

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU/B.Sc./08/2022

It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies and Ad-hoc Boards with recommendation of the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following syllabi of Bachelor of Science with Regulation under the scheme of Choice Based Credit & Grading System** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Courses	Semester
1.	B.Sc.Electronics(Optional)	Ist and IInd semester (First Year)
2.	B.A./B.Sc.Mathematics(Optional)	Ist and IInd semester (First Year)
3.	B.Sc.Chemistry(Optional)	Ist and IInd semester (First Year)
4.	B.Sc.Physics(Optional)	Ist and IInd semester (First Year)
5.	B.Sc.Analytical Chemistry	Ist and IInd semester (First Year)
6.	B.Sc.Geology (Optional)	Ist to VIth semester (First to Third)

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.

REF.NO.SU/2022/ 6852-62

Date:- 10.08.2022.

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*Deputy Registrar,
Academic Section*

Copy forwarded with compliments to :-

- 1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] **The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.**
- 2] The Section Officer,[B.Sc.Unit] Examination Branch,Dr.BAMU,A'bad.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
- 6] The Public Relation Officer, Dr.BAMU,A'bad.
- 7] The Record Keeper, Dr.BAMU,A'bad.

Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)



Undergraduate Bachelor Degree Program in Science (B. Sc.)

GEOLOGY (Optional Subject)

**Course Structure and Curriculum
(Outcome based Curriculum)
Choice based Credit System
(Effective from Academic Year 2022-23)**

Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)

Dean
Faculty of Science & Technology
Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad

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1. Preamble

2. Geology is one of the major subjects of Earth Sciences and deals with all aspects of the liquid and solid Earth, the rocks of which it is composed, and the processes by which they change over time. It includes an interesting range of highly diverse topics. A geology student needs to gain understanding of many areas of the subject to keep pace with advancements in Earth Sciences.
3. This under-graduate degree program has been designed by the Board of Studies in Geology of Dr.BabasahebAmbedkarMarathwada University with a substantial component of what is needed from a geologist as a skilled career and what geologists needs to pursue for post-graduation and further academic studies. It follows the guidelines laid down by the University Grants Commission, New Delhi. This newly designed curriculum is a perfect blend of the classical aspects in Geology with the advanced and more specialized areas.
4. This degree offers Discipline Specific Core Courses [CC] in Biogeology, Economic geology, Environmental geology, Geochemistry, Geologic modelling, Geomorphology, Geophysics, Historical geology, Hydrogeology, Marine geology, Mineralogy, Mining geology, Paleontology, Petroleum geology, Petrology, Sedimentology, Stratigraphy, Structural geology and Volcanology.
5. In addition to the Core Courses, Ability Enhancement Compulsory Courses [AECC] have been added in the second year i.e. Semester III and Semester IV of the undergraduate course. In the third year i.e. Semester V and Semester VI, Discipline specific Elective Courses [DSEC] and Skill Enhancement Courses [SEC] have been offered. The students, therefore, have an opportunity to take courses in Environment Awareness, Language & communication, English / Marathi, Environmental Impact Assessment. In Semester VI the students also have a course dedicated to Project work.
6. The syllabus has been framed in such a way that the student gains each year, a broader perspective of the subject as he/ she progresses towards completion of the degree program. Field visits, Educational visits and the Project work have been included for the student to experience the applications of the theory learnt in the classroom.
7. After completion of the program, it is expected that students will understand and appreciate: Earth sciences, few applications of Geology, the structure, functions and geological processes, timescale, interior processes and system levels, significance of geology, and further basic concepts of earth sciences. The students would also gain an insight into laboratory and field work through the practical course, field work and the project.
8. While presenting this new syllabus to the teachers and students of T. Y. B. Sc. Geology, I am extremely happy to state that efforts have been made to seek inputs of all the stake holders to make it more relevant.
9. The new course will be effective from the academic year 2022- 2023 and will follow the Choice Based Credit System in a Semester mode. It has been primed keeping in view the distinctive requirements of B. Sc. Geology students. The contents have been drawn-up to accommodate the widening prospects of the discipline of Earth Sciences. They reflect the changing pre requisites of the students. This graduate

program has been introduced with 149 credits. This pattern has been specially aimed towards the overall development of the students.

10. The calculation of credits and CGPA will be as per the guidelines of the University. The B. Sc. Geology program provides an appropriate blend of classical and applied aspects of the subject. This newly designed curriculum will allow students to acquire the skill in handling scientific instruments planning and performing in the laboratory and exercising critical judgement, independent thinking and problem solving skills. The Syllabus has been revised with the following aims -

- ☐ To foster curiosity in the students for Geology,
- ☐ To create awareness amongst students for the basic and applied areas of Geology,
- ☐ To provide an insight to the aspects of Geology,
- ☐ To inculcate good laboratory and field practices in students.

11. Structure And Curriculum For
Bachelor Of Science (B. Sc.) **Geology**(Optional Subject)
(Choice Based Credit System)

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad**

Choice Based Credit System (CBCS) Curriculum
For

Faculty Of Science And Technology
Course Structure And Scheme Of Examination
B.Sc. Three Year Undergraduate Degree Program

Semester I

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1A) Core courses	GEO-111	Core Course (Theory Paper-I)	2 hours	2	50	10	40	20
	GEO-112	Core Course (Theory Paper-II)	2 hours	2	50	10	40	20
	GEO-121	Lab Course I (based on GEO-111 and GEO-112)	3 hours	1.5	50	10	40	20
Ability Enhancement Compulsory Course (AECC-1)	GEO-131	Communication skills in English-I	3 hours	3	50	10	40	20
	GEO-132	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-I)	3 hours	3	50	10	40	20
Non-Credit Course/Additional Credits	GEO-113	Environmental Studies	2 hours	2*				
			15	11.5	250	50	200	100

Total Credits for Semester I : 11.5 (Theory : 10 : Laboratory : 1.5)

Semester II

[illegible]

Semester III

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1C) Core courses	GEO-311	Core Course (Theory Paper-V)	2 hours	2	50	10	40	20
	GEO-312	Core Course (Theory Paper-VI)	2 hours	2	50	10	40	20
	GEO-321	Lab Course 3 (based on GEO-311)	3 hours	1.5	50	10	40	20
	GEO-322	Lab Course 4 (based on GEO-312)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-1)	GEO-313	SEC-1 Any one skill to be chosen out of two SEC-1(A) SEC-1 (B)	2 hours	2	50	10	40	20
	GEO-331	Communication skills in English-III	3 hours	3	50	10	40	20
Ability Enhancement Compulsory Course (AECC-3)	GEO-332	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-III)	3 hours	3	50	10	40	20
Additional Credits		Computer ability	2 hours	2*	50	10	40	20
			18	15	350	70	200	140

Total Credits for Semester III : 15 (Theory : 12 : Laboratory : 3)	
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Semester IV

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core courses	GEO-411	Core Course (Theory Paper-VII)	2 hours	2	50	10	40	20
	GEO-412	Core Course (Theory Paper-VIII)	2 hours	2	50	10	40	20
	GEO-421	Lab Course 5 (based on GEO-411)	3 hours	1.5	50	10	40	20
	GEO-422	Lab Course 6 (based on GEO-412)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-2)	GEO-413	SEC-2 Any one skill to be chosen out of two SEC-2(C) SEC-2 (D)	2 hours	2	50	10	40	20
Ability Enhancement Compulsory Course (AECC-4)	GEO-431	Communication skills in English-IV	3 hours	3	50	10	40	20
	GEO-432	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-IV)	3 hours	3	50	10	40	20
Additional Credits		Computer ability	2 hours	2*	50	10	40	20
			18	15	350	70	280	140

Total Credits for Semester IV : 15 (Theory : 12 : Laboratory : 3)

Semester V

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1A) Discipline Specific Elective	GEO-511	DSE – 1A(1)(Theory Paper-IX) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	GEO-512	DSE – 1A(2)(Theory Paper-X) (Select any one paper from A2/B2/C2/D2)	2 hours	2	50	10	40	20
	GEO-521	Lab Course 7 (based on GEO-511)	3 hours	1.5	50	10	40	20
	GEO-522	Lab Course 8 (based on GEO-512)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-3)	GEO-513	SEC-3 Any one skill to be chosen out of two SEC-3(E) SEC-3 (F)	2 hours	2	50	10	40	20
None Credit Course	GEO-514	Professional Ethics and Moral Values	2 hours					
			14	9	250	50	200	100

Total Credits for Semester V : 9 (Theory : 06 : Laboratory : 03)

Semester VI

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1B) Discipline Specific Elective	GEO-611	DSE – 1B (1)(Theory Paper-XI) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	GEO-612	DSE – 1B(2)(Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	2 hours	2	50	10	40	20
	GEO-621	Lab Course 9 (based on GEO-611)	3 hours	1.5	50	10	40	20
	GEO-622	Lab Course 10 (based on GEO-612)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-4)	GEO-613	SEC-4 Any one skill to be chosen out of two SEC-4(G) SEC-4 (H)	2 hours	2	50	10	40	20
			15	9	250	50	200	100

Total Credits for Semester VI : 9 (Theory : 06 : Laboratory : 03)

Total Credits for three years : Sem I (11.5) + Sem II (11.5) + Sem III (15) + Sem IV (15) + Sem V (09) + Sem VI (09)
= 71 Credits

3. Vision

To create and maintain an environment for students to explore the understanding of earth science.

4. Mission

- a) To provide knowledge to the students about the natural resources which are on the verge of getting extinguished.
- b) To provide practical and theoretical learning in earth sciences.
- c) To develop practices in the field of earth sciences.
- d) To encourage students to enhance knowledge in earth sciences to solve problems of society.

5. Program Educational Objectives:

To produce well-trained, competent, academic and professional geologist capable of responding to societal needs.

6. Programme Outcomes (POs) and Programme Specific Outcomes:

- ♦ To have knowledge in the science of Geology, Earth History, Stratigraphy Structural Geology, Land forms etc.
- ♦ To Know the geologic time scale and evolution of life.
- ♦ Interpret topographic maps and terrain models and create profiles
- ♦ Knowledge to interpret geologic maps and construct cross sections from them.
- ♦ Knowledge to interpret types of surface deposits and landforms.
- ♦ Knowledge to carry out geophysical measurements of subsurface properties
- ❖ To make them employable as professional Geologist and benefit the society and nation.

7. Eligibility : XII Science Passs

8. Duration: 03 Years

9. Medium of Instructions : English

10. Choice Based Credit System (CBCS) and Credit-to-contact hour Mapping:990 hour for 149 credits. For Whole year

11. Attendance : Regular 75%

12. Evaluation Methods/ Scheme of Examination, Earning Credits, Grading System

13. Curriculum for Semester I: Attached with separate sheet

14. Curriculum for Semester II: Attached with separate sheet

15. Curriculum for Semester III: Attached with separate sheet

16. Curriculum for Semester IV : Attached with separate sheet

17. Curriculum for Semester V: Attached with separate sheet

18. Curriculum for Semester VI: Attached with separate sheet

Template for the designing curriculum of various courses/ papers

Course code and course Title

Total Credits : 02

Contact Hours : 30 (Clock Hours)

Marks : 50

Periods: 45 (45 minutes each)

Learning Objectives of the Course:

- ❖ Learn, design and perform experiments in the labs to demonstrate the concepts, principles and theories learned in the classrooms.
- ❖ Develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and applied Geology.
- ❖ Expose the student to the vast scope of Geosciences as a theoretical and experimental science with applications in solving most of the geogenic problems in nature spanning from disaster management, watershed management, water pollution, oil exploration and mining, etc.

Learning Outcomes of the Course

The student graduating with the Degree B. Sc. Geology should be able to Acquire a fundamental/systematic understanding of the academic field of Geology, its different learning areas and applications in basic Geology like Mineralogy, Petrology, Stratigraphy, Palaeontology, Economic geology, Hydrogeology, etc. and its linkages with related interdisciplinary areas/subjects like Geography, Environmental sciences, Physics, chemistry, Mathematics, Life sciences, Atmospheric sciences, Remote Sensing, Computer science, Information technology.

Unit I : 10 Periods

Unit II : 10 Periods

Unit III : 10 Periods

Unit IV : 10 Periods

Unit V : Tutorials, seminars and Assignments (05 periods)

References:

Dr. Babasaheb Ambedkar Marathwada University,

Aurangabad

Choice Based Credit System (CBCS) Curriculum

For

Faculty Of Science And Technology

Course Structure And Scheme Of Examination

B.Sc. Three Year Undergraduate Degree Program

Semester I

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1A) Core courses	GEO-111	Core Course (Theory Paper-I)	2 hours	2	50	10	40	20
	GEO-112	Core Course (Theory Paper-II)	2 hours	2	50	10	40	20
	GEO-121	Lab Course I (based on GEO-111 and GEO-112)	3 hours	1.5	50	10	40	20
Optional I (DSC-1A) Core courses	GEO-111	Core Course (Theory Paper-I)	2 hours	2	50	10	40	20
	GEO-112	Core Course (Theory Paper-II)	2 hours	2	50	10	40	20
	GEO-121	Lab Course I (based on GEO-111 and GEO-112)	3 hours	1.5	50	10	40	20
Optional III (DSC-3A) Core courses	GEO-111	Core Course (Theory Paper-I)	2 hours	2	50	10	40	20
	GEO-112	Core Course (Theory Paper-II)	2 hours	2	50	10	40	20
	GEO-121	Lab Course I (based on GEO-111 and GEO-112)	3 hours	1.5	50	10	40	20
Ability Enhancement Compulsory Course (AECC-1)	GEO-131	Communication skills in English-I	3 hours	3	50	10	40	20
	GEO-132	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-I)	3 hours	3	50	10	40	20
Non-Credit Course/Additional Credits	GEO-113	Environmental Studies	2 hours	2	50	10	40	20
			29	22.5	550	110	440	

Total Credits for Semester I : 22.5 (Theory : 18 , Laboratory : 4.5)

Semester II

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1B) Core courses	GEO-211	Core Course (Theory Paper-III)	2 hours	2	50	10	40	20
	GEO-212	Core Course (Theory Paper-IV)	2 hours	2	50	10	40	20
	GEO-221	Lab Course 2 (based on GEO-211 and GEO-212)	3 hours	1.5	50	10	40	20
Optional II (DSC-2B) Core courses	GEO-211	Core Course (Theory Paper-III)	2 hours	2	50	10	40	20
	GEO-212	Core Course (Theory Paper-IV)	2 hours	2	50	10	40	20
	GEO-221	Lab Course 2 (based on GEO-211 and GEO-212)	3 hours	1.5	50	10	40	20
Optional III (DSC-3B) Core courses	GEO-211	Core Course (Theory Paper-III)	2 hours	2	50	10	40	20
	GEO-212	Core Course (Theory Paper-IV)	2 hours	2	50	10	40	20
	GEO-221	Lab Course 2 (based on GEO-211 and GEO-212)	3 hours	1.5	50	10	40	20
Ability Enhancement Compulsory Course (AECC-2)	GEO-231	Communication skills in English-II	3 hours	3	50	10	40	20
	GEO-232	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-II)	3 hours	3	50	10	40	20
Non-Credit Course	GEO-213	Constitution of India	2 hours	2*	50	10	40	20
Non-Credit Course/Additional Credits	GEO-214	Environmental Studies	2 hours	2*	50	10	40	20
			31	22.5	550	110	440	
Total Credits for Semester II : 22.5 (Theory : 18 : Laboratory : 4.5)								

Semester III

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1C) Core courses	GEO-311	Core Course (Theory Paper-V)	2 hours	2	50	10	40	20
	GEO-312	Core Course (Theory Paper-VI)	2 hours	2	50	10	40	20
	GEO-321	Lab Course 3 (based on GEO-311)	3 hours	1.5	50	10	40	20
	GEO-322	Lab Course 4 (based on GEO-312)	3 hours	1.5	50	10	40	20
Optional II (DSC-2C) Core courses	GEO-311	Core Course (Theory Paper-V)	2 hours	2	50	10	40	20
	GEO-312	Core Course (Theory Paper-VI)	2 hours	2	50	10	40	20
	GEO-321	Lab Course 3 (based on GEO-311)	3 hours	1.5	50	10	40	20
	GEO-322	Lab Course 4 (based on GEO-312)	3 hours	1.5	50	10	40	20
Optional III (DSC-3C) Core courses	GEO-311	Core Course (Theory Paper-V)	2 hours	2	50	10	40	20
	GEO-312	Core Course (Theory Paper-VI)	2 hours	2	50	10	40	20
	GEO-321	Lab Course 3 (based on GEO-311)	3 hours	1.5	50	10	40	20
	GEO-322	Lab Course 4 (based on GEO-312)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-1)	GEO-313	SEC-I Any one skill to be chosen out of two SEC-I(A) SEC-I (B)	2 hours	2	50	10	40	20
	GEO-331	Communication skills in English-III	3 hours	3	50	10	40	20
Ability Enhancement Compulsory Course (AECC-3)	GEO-332	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-III)	3 hours	3	50	10	40	20
Additional Credits		Computer ability	2 hours	2*	50	10	40	20
			38/	29	750	150	600	

Total Credits for Semester III : 29 (Theory : 20 : Laboratory : 9)

Semester IV

	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSC-1D) Core courses	GEO-411	Core Course (Theory Paper-VII)	2 hours	2	50	10	40	20
	GEO-412	Core Course (Theory Paper-VIII)	2 hours	2	50	10	40	20
	GEO-421	Lab Course 5 (based on GEO-411)	3 hours	1.5	50	10	40	20
	GEO-422	Lab Course 6 (based on GEO-412)	3 hours	1.5	50	10	40	20
Optional II (DSC-2D) Core courses	GEO-411	Core Course (Theory Paper-VII)	2 hours	2	50	10	40	20
	GEO-412	Core Course (Theory Paper-VIII)	2 hours	2	50	10	40	20
	GEO-421	Lab Course 5 (based on GEO-411)	3 hours	1.5	50	10	40	20
	GEO-422	Lab Course 6 (based on GEO-412)	3 hours	1.5	50	10	40	20
Optional III (DSC-3D) Core courses	GEO-411	Core Course (Theory Paper-VII)	2 hours	2	50	10	40	20
	GEO-412	Core Course (Theory Paper-VIII)	2 hours	2	50	10	40	20
	GEO-421	Lab Course 5 (based on GEO-411)	3 hours	1.5	50	10	40	20
	GEO-422	Lab Course 6 (based on GEO-412)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-2)	GEO-413	SEC-2 Any one skill to be chosen out of two SEC-2(C) SEC- 2 (D)	2 hours	2	50	10	40	20
Ability Enhancement Compulsory Course (AECC-4)	GEO-431	Communication skills in English-IV	3 hours	3	50	10	40	20
	GEO-432	Marathi/Hindi/Urdu/Sanskrit A student can opt for any one of these languages (SL-IV)	3 hours	3	50	10	40	20
Additional Credits		Computer ability	2 hours	2*	50	10	40	20
			38	29	750	150	600	

Total Credits for Semester IV : 29 (Theory : 20 : Laboratory : 9)

Semester V

[illegible]

Semester VI								
	Course Code	Course Title	Teaching Time/Week	Credits	Scheme Of Examination			
					Max Marks	CIA	UA	Min Marks
Optional I (DSE-1B) Discipline Specific Elective	GEO-611	DSE – 1B (1)(Theory Paper-XI) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	GEO-612	DSE – 1B(2) (Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	2 hours	2	50	10	40	20
	GEO-621	Lab Course 9 (based on GEO-611)	3 hours	1.5	50	10	40	20
	GEO-622	Lab Course 10 (based on GEO-612)	3 hours	1.5	50	10	40	20
Optional II (DSE-2B) Discipline Specific Elective	GEO-611	DSE – 1B (1)(Theory Paper-XI) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	GEO-612	DSE – 1B(2) (Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	2 hours	2	50	10	40	20
	GEO-621	Lab Course 9 (based on GEO-611)	3 hours	1.5	50	10	40	20
	GEO-622	Lab Course 10 (based on GEO-612)	3 hours	1.5	50	10	40	20
Optional III (DSE-3B) Discipline Specific Elective	GEO-611	DSE – 1B (1)(Theory Paper-XI) (Select any one paper from A1/B1/C1/D1)	2 hours	2	50	10	40	20
	GEO-612	DSE – 1B(2) (Theory Paper-XII) (Select any one paper from A2/B2/C2/D2)	2 hours	2	50	10	40	20
	GEO-621	Lab Course 9 (based on GEO-611)	3 hours	1.5	50	10	40	20
	GEO-622	Lab Course 10 (based on GEO-612)	3 hours	1.5	50	10	40	20
Skill Enhancement Course (SEC-4)	GEO-613	SEC-4 Any one skill to be chosen out of two SEC-4(G) SEC-4 (H)	2 hours	2	50	10	40	20
			32	23	650	130	520	
Total Credits for Semester VI : 23 (Theory : 14 : Laboratory : 09)								
Total Credits for three years : SemI (22.5) + Sem II (22.5) + Sem III (29) + Sem IV (29) + Sem V (23) + Sem VI (23) = 71 Credits								

Total Credits for three years : Sem I (22.5) + Sem II (22.5) + Sem III (29) + Sem IV (29) + Sem V (23) + Sem VI (23)
= 71 Credits

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)**



**Undergraduate Bachelor Degree Program in Science
(B. Sc.)**

GEOLOGY (Optional Subject)

**Syllabus of
B.SC. IST YEAR
GEOLOGY
SEMESTER-I & II
[**

(Effective from Academic Year 2022-23)

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)**

Course Structure

YEAR	SEMESTER	PAPER NUMBER	PAPER TITLE	Hours	MARKS
First	I	Paper – I 111	General Geology	45	50
	I	Paper – II 112	Mineralogy and Crystallography	45	50
	I	Paper 121	Lab Course 1	22	50
Second	II	Paper – III 211	Petrology and Structural Geology	45	50
	II	Paper – IV 212	Paleontology and Stratigraphy	45	50
	II	Paper 221	Lab Course 2	22	50
				224	300

Semester Ist
Subject Geology
Paper I: General Geology
Core Course (Theory Paper-I)
GEO-111

	Topics	Total Periods	Marks
UNIT I	Introduction: Definition, of geology, Its divisions, subdivisions and scope, Branches of geology and their importance Universe&Planet Earth Universe formation (Big Bang Theory)& formation of Earth (Nebular Hypothesis, Tidal, Planetesimal), Solar system. Earth: Its origin size, shape and density. Temperature, pressure and magnetism within the earth. Age of the Earth: A brief account of the historical methods. Determination of age by the K/Ar, C14 and U/Th methods The Earth's Atmosphere (various layers of atmospheres), Hydrosphere, Lithosphere and Biosphere. Earth's crust, mantle and core	10	10
UNIT II	Continental Drift& Plate Tectonic: Concept and evidence of plate Tectonics a Broad outline concept of sea floor spreading type of plate boundary and plate movement. Concept of Isostasy, theory of continental drift.	10	10
UNIT III	Weathering (Mechanical and chemical); erosion, denudation, soil formation and soil profile, & types of soils. The dynamics of erosional and depositional landforms resulting from the action of rivers, wind, and glaciers	10	10
UNIT IV	Earthquakes: Definition, terminology, causes, intensity and magnitude. Recording of earthquakes. Use of seismic waves in internal structure. Seismic Zones. History and susceptibility of the Indian subcontinent to earthquakes. Diastrophism , orogenic and epirogenic movements Mountains and their types Volcanoes: Genesis of volcanoes, Central and fissure type of eruptions. Products of volcanic, activity volcanic belts on the earth.	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Subject Geology
Semester Ist
Paper II: Mineralogy and Crystallography
Core Course (Theory Paper-II)
GEO-112

Sr. No	Topics	Total Periods	Marks
UNIT I	Mineralogy Introduction: Definition, branches and Scope of mineralogy, Importance and conservation of minerals. Formation of minerals: Introduction and description of geological processes of mineral formation Crystallizations from melt. Crystallization from Solution (Evaporation and precipitation) Crystallization from Vapour (Sublimation) Formation of minerals by Metamorphic processes. Placer Deposits.	10	10
UNIT II	Physical properties of minerals Colour, streak, luster, cleavage, fracture, hardness, form, magnetism, electrical property, radio activity, specific gravity & luminescence (phosphorescence and Fluorescence) Methods of determining specific gravity-Chemical balance, Walker's steelyard, Jolly's spring balance, pycno-meter.	10	10
UNIT III	Crystallography Definition and conditions conducive for the formation of crystals, crystal habits and aggregates. Crystal morphology-faces, forms, edges, solid angles, interfacial angle and its measurement by contact Goniometer, law of constancy of interfacial angle. Symmetry of crystals-Plane, axis and center of symmetry, Crystallographic and geometric symmetry. Crystallographic axes, lettering and order of crystallographic axes, parameters, axial ratio, indices, parameter system of Classification of crystals based on their elements of symmetry and	10	10
UNIT IV	Crystallographic axes. The study of following crystal systems: Orthorhombic (Type: Barytes) Tetragonal (Type: Zircon) Cubic (Type: Galena) Hexagonal (Type: Beryl) Monoclinic (Type: Gypsum) Triclinic (Type: Axinite) Comparative studies of all the six crystallographic systems	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester Ist
Subject Geology
Lab Course 1 (Practical)
GEO - 121

Sr. No	Topics	Total Periods	Marks
UNIT I	Mineralogy Physical properties of minerals colour, form, streak, luster, cleavage, fracture, hardness and specific gravity. Megascopic Identification of following mineral (with the help of physical properties) Quartz, Rock Crystal, Rose Quartz, Milky Quartz, Smoky quartz, Amethyst, Chalcedony, Agate, jasper, Flint, Opal, Orthoclase, Plagioclase, Biotite, Muscovite, Garnet, Olivine, Hornblende, Apophyllite, Stilbite, Kyanite, Talc, Calcite, Fluorite, Gypsum, Barytes, Magnetite, Haematite, Chromites, Chalcopryite, Galena, Pyrolusite, Bauxite, Graphite.	10	10
UNIT II	Experiment: To find out the specific gravity of minerals using Walker's Steel Yard. Geological Maps.	10	10
UNIT III	Toposheets: Reading of top sheets with reference to Toposheet number, Latitude and Longitude, State / District, Scale Adjacent toposheet numbers and conventional signs. Introduction to topographic and geological maps. Study of geomorphological models of , Volcano, Earth quake, Ox Bow lake, river meanders, deltas	10	10
UNIT IV	Crystallography: Study of elements of symmetry, crystallographic axes and forms with Miller indices in the crystal models belonging to the following crystal systems Orthorhombic System (Type: Baryte) Tetragonal System (Type: Zircon) Cubic system (Type: Galena). Hexagonal system (Type: Beryl) Monoclinic System (Gypsum) Triclinic System (Type: Axinite)	10	10
UNIT V	Field survey and collection of rock, mineral sample.	05	10

Semester IIInd
Subject Geology
Paper III: Petrology and Structural Geology
GEO - 211

Sr. No	Topics to be covered	Total Periods	Marks
UNIT I	PETROLOGY Definition and major divisions: Definitions of petrology, Lithology, petrography, petrogeneses Major divisions and diagnostic characteristic of rocks: igneous, sedimentary and metamorphic Rock cycle. Magma: Magma and its composition Pyrogenetic minerals Formation of crystals and glass Forms of Igneous bodies: Intrusive: Concordant and discordant intrusions Concordant: Sills, laccoliths, lopoliths, phaccoliths, Discordant: dykes, ring dykes, Cone sheets, Stock boss Conolith and Batholiths. Extrusive: lava flows, pahohoe' and 'aa' lava. Textures and Structures of Igneous rocks Textures, Definition and factors controlling textures: Equigranular (granitic), Inequigranular (porphyritic), glassy. Structures: Vesicular, amygdaloidal, blocky, pillow, flow and columnar Joints. Difference between textures and structures Classification of Igneous Rocks Basic of classification: Chemical, mineralogical, mode of occurrence, silica percentage and type of feldspar. Tabular classification. Description of the following igneous rocks: Plutonic: Granite, Syenite, Diorite, Gabbro, and Dunite. Hypabyssal: Pegmatite, Pitchstone, and Dolerite. Volcanic: Rhyolite, Pumice, Basalt, Trachyte, Andesite	10	10
UNIT II	SEDIMENTARY PETROLOGY Products of weathering Sediments, sedimentation, and formation of sedimentary rocks: denudation, transportation, deposition and lithification. Textures and structures of sedimentary rocks Clastic and non-Clastic textures Structures: Lamination, bedding , graded bedding and ripple marks. Description and classification of the following secondary rocks: Laterite and Bauxite, Breccia, Conglomerate, Sandstones, shales, Mudstone, Limestones, coral limestone.	10	10
UNIT III	METAMORPHIC PETROLOGY Definition of metamorphism, agents and kinds of metamorphism, Structure of metamorphic rocks: maculose, slaty cleavage, Schistose, Granulose, Gneissose. Types of metamorphic rocks Texture of Metamorphic rock and description of following rocks.	10	10

UNIT IV	Structural Geology: Definition of outcrop, outlier and inliers, identification of bedding order of superposition. Attitude of beds,(strike and dip) contour map and its preparation . Fold, definition, part of fold, type of fold, causes of fold Joints, definition, type of joints and general characteristic of joints. Fault, definition, terminology, types of fault, causes of fault. Unconformity, definition and types of unconformities	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester IIInd
Subject Geology
Paper IV: Paleontology and Stratigraphy
GEO - 212

Sr. No	Topics	Total Periods	Marks
UNIT I	Paleontology: Definition, branches, and its importance Fossils: Definition, modes of preservation, Uses of fossils, Index fossils, living fossils. Morphology of hard parts, shell , ornamentation , type of hinge lines and dentitions. Geological position and geographical distribution of the following: Phylum Mollusca: Class Lamellibranchia or Bivalvia, Class Gastropoda, Class Cephalopoda, Nautiloids, Ammonoids, Belemnites and type of suture lines.	10	10
UNIT II	Morphology of hard parts, shell, ornamentation, type of hinge lines and dentitions. Geological position and geographical distribution of the following: Phylum Brachiopoda articulate and inarticulate. Types of brachial skeleton Phylum Echinodermata Class Echinodea, regularia and irregularia. Variation in the apical disc in echinoids.	10	10
UNIT III	Stratigraphy Principles of Stratigraphy, Correlation & Nomenclature Standard Geological time scale Indian Stratigraphical time scale	10	10
UNIT IV	Introduction Major Stratigraphical divisions , Physiographical division of India, Stratigraphy of Maharashtra	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester IInd
Subject Geology
Practical
Lab Course 2
GEO - 221

Sr. No	Topics	Total Periods	Marks
UNIT I	Igneous Petrology – - Megascopic study, Colour index, texture, mineral composition, Classification of the following rocks Rhyolite, Granite, Pegmatite, Gabbro, Dolerite, Compact Basalt, Syenite, Diorite, Grano-diorite, Amygdaloidal Basalt. Sedimentary Petrology – - Megascopic study, Structure, texture, mineral composition, Classification of the following rocks Laterite, Bauxite, Breccia, Conglomerate, Sandstones, Shale, Clay, Limestones, Coral Kankar. Metamorphic Petrology – - Megascopic study, Structure, texture, mineral composition, Classification of the following rocks Slate, Phyllite, Marble, Quartzite, Schist, Mica Schist, Hornblende Schist, Dolomite, Gneiss, Hornblende Gneiss.	10	10
UNIT II	Paleontology Study of at least two specimens from each phylum/class (Total number of specimens should not be less than 15) Phylum Mollusca-Class Lamellibranchia, Class Gastropoda, Class Cephalopoda. Phylum Brachiopoda Phylum Echinodermata	10	10
UNIT III	Depiction of important Stratigraphic divisions in the map of India Geological Fieldwork (excursion) to be conducted in an area of geological report to be submitted for the same.	10	10
UNIT IV	Study of models of Fold, Fault, Joints, Unconformity, Study of structural maps.	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Reference Books:

1. Rutleys's Elements of Mineralogy: H.H. Read.
2. Text Books of Mineralogy: Dona and Ford
3. Rock Forming Minerals: Deer, Howie, Zussman
4. Manual of Mineralogy: Cornelius, S. Hurlbut and cornel Klein
5. Principals of Mineralogy: W.H. Blackburn, W.H. Denman
6. General Geolog : Pramod Pathrikar, Ashok Tejankar
7. Mineralogy: Berry Mason, Dietrich
8. Principles of Petrology: Tyrrel
9. Invertebrate Plaeontology: Henry Woods
10. General Geology: Radhakrishan

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)**



**Undergraduate Bachelor Degree Program in Science
(B. Sc.)**

GEOLOGY (Optional Subject)

**Syllabus of
B.SC. IInd YEAR
GEOLOGY
SEMESTER-III & IV**

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(Effective from Academic Year 2022-23)

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)**

Course Structure

YEAR	SEMESTER	PAPER NUMBER	PAPER TITLE	Hours	MARKS
Second	III	Paper – V 311	Physical-Mineralogy and Optical mineralogy	45	50
	III	Paper – VI 312	Crystallography and Optical Petrology	45	50
	III	Paper 321	Lab Course 3	22	50
	III	Paper 321	Lab Course 4	22	50
	IV	Paper – VII 411	Igneous Petrology Sedimentary Petrology and Metamorphic Petrology	45	50
	IV	Paper – VIII 412	Structural Geology and Paleontology	45	50
	IV	Paper 421	Lab Course 5	22	50
	IV	Paper 421	Lab Course 6	22	50
				268	400

Semester :-III
Subject Geology
Paper V: Physical-Mineralogy and Optical mineralogy
GEO - 311

Sr. No	Topics	Total Periods	Marks
UNIT I	Broad outline of crystalline and non-crystalline minerals Classification of Silicates	10	10
UNIT II	Study of the following rock forming silicates groups 1. Olivine 2. Pyroxene 3. Amphibole 4. Mica 5. Garnet 6. Feldspar 7. Silica, Secondary minerals in basalt, Precious and semiprecious stones	10	10
UNIT III	Nature of light Ordinary and plane polarized light Double refraction. Nicol prisms their construction and function. Different parts of petrological microscope and their function. Optical properties of minerals as viewed under plane polarized light and cross nicolsisotropism and anisotropism	10	10
UNIT IV	Type extinction. Extinction positions of minerals in different crystal system Observation of mineral sections under conoscpic light study of uniaxial and biaxial interference figures, Use of accessory plates and their application	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-III
Subject Geology
Paper IV: Crystallography and Optical Petrology
GEO - 312

Sr. No	Topics	Total Periods	Marks
UNIT I	Definition of crystal. Crystallographic and geometrical symmetry. Imperfections in crystals. Law of constancy of Interfacial angle. Study of elements of symmetry and forms occurring in hemihedral classes Cubic System : Pyrite type and Tetrahedrite type Hexagonal System : Calcite types, Quartz type and tourmaline type	10	10
UNIT II	Concept of hemihedrism hemimorphism enantiomorphism Tetrahedrism Definition of twinning Twinning laws in different crystal classes	10	10
UNIT III	Optical Properties of Rocks Identification of Microscopic minerals with properties Microscopic Texture of Igneous rocks, (Panidiomorphi, Hypidiomorphi, alltriomorphic). Sedimentary Petrology Optical behavior of sedimentary minerals and Cementing material. Microscopic texture of sedimentary rocks.(Clastic , Non clastic, oolitic , pisolitic, Fosssileferous,etc). Metamorphic Petrology Identification, and physical changes in minerals, Microscopic texture of Porphyro blast, Idio- blast,Grano- blast etc.	10	10
UNIT IV	Microscopic structure of Igneous rocks, Zoning, Reaction rim, Alteration, verulites, , flow etc. Microscopic structure of sedimentary rocks, Oolitic ,pisolitic , fosilleferous , concreations, secretions, dendrites, stratification , lamination , bedding , foot print, suture line etc. Microscopic structure of Metamorphic rocks, Alteration Zoning, Reaction rim, schistose, granulose, maculose, sacheroidal , mosaic etc.	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-III
Subject Geology Practical
Lab Course 3
Physical-Mineralogy and Optical mineralogy
GEO - 321

Sr. No	Topics	Total Periods	Marks
UNIT I	Physical mineralogy : In addition to B.Sc, Ist year megascopic identification of following minerals with the help of physical properties. Apatite, Topaz, Corundum, Tour maline, Andalusitesillimanite, Olivine, Staurulite, Chlorite, Asbestos,	10	10
UNIT II	Megascopic identification of following minerals with the help of physical properties. Phlogopite, lepidoliteEpidote, Rhodonite, Soda lite serpentine, wavellite hypersthene ThomosniteNatrolite	10	10
UNIT III	Identification of following mineral thin sections with the help of optical properties under petrological microscope Quartz, orthoclase, plagioclase, Microcline calcite Augite, Diopside Hornblende muscovite BiotitesillimanitekyaniteOlivine Garnet chlorite	10	10
UNIT IV	Identification of uniaxial and Biaxial Interference figures under conosopic light	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Semester :-III
Subject Geology Practical
Lab Course 4
Crystallography and Optical Petrology
GEO - 322

Sr. No	Topics	Total Periods	Marks
UNIT I	Crystallography Study of axial characters, elements of symmetry and forms occurring in the crystal models belonging to the face lower symmetry classes pyrite type, Tetrahedrite type calcite type tourmaline type and quartz type Twins.albite, cross, bavinoetc	10	10
UNIT II	Study of thin section of following igneous rocks Granite, Porphyritic Granite, Diorite, Syenite, Rhyolite, Andesite, Basalt, porphyritic basalt, Amygdaloidal basalt, Trachyte, Dolerite, Gabbro	10	10
UNIT III	Study of thin section of following sedimentary rocks Sand stone, Limestone, corals, shale, oolitic limestone, bauxite, shelly limestone.	10	10
UNIT IV	Study of thin section of following Metamorphic rocks Siliminiteschist ,Biotite schist, mica schist , marble, gneiss, quartzite, marble, chlorite schist, hornblende schist, Biotite- garnet schist.	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Semester :-IV
Subject Geology
Paper VII: Igneous, Sedimentary and Metamorphic Petrology
GEO - 411

Sr. No	Topics	Total Periods	Marks
UNIT I	Physicochemical constitution of magma concept of primary magma, Crystallization of Unicomponent, Binary, Ternary magma. Bowen reaction series, differentiation and assimilation of magma. Texture with respective characters, study of Various structures.	10	10
UNIT II	Mineral composition of sediments, cementing materials Textures of sedimentary rocks Wentworth and Udden grade scale, roundness and sphericity kind of transport of sediments.	10	10
UNIT III	Lithification and diagenesis. Important mechanical and chemical structures found in sedimentary rocks. Study of following secondary deposits with respect to their texture/ Structure mineral composition and varieties Residual Laterite, Bauxite and soil Rudaceous conglomerate and Breccia Arenaceous – sandstones Argillaceous – shales and Mud stone Chemical deposits Organic deposits	10	10
UNIT IV	Metamorphic minerals textures of metamorphic rocks metamorphic facies, stress and antistress minerals. Metamorphism and Metamorphic products Regional metamorphism of i) Argillaceous rock ii) Quartzofeldspathic rocks iii) Basic igneous rocks Cataclasis, cataclastic Thermal metamorphism of i) Pure and impure limestones Arenaceous rocks	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-IV
Subject Geology
Paper VIII: Structural Geology and Paleontology
GEO - 412

Sr. No	Topics	Total Periods	Marks
UNIT I	Introduction to structural Geology Definition and its relation with other branches of Geology Tectonic and non-tectonic structures Attitude of planar feature strike and dip Clinometer compass and its application.	10	10
UNIT II	Folds: Definition, nomenclature of folds.Types of Folds Classification of fold geometric, genetic and non-tectonic folds Joints : Definition and nomenclature of joints Geometric and genetic classification of joints with examples	10	10
UNIT III	Faults : Definition and nomenclature related to faults. Types of Faults Geometric and genetic classification of fault. Recognition of faults in the field and geological map. Unconformity Definition, structural classification of unconformities Recognition of unconformity.	10	10
UNIT IV	Paleontology : Significance of fossils, index and zonal guide fossils Their geographical distribution and geological history,Morphological feature of trilobites, graptolites,echinoidea. Introduction to Gondwana plant fossils.(Gondwana Flora) Introduction to micropaleontology.	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-IV
Subject Geology Practical
Lab Course 5
Igneous, Sedimentary and Metamorphic Petrology
GEO - 421

Sr. No	Topics	Total Periods	Marks
UNIT I	Igneous petrology In addition to B.Sc. Ist megascopic study of the following igneous rocks. Diorite, Syenite, Dunite, Peridotite, Norite, Pegmatite, Graphic granite, dolerite, lamprophyre, Trachyte, Andesite and varieties of basalt.	10	10
UNIT II	In addition to the syllabus of B.Sc. Ist year Megascopic study of the following sedimentary rocks and their identification, greywacke, grit, flagstone, carbonaceous shale, Black limestone, Shelly limestone, coral limestone.	10	10
UNIT III	In addition to the syllabus of Ist year Megascopic study of the following metamorphic rocks and their identification. Pink marble, Serpentine marble, Sackharoidal marble, Mica granet schist, Fuchsite quartzite, Staurotite schist, kyanite schist, Hornblende Biotite gneiss, granite gneiss, Augen gneiss, Banded gneiss. Amphibolite, schorl rock.	10	10
UNIT IV	Megascopic texture and structure: Flow structure, Amygdaloidal structure, vesicular structure, Ropy lava, Porphyritic, Poikilitic, Clastic, non clastic, pisolitic, schistose, gneissose, granulose, maculose,	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Semester :-IV
Subject Geology Practical
Lab Course 6
Structural Geology and Paleontology
GEO - 422

Sr. No	Topics	Total Periods	Marks
UNIT I	Study of Geological maps; inclined beds, unconformity igneous intrusions, Faulting in outcrops	10	10
UNIT II	Fold and fault. Structural problem. Attitude of beds or orthographic and stereo graphic problems Coal seam bed.	10	10
UNIT III	Study of the following fossils and their identifications. Echinoidea :- Cidaris, Micraster Trilobita :- Phacops, Calymene, Paradoxides Gondwana plant fossils Glossopteris, calamities, ptillophyllum, Gangamopteris.	10	10
UNIT IV	Geological excursion in selected area, Report writing and sample collection.	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Book :

1. Ruttey's Elements of Mineralogy : H. H. Read
2. Mineralogy : I. G. Berry and B Mascon
3. A Text book of mineralogy : E. S. Dana
4. Principles of Petrology : G. W. Tyrrel
5. Igneous and Metamorphic Petrology : Turner & Verhogen
6. Mineralogy Oxford Publishers, New Delhi : A.V. Tejankar
7. A Introduction to Igneous Petrology : John D. Winter
8. Introduction to Sedimentology : S. M. Sengupta
9. Palaeontology Evolution and Animal Distribution : Dr. P.C. Jain & Dr. M.S. Anantharaman
10. Fundamentals of Sedimentary Rocks : N.W. Gokhale
11. Optical Mineralogy : Paul F. Kerr
12. Crystallography Oxford Publishers, New Delhi: A.V. Tejankar
13. Structural Geology : M P Billings
14. Principles of Invertebrate Paleontology : Twenhofel and Shrock
15. Petrography and petrochemistry of Deccan Basalt Oxford Book Company: A.V. Tejankar
16. Fundamentals of Invertebrate Palaeontology : M. A. Koregave

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**Undergraduate Bachelor Degree Program in Science
(B. Sc.)**

GEOLOGY (Optional Subject)

**Syllabus of
B.SC. IIIRD YEAR
GEOLOGY
SEMESTER-V &VI**

(Effective from Academic Year 2022-23)

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad – 431 004, Maharashtra State (India)**

Course Structure

YEAR	SEMESTER	PAPER NUMBER	PAPER TITLE	Hours	MARKS
Third year	V	Paper – IX 511	Indian Geology	45	50
	V	Paper – X 512	Economic Geology	45	50
	V	Paper 521	Lab Course 7	22	50
	V	Paper 522	Lab Course 8	22	50
	VI	Paper – XI 611	Applied Geology-I	45	50
	VI	Paper – XII 612	Applied Geology-II	45	50
	VI	Paper 621	Lab Course 9	22	50
	VI	Paper 622	Lab Course 10	22	50
				268	400

Semester :-V
Subject Geology
Paper IX: Indian Geology
GEO - 511

Sr. No	Topics	Total Periods	Marks
UNIT I	Introduction Major Stratigraphical divisions ,Physiographical division of India,peninsular, Extra peninsular Indiaand Gangetic alluvial plain.. Distribution, classification, Lithology, fossil content if any and economic importance of the following major groups of peninsular and Extra peninsular India. Archaeans:- Sargur, Dharwar and associated intrusives, Sausar, Sakoli, Iron Ore , Chilpighat, Bundelkhand gneiss, Banded Gneissic complex, Aravalli, Raialo, Bastar, Delhi .	10	10
UNIT II	Vindhyan, Cuddapah, Kurnool Kaladgi, Kamthee. Gondwanas, Umari marine beds. Jurassics of kutch,	10	10
UNIT III	Deccan traps. Intertrapean and infratrapean beds Lameta and Bagh beds. Cretaceous of TiruchirapalliCuddalore and Rajahmundry sandstones	10	10
UNIT IV	Geology of Spiti, Geology of Kashmir, Petroliferous formation of assam. Siwaliks, Mammalian fossils and their extinction. Pleistocene Karewas of Kashmir.	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-V
Subject Geology
Paper X: Economic Geology
GEO - 512

Sr. No	Topics	Total Periods	Marks
UNIT I	Magma as a source of mineral deposits Processes of formation of mineral deposits. Magmatic concentration. Hydrothermal processes. Cavity filling deposits Replacement deposits.	10	10
UNIT II	Sedimentation. Oxidation and supergene sulphide enrichment Residual and Mechanical concentration. Evaporation and sublimation. Metasomatism and metamorphism	10	10
UNIT III	Geo – Exploration Resource, reserve, deposit, Introductory mining, open cast mining, underground mining.	10	10
UNIT IV	Economic mineral deposits of India. Geological, geographical distribution of following mineral deposits. Iron, manganese, chromites, copper, Lead Zinc Gold, Bauxite, Barytes, Gypsum, Asbestos and Mica. Occurrence, formation and distribution of petroleum and natural gas and coal deposits	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester: -V
Subject Geology Practical
Lab Course 7
Stratigraphy
GEO - 521

Sr. No	Topics	Total Periods	Marks
UNIT I	Depiction of various Stratigraphic units in the map of India with their succession.	10	10
UNIT II	Advanced structural maps, Completion of outcrops.	10	10
UNIT III	Depiction of petroliferous basins in the map of India	10	10
UNIT IV	Isopach maps, Coal seam problem.	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Semester :-V
Subject Geology Practical
Lab Course 8
Economic Geology
GEO – 522

Sr. No	Topics	Total Periods	Marks
UNIT I	Identification of following ore /industrial minerals in hand specimens Magnetite, Hematite, Pyrite, Laterite, Limonite, Goethite, Pyrolusite, Pyrite, Psilomelane, Rhodonite, Rhodrosite, Chalcopyrite, Cuprite, Bornite, Covellite, Chalcocite, Malachite, Azurite, Chromite, Galena, Sphalerite, Bauxite, Stibnite, Cassiterite, Wolframite, Realgar, Orpiment, BaryteMagnesite, Gypsum, Mica, Talc, Kyanite, Asbestos	10	10
UNIT II	CIPW Normative calculations of Igneous rocks	10	10
UNIT III	Semiprecious Stone and important occurrences of various economics minerals to be depicted in the map of India	10	10
UNIT IV	Mining Problem/ Core logging problem.	10	10
UNIT V	Record Book,Map Book, Tour report, Viva	05	10

Semester :-VI
Subject Geology
Paper XI: Applied Geology-I
GEO - 611

Sr. No	Topics	Total Periods	Marks
UNIT I	Introduction to various Geoexploration techniques Geo-chemical and Geo-botanical method of prospective method. Geophysical methods of prospecting a) Gravity method b) Magnetic method c) Seismic reflection method, seismic refraction method d) Radioactive method e) Electrical resistivity method	10	10
UNIT II	Engineering properties of rocks Application of Geology in the construction of major civil Engineering structures. Major dams types, and their terminology. Tunnels.	10	10
UNIT III	Introduction to Remote sensing Electromagnetic radiation (spectrum) Platforms, sensors, image and its types of satellites elements of photo interpretation Different between Remote sensing and Ariel photography Black and white and color aerial photograph, Multi spectral scanner (M.S.S), False color composite (F.C.C) infrared satellite imagery, thematic map RADAR AND SLAR. I.R.S. I.S.R.O.	10	10
UNIT IV	Introduction Oceanography Definition, Major ocean, Scope of oceanography. Environmental Geology natural and Industrial hazards – volcano landslides earthquake.	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-VI
Subject Geology
Paper XII: Applied Geology II
GEO - 612

Sr. No	Topics	Total Periods	Marks
UNIT I	Hydrological cycle, concept of Hydrology Hydrogeology and Geohydrology Hydrological properties of Rocks, Porosity, Permeability, Storativity, Transmissivity, Specific yield, Safe yields; Specific retention , recuperation ,Storage coefficient, Draw downs	10	10
UNIT II	Aquifers and their classification Movement of ground water Darcy's law	10	10
UNIT III	Well inventory and preparation of static water level and hydrogeological maps Occurrence of Groundwater in Igneous, sedimentary and metamorphic rocks	10	10
UNIT IV	Concept of watershed Management, soil and its type's soil conservation and measures, water conservation measures, water conservation structures, importance of hydrogeology in watershed development. Hydrochemical parameters of ground water	10	10
UNIT V	Tutorials, seminars and Assignments	05	10

Semester :-VI
Subject Geology Practical
Lab Course 9
Applied Geology- I
GEO - 621

Sr. No	Topics	Total Periods	Marks
UNIT I	Groundwater prospecting by geophysical resistivity survey	10	10
UNIT II	Study of satellite Imageries. Interpretation of Geomorphological features from the Imageries Study of aerial photographs identification of various Geomorphological landforms and their interpretation	10	10
UNIT III	Feasibility of construction of civil engineering project like dams, structural features and selection of suitable site.	10	10
UNIT IV	Engineering problem , Compressive strength , crushing strength	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

Semester :-VI
Subject Geology Practical
Lab Course 10
Hydrogeology
GEO - 622

Sr. No	Topics	Total Periods	Marks
UNIT I	Morphometric analysis of basin (watershed) (Run off, Recharge area, Discharge area)	10	10
UNIT II	Hydrogeological problems (Darcy's law etc.)(Calculation of flow rate)	10	10
UNIT II	Well inventory survey and preparation of hydrogeological Maps, litholog	10	10
UNIT IV	Chemical analysis of water sample	10	10
UNIT V	Record Book, Map Book, Tour report, Viva	05	10

List of Books:

1. Economic Geology : Bateman
2. Geology of India : Wadia
3. Engineering and General Geology : Parbingsingh
4. Ground water Hydrology : Todd
5. Text Book of Engineering Geology : R B Gupte
6. Water management Ajanta Publishers, Aurangabad : A.V. Tejankar
7. Geology of India : Krishnan
8. Economic Mineral Deposits : Bateman
9. Ground water : Raghunath
10. Artificial recharge in hard rock terrain Deogiri Publishers, Aurangabad : A.V. Tejankar
11. Physical Geology Oxford Publishers, New Delhi : A.V. Tejankar
12. Fundamentals of Remote Sensing : Pandey S.N
13. Text Book of Remote Sensing and Geographical Information Systems : M. Anji Reddy
14. General and Applied Geophysics : Kaul, I.K., Bhattacharyya, A.K., Sengupta, S
15. Maharashtra til Paniprashnaani Jalsakshrata Chinmay Prakashan: A.V. Tejankar
16. Groundwater Oxford Book Company : A.V. Tejankar
17. Historical Geology and Stratigraphy of India : Dr. Ravindra Kumar
18. Principals of Engineering Geology : K.M. Bangar
19. Fundamentals of Geomorphology: Thorn, C. E.
20. Hydrogeomorphology: Fundamentals, Applications and Techniques : Md. Babar
21. Environmental Geology: Ecology, Resource and Hazard Management : K.S. Valdiya
22. Hydrogeology : K. R. Karanth
23. Textbook of Engineering Geology : N. Chenna Kesavulu