Credits)		Discipline Specific Elective Courses (DSE) (L+P) (Credits)		Ability Enhancement Compulsory Courses(AECC) (L+P) (Credits)	Skill Enhancement Courses (SEC) (L+P)	Total Credits
8	**VII**						SEC-7 Multidisciplinary (2)	20
	VIII						SEC-8 Multidisciplinary (2)	20
Exit Option 4 (Level 8) : Exit with four years Bachelor of Science (Honors / Research) (With the completion of courses equal to minimum of 200 credits)								

Note:

1. For First Year Semester - I, students have to select any four DSC courses available at their respective colleges. Same four courses they have to continue for Semester - II.

2. For Second Year Semester - III, students have to select any three out of four DSC courses selected for first year. Same three courses they have to continue for Semester - IV.
3. For Third Year Semester– V, students have to select any one DSC course out of three DSC courses selected for second year. Same course they have to continue for Semester - VI.

4. For semesters V&VI there shall be Four DSE courses (papers) for each semester.

5. The DSC courses from C1 to C14 each have two papers of 50 marks each with combined passing i.e. minimum 35 marks are required to pass out of 100 marks.

a) Each DSC Course from C1 to C14 shall have two paper of 50 marks (40 marks semester end examination +10 marks internal assessment) with separate passing

b) The examination of each AECC Course shall be of 50 marks (40 marks semester end examination +10 marks internal assessment)

c) Minimum marks for passing DSC and AECC Courses shall be as follows. 1. 14 Marks out of 40 Marks for semester end examination. 2. 4 marks out of 10 marks for internal assessment.

d) For SEC-1 and SEC-2 courses there shall be semester end examination of 50 marks whereas minimum marks required for passing these courses shall be 18. The question paper of these courses shall consist of 25 MCQs of 2 marks each.

6. For DSE courses (papers) of Semesters V & VI, there shall be separate passing.

7. Students can exit after Level 5 with Certificate Course in Science (with the completion of courses equal to minimum of 60 credits).

8. Students can exit after Level 6 with Diploma in Science (with the completion of courses equal to minimum of 116 credits).

9. Students can exit after Level 7 with Bachelor of Science (with the completion of courses equal to minimum of 160credits).

10. SEC: Skill Enhancement Courses (2 credits). Students have to select one SEC for each semester from the pool of courses available at their respective colleges

11. VBC: Value Based Courses (1 credit). Students have to study one VBC from Bahai Academy for first semester only.

12. Examination of AECC-3 (Env. Studies) (4 credits) will take place at the end of Semester-IV

FIRST YEAR Geology Semester I and II

Sr. No.	Subjects	Marks(Credits)
1.	DSC 21A: Physical Geology	Marks: 50 (Credits: 2)
2.	DSC 22A: Structural Geology	Marks: 50 (Credits: 2)
3.	DSC 21B: Crystallography	Marks: 50 (Credits: 2)
4.	DSC 22B: Mineralogy	Marks: 50 (Credits: 2)
	DSC A and DSC B Lab Course	Marks: 50 (Credits: 2)
	Total	Marks:250 (Credits: 10)

SECOND YEAR Geology Semester III and IV

Sr. No.	Subjects	Marks(Credits)
1.	DSC 21C: Igneous Petrology	Marks: 50 (Credits: 2)
2.	DSC 22C: Sedimentary and Metamorphic Petrology	Marks: 50 (Credits: 2)

3.	DSC 21D: Stratigraphy	Marks: 50 (Credits: 2)
4.	DSC 22D: Palaeontology	Marks: 50 (Credits: 2)
	DSC C and DSC D Lab Course	Marks: 100 (Credits: 4)
	Total	Marks:300 (Credits: 12)

THIRD YEAR Geology Semester V and VI (NO.OF PAPERS- 8)

Semester V

Sr. No.	Subjects	Marks(Credits)
1.	DSE 41E: Economic Geology	Marks: 50 (Credits: 2)
2.	DSE 42E: Hydrogeology	Marks: 50 (Credits: 2)
3.	DSE 43E: Applied Geology-Engineering Geology	Marks: 50 (Credits: 2)
4.	DSE 44E: Applied Geology-Prospecting and Mining Geology	Marks: 50 (Credits: 2)
	DSE E Lab Course	Marks: 100 (Credits: 4)
	Total	Marks:300 (Credits: 12)

Semester VI

Sr. No.	Subjects	Marks(Credits)
1.	DSE 41F: Photogeology and Remote Sensing	Marks: 50 (Credits: 2)
2.	DSE 42F: Geomorphology and Geotectonics	Marks: 50 (Credits: 2)
3.	DSE 43F: Environmental Geology	Marks: 50 (Credits: 2)
4.	DSE 44F: Geochemistry	Marks: 50 (Credits: 2)
	DSE F Lab Course	Marks: 100 (Credits: 4)
	Total	Marks:300 (Credits: 12)

10. SCHEME OF EXAMINATION :-

• Question Paper will be set in the view of the /in accordance with the entire Syllabus and preferably covering each unit of syllabi.

11. STANDARD OF PASSING:-

As Prescribed under rules & regulation for each degree/programme of Shivaji University, Kolhapur.

12. EXAMINATION SCHEME

Theory: Theory examination will be conducted at the end of each semester.

Paper: Duration: 2 Hrs. Marks: 50. Minimum for passing: 35%.

Practical: Practical Examination will be conducted annually towards the end of Second Term of every Academic year.

Duration: 1 Day (6 Hours approx.). Marks: 50. Minimum for passing: 35%.

B.Sc. Part II

SUBJECT : GEOLOGY

Semester – III

DSC-C Theory Course

DSC 21C: IGNEOUS PETROLOGY Marks 50(02 Credits)

Unit-I: (15 Hours) (18-19 lectures)

Magma: definition, composition, types and origin; Forms of igneous rocks - Concordant and Discordant forms; textures of igneous rocks – Porphyritic, Poikilitic, Ophitic, Graphic, Trachytic, Xenolithic, Spherulitic, Perthitic and Reaction rims (9 hours)

Differentiation – Liquid Immiscibility, Gravitational Differentiation, Filtration Differentiation; Role of volatiles in Differentiation (3 hours)

Assimilation – Reactions between Basaltic magma and acidic igneous rocks; Basaltic magma and Sedimentary rocks; Reactions with Granitic magma and basic igneous rocks; Granitic magma and Sedimentary rocks; Bowen's Reaction Series (3 hours)

Unit-II: **(15 Hours) (18-19 lectures)**

Classification of igneous rocks based on i. Mode of Occurrence, ii. Silica Percentage, iii. Colour Index iv. Feldspar Content v. Silica Saturation vi. Alumina Saturation (2 hours)

Crystallization of unicomponent magma – Augite (2 hours)

Crystallisation of Bicomponent magma (two independent components) – Diopside – Anorthite system (3 hours)

Crystallisation of Bicomponent magma (mixed crystals) – Albite-Anorthite system (4 hours)

Crystallisation of Ternary magma – Diopside – Albite – Anorthite system (4 hours)

DSC 22C: SEDIMENTARY AND METAMORPHIC PETROLOGY Marks 50(02 Credits)

Unit-I: (15 Hours) (18-19 lectures)

Processes of formation of sedimentary rocks- Residual deposits, Sedimentary Deposits, Chemical deposits, Organic deposits; (6 hours)

Textures based on grain size, sorting, shape and roundness; (3 hours)
Structures of sedimentary rocks – Primary and secondary; (3 hours)
Depositional Environments – Continental, Transitional, Marine; Provenance (3 hours)

Unit-II: (15 Hours) (18-19 lectures)

Definition of metamorphism; Agents of metamorphism; (1 hour)
Types of metamorphism – Thermal, Cataclastic, Dynamothermal and Plutonic Metamorphism; (9 hours)
Zones and grades of metamorphism; Outline of Facies of Metamorphism (2 hours)
Textures and structures of metamorphic rocks. (3 hours)

DSC C- LAB COURSE

Teaching : 15 Practical turns – each of 3,2 hours (4 lectures of 48 minutes)

Marks 50 (02 Credits)

IGNEOUS, SEDIMENTARY AND METAMORPHIC PETROLOGY

Section I

• **Igneous Petrology:**

- Identification of rocks: On the basis of their physical properties in hand specimen; and optical properties in thin sections.

- Textures and Structures of igneous rocks : Megascopic and Microscopic

Section II

• **Sedimentary and metamorphic Petrology:**

- Identification of sedimentary and metamorphic rocks both in hand specimen and optical properties in thin sections.

- Textures and Structures of sedimentary and metamorphic rocks : Megascopic and Microscopic

Books Recommended:

1. Turner, F.J. & Verhoogen, J., , Igneous & Metamorphic petrology. McGraw Hill Co.
2. Bose, M.K., . Igneous petrology. World press
3. Tyrell, G. W.,. Principles of Petrology. Methuren and Co (Students ed.).
4. Ehlers, WG, and Blatt, H.,. Petrology, Igneous, Sedimentary and Metamorphic rocks, CBS Publishers

5. Moorhouse, WW.,. The study of rocks in thin sections. Harper and sons.
6. Friedman & Sanders,. Principles of Sedimentology. John Wiley and sons.
7. Pettijohn, F.J.,. Sedimentary rocks, Harper & Bros. 3rd Ed.
8. Prasad, C.,. A text book of sedimentology.
9. Sengupta. S.,. Introduction to sedimentology. Oxford-IBH.
10. Turner, F.J.,. Metamorphic petrology. McGraw Hill.
11. Mason, R.,. Petrology of Metamorphic Rocks. CBS Publ.
12. Winkler, H.G.C.,. Petrogenesis of Metamorphic Rocks. Narosa Publ.

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SYLLABUS WITH EFFECT FROM AUGUST 2023

B.Sc. Part II

SUBJECT : GEOLOGY

Semester – IV

DSC-D Theory Course

DSC 21D: STRATIGRAPHY Marks 50(02 Credits)

Unit I: (15 Hours) (18-19 lectures)

Definition, Principle of stratigraphy- stratigraphic correlation, Concepts of Uniformitarianism and catastrophism; (3 hours)

Geological Time Scale and stratigraphic classification; Physiographic division of India. (3 hours)

Study of following Precambrian succession: Dharwar, Cuddapah, Vindhyan and Delhi Supergroups; (9 hours)

Unit II : (15 Hours) (18-19 lectures)

Brief idea of Palaeozoic succession of northwestern Himalaya; (5 hours)

Brief idea of Mesozoic succession : Triassic of Spiti; Jurrasic of Kutch; Cretaceous of Tiruchirapalli; (5 hours)

Study of following type localities: Gondwana with flora and fauna ; Deccan Volcanic Province

(5 hours)

DSC 22D: PALAEONTOLOGY Marks 50(02 Credits)

Unit-I: **(15 Hours) (18-19 lectures)**
Palaeontology: Definition, Fossils: definition, characters, binomial nomenclature in Taxonomy, mode of preservation, condition of fossilization and significance of fossils; (5 hours)
Morphology, geological distribution and age of Brachiopods, Pelecypods, Cephalopods. (10 hours)

Unit II: (15 Hours) (18-19 lectures)
Morphology, geological distribution and age of Trilobite, Echinoidea. (4 hours)
Microfossils – Introduction; Foraminifera and its significance (3 hours)
Vertebrate Palaeontology – Introduction; Evolution of Horse, Elephant and Man. (5 hours)
Plant Fossils – Morphology, Distribution and age of Ptilophyllum, Glossopteris and Gangmopteris (3 hours)

DSC D- LAB COURSE

Teaching: 15 Practical turns – each of 3, 2 hours (4 lectures of 48 minutes)
Marks 50 (02 Credits)

STRATIGRAPHY AND PALAEONTOLOGY

I. Morphological characters, systematic position and age of fossil genera pertaining to brachiopods, pelecypods, cephalopods, trilobite and Echinoidea.
II. Preparation of lithostratigraphic maps of India showing distribution of important geological formations.

Books Recommended:

1. Wadia, D.,. Geology of India. Mc Graw Hill Book co.
2. Krishnan, M.S.,. Geology of India and Burma, 6th Edition. CBS Publ.
3. Ravindra Kumar,. Fundamentals of Historical Geology & Stratigraphy of India. Wiley Eastern.
4. Shrock, R.R. & Twenhoffel, W.H.,. Principles of Invertebrate Paleontology. CBS Publ.
5. Swinerton, HH.,. Outlines of Paleontology. Edward Arnold Publishers
6. Jain, P.C. & Anantharaman, M.S.,. Paleontology: Evolution & Animal Distribution. Vishal Publ.
7. Lehmann, U.,. Fossil Invertebrate. Cambridge Univ. Press.
8. Rastogi,. Organic evolution. Kedrnath and Ramnath Publ.