

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २० जून २०२० रोजी संपन्न झालेल्या ४७व्या मा. विद्या परिषद बैठकीतील विषय क्र.११/४७-२०२०च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे खालील विषयांचे C.B.C.S. (Choice Based Credit System) Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्यात येत आहेत.

1. B.Sc.-II Year-Biophysics
2. B.Sc.-II Year-Bioinformatics
3. B.Sc.-II Year-Biotechnology
4. B.Sc.-II Year-Biotechnology (Vocational)
5. B.Sc.-II Year-Food Science
6. B.Sc.-II Year-Botany
7. B.Sc.-II Year-Horticulture
8. B.Sc.-II Year-Agro Chemical Fertilizers
9. B.Sc.-II Year-Analytical Chemistry
10. B.Sc.-II Year-Biochemistry
11. B.Sc.-II Year-Chemistry
12. B.Sc.-II Year-Dyes & Drugs Chemistry
13. B.Sc.-II Year-Industrial Chemistry
14. B.C.A. (Bachelor of Computer Application)-II Year
15. B.I.T. (Bachelor of Information Technology)-II Year
16. B.Sc.-II Year-Computer Science
17. B.Sc.-II Year-Network Technology
18. B.Sc.-II Year-Computer Application (Optional)
19. B.Sc.-II Year-Computer Science (Optional)
20. B.Sc.-II Year-Information Technology (Optional)
21. B.Sc.-II Year-Software Engineering
22. B.Sc.-II Year-Dairy Science
23. B.Sc.-II Year-Electronics
24. B.Sc.-II Year-Environmental Science
25. B.Sc.-II Year-Fishery Science
26. B.Sc.-II Year-Geology
27. B.Sc.-II Year-Mathematics
28. B.Sc.-II Year-Microbiology
29. B.Sc.-II year Agricultural Microbiology
30. B.Sc.-II Year-Physics
31. B.Sc.-II Year Statistics
32. B.Sc.-II Year-Zoology

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

‘ज्ञानतीर्थ’ परिसर,
विष्णुपुरी, नांदेड - ४३१ ६०६.
जा.क्र.: शैक्षणिक-१/परिपत्रक/पदवी-सीबीसीएस अभ्यासक्रम/
२०२०-२१/३३३

दिनांक : १५.०७.२०२०.

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

स्वाक्षरित / -

उपकुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

Swami Ramanand Teerth Marathwada University, Nanded
Distribution of credits for B.Sc. Geology (optional) Under Faculty of Science
B. Sc. Syllabus structure Semester Pattern
With Effective from June 2020
Subject: Geology
B. Sc. First Year
Syllabus

Preamble of the syllabus

B.Sc. Degree course is of six semester in Geology would be of 36(08*) credits, where **two** credit course of theory will be of (3) three lectures per week running for one term and one practical course will consist of laboratory exercises of three (3) clock hours per week . Student will have to take admission in Geology as optional subject with other two optional subjects and compulsory or optional languages. Complete 36 credits incorporated in the syllabus of Geology. Every student shall complete 36 credits in a minimum of **six** semesters. **Each** semesters will have 06 credits. The field work is included as part of syllabus and mandatory for fulfillment of course. An academic calendar showing dates of commencement and end of teaching, Continuous Internal Assessment (CIA) and End Semester Examination (ESE) will be prepared and duly notified before commencement of each semester per year.

Eligibility

The candidate should have passed or allowed to keep term in B.Sc. I year for admission in B.Sc. II Year as per University norms.

Prerequisite: The course paper is essential to have clear cut understanding in the basics of Earth science knowledge at First Year.

Aims and Objectives of the Course:``

The aims and objectives of the Geology (UG) course for students are to absorb the fruitful and skillful knowledge in the field of Geoscience. The main goal of the Course of the Geology in undergraduate program is to equip students with the fundamental knowledge of the diverse fields of Geology (encompassing Geomorphology and Surface Processes, Hydrology and Low-Temperature Geochemistry, Sedimentology and Paleoecology, and Tectonics and Solid-Earth Processes). Apart from this, to generate the mental ability of students on the basis of practically scientific level and research oriented knowledge in their academic coursework. In addition, it is critical that students learn to think like a scientist and to apply the scientific method in their coursework and in their lives.

To prepare the students for post- graduate study in various disciplines of the Earth Sciences

To equip the students for career after Bachelor Degree.

To develop the earth science skills in Students

SWMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Scheme of B.Sc. Programme in GEOLOGY (Science Faculty) Under CBCS

Swami Ramanand Teerth Marathwada University, Nanded

Distribution of credits for B.Sc. II year Geology (optional)

Under Faculty of Science

B. Sc. II Syllabus structure

Subject: Geology

Semester	Paper No.	Name of the Course	Instruction Hrs/ week	Total period	Continuous Assessment Marks	ESE Marks	Total Marks	Credits
III	CCG-III (Section A)	Optical and Descriptive Mineralogy (P-VI)	03	45	10	40	50	02
	CCG-III (Section B)	Dynamics of the Earth and Igneous petrology (P-VII)	03	45	10	40	50	02
IV	CCG-IV (Section A)	Structural geology (P-VIII)	03	45	10	40	50	02
	CCG-IV (Section B)	Sedimentary and Metamorphic Petrology (P-IX)	03	45	10	40	50	02
Annual	(CCGP-III [CCG III (Section A and B)])	Practical's based on Section A and Section B of CCG III (P-X)	04	80	10	40	50	02
	(CCGP-III [CCG IV (Section A and B)])	Practical's based on Section A and Section B of CCG III (P-XI)	04	80	10	40	50	02
III	SEC-I Geology	Skill Enhancement Course in Geology-I (SECG-I)*	03	45	10	40	50	02
IV	SEC-II Geology	Skill Enhancement Course in Geology-II (SECG-II)*	03	45	10	40	50	02

*SECG- 1 credit is of 25 Marks

Total credits semester I and II: 16

B.Sc. II
Semester-III
(CCG-III): Core Course Geology –III

Salient Features: The paper is divided in four units comprising Optical Mineralogy I, II, and Descriptive Mineralogy I, II

The paper is designed in order to understand the optics, optical characters, chemical characters, structure, origin and occurrence of rock forming minerals

Objectives: i) To study the optics, optical, chemical and structural characters of minerals
ii) To study origin and occurrence of rock forming minerals.

Prerequisite: The students should have the basic information of minerals

Course outcome: Minerals are fundamental units of earth crust and rocks are aggregate of minerals, understanding of minerals help to explore the chemistry of the Earth.

Section A - Optical and Descriptive Mineralogy – Paper VI
(Credits -2)

Unit – I Optical Mineralogy-I : (Periods 15, Marks,15)

Introduction to petrological microscope. Nature of Light, reflection, refraction, double refraction, total internal reflection and critical angle. Nicol's prism, position of extinction, and extinction angle, isotropism and anisotropism, isotropic and anisotropic minerals. Birefringence, refractive index, use of accessory plates, compensation and determination of interference colours, Newton's scale, determination of sign of elongation where 'C' axis is known.

Unit – II Optical Mineralogy -II: (Periods 10, Marks,10)

Vibration direction and optic orientation, anomalous colours, pleochroism and absorption. Uniaxial and biaxial interference figures and determination of optic sign of uniaxial and biaxial minerals. Methods of determination of refractive index: Becke line, Oblique illumination and liquid immersion method. Study of optical properties of minerals.

Unit – III Descriptive Mineralogy - I: (Periods 10, Marks,15)

Introduction to mineral, silicate structure, isomorphism, polymorphism and pseudomorphism. Classification of minerals. Study of structure, chemistry, physical and optical properties, paragenesis and uses of the following mineral groups:

Olivine, garnet, alumino-silicate, pyroxene,

Unit – IV Descriptive Mineralogy –II: (Periods 10, Marks,10)

Study of structure, chemistry, physical and optical properties, paragenesis and uses of the following mineral groups:

Amphibole, mica, silica, feldspar, feldspathoid.

Section B -Dynamics of the Earth and Igneous Petrology Paper VII (Credits -2)

Salient Features: The paper is divided in four units comprising Dynamics of the Earth-I, II and Igneous Petrology I, II.

The paper is designed in order to understand the dynamic processes within the earth and the origin and process of formation of igneous rocks.

Objectives: i) To study the dynamic processes of the earth.
ii) To study the origin and formation of igneous rocks.

Prerequisite: The students should have the basic information about the nature and internal structure of the earth.

Course Outcome: The surface features of the earth depend on internal activities and behavior of magma. The knowledge of dynamic processes and igneous rocks help in understanding the crustal dynamics of the earth.

Unit – I- Dynamics of the Earth-I (Periods 15, Marks,15)

Isostasy: Concept and theories of Isostasy; Geosynclines; Theories of Continental drift and its evidences and Palaeomagnetism.

Unit – II- Dynamics of the Earth-II (Periods 10, Marks,10)

Evolution of plate tectonic theories, nature and types of plate margins. Origin and significance of Mid-oceanic ridges. Island arc and trenches. Sea-floor spreading and Wilson cycle.

Unit – III: Igneous Petrology -I (Periods 10, Marks,15)

Formation of glass and crystal. Crystallization of unicomponent magma. Crystallization of binary magma, eutectics and mixed crystals. Crystallization of Ternary magma. Reaction relation and Bowen's reaction series.

Unit – IV: Igneous Petrology -II (Periods 10, Marks,10)

Textural characters such as granularity, shape of the crystal, mutual relation of crystals, textures and their types. Microstructures and structures of igneous rocks. Classification of igneous Rocks. Theories of differentiation and assimilation. Crystallisation of Granitic and Basaltic magma. Study of common igneous rocks.

**B.Sc. II
Semester-IV**

CCG-(IV): Core Course Geology -IV

Section A - Structural Geology- Paper VIII

(Credits -2)

Salient Features: The paper is divided in four units comprising structural geology I, II, III and IV.

The paper is designed in order to understand the major structures in the crust and deformation behavior of rocks.

- Objectives:**
- i) To study the structural characters of the crust
 - ii) To study origin and occurrence of major structures.

Prerequisite: The students should have the basic knowledge of the stress, strain and nature of rocks

Course outcome: The study of structures helps in understanding the process of deformation of rocks and dynamic history of the region

Unit -I

(Periods 15, Marks,15)

Introduction, Attitude of beds, strike and dip, study of clinometers compass, Brunton compass and its application in the field survey. Fold: Parts of fold, nomenclature of folds, plunge of folds, types of fold and field study of folds. Determination of top of beds by using primary structures.

Unit -II

(Periods 10, Marks,10)

Fault: General characteristic of fault, types of movement, classification of fault based on geometry, genetic and net slip. Attitude of faults relative to attitude of beds, fault pattern and value of dip of fault. Criteria for recognition of fault in field such as discontinuity of strata, repetition and omission of beds, feature characteristic of fault plane surface and physiographic criteria.

Unit -III

(Periods 10, Marks,15)

Joint: Introduction, Genetic and geometric classification of joints.
Unconformity: Introduction, general significance of unconformity. Types of unconformities such as disconformities, angular unconformity, non-conformity and local unconformity. Overlap, off lap, overstep, outlier and inlier.

Unit -IV

(Periods 10, Marks,10)

Distinction between unconformities and fault.
Lineation and Foliation: Introduction, descriptive terminology, kinds, origin and relation to the major structures.
Schistosity: In relation with lineation and foliation.

Section B - Sedimentary and Metamorphic Petrology – Paper IX

(Credits -2)

Salient Features: The paper is divided in four units comprising Sedimentary Petrology I and II and Metamorphic Petrology I and II.

The paper is designed in order to understand the surface and sub surface processes of formation, mineral composition and structures of rocks due to various sedimentary and metamorphic processes.

Objectives i) To study the sedimentary rocks in detail
ii) To study the metamorphic rocks in detail

Prerequisite: The students should have the basic knowledge of sedimentary and metamorphic rocks.

Course outcome: The study of sedimentary and metamorphic rocks helps in understanding the earth material in relation to the environmental condition during process of formation.

Unit-I Sedimentary Petrology-I: - (Periods 15, Marks,15)

Formation of sediment and sedimentary rocks. Different types of depositional environment such as terrestrial and marine environment. Mineral composition of sedimentary rocks. Textural characters such as grain size, sphericity, roundness and shape. Mechanical, chemical and organic structures. Maturity of sediments. Heavy Minerals.

Unit-II Sedimentary Petrology-II : - (Periods 10, Marks,10)

Introduction, mineralogy, texture, structure, classification and economic importance of conglomerate, sandstones, shale and limestones. Study of common sedimentary rocks.

Unit -III Metamorphic Petrology-I - (Periods 10, Marks, 15)

Agents and kinds of metamorphism. Concept of depth zones and grades of Metamorphism. Metamorphic facies and Eskola's concept of metamorphic facies. Pressure-Temperature Diagram. Metamorphic minerals (stress and antistress minerals) Texture and structure of metamorphic rocks.

Unit -IV Metamorphic Petrology-II - (Periods 10, Marks, 10)

Process of formation of metamorphism such as cataclastic, thermal, dynamothermal, plutonic metamorphism and their products. Metasomatism, pneumatolytic metamorphism, injection metamorphism and Auto-metamorphism. Lit-per-lit gneiss, composite gneiss. Anatexis and palingenesis. Study of common metamorphic rocks.

B.Sc. II Semester III

(CCGP_III) : Core Course Geology –Practical-X

(Credits -2)

Practical Based on Core course Section A and B of Semester III

- 1) Study of Optical Properties of Following Minerals:
Quartz, Orthoclase, Microcline, Plagioclase, Augite, Hypersthene, Hornblende, Actinolite, Olivine, Muscovite, Biotite, Garnet, Calcite, Chlorite, Kyanite, Sillimanite and Andalusite.
- 2) Newton's scale of interference colours,
- 3) Determination of sign of elongation.
- 4) Determination of optic sign of uniaxial/biaxial minerals.
- 5) Calculation of Hess Metasilicate of Pyroxene Minerals.
- 6) Identification and description of Plate Margins in the given diagram/Map
- 7) Study of Following Igneous Rocks in Hand Specimen.
Porphyritic Granite, Granite, Nephilian syenite, Norite, Felsite, Peridotite Graphic granite, Obsidian, Granodiorite, Gabbro, Dunite Rhyolite, Trachyte, Andesite,
- 8) Identification of various types of Basalts.
- 9) Study of the Optical Properties of Following Rocks:
Granite, Syenite, Diorite, Gabbro, Rhyolite, Trachyte, Andesite and Basalt
- 10) Study of structures of Igneous Rocks in hand specimen

B.Sc. II Semester IV

(CCGP_IV) : Core Course Geology –Practical-XI

(Credits -2)

Practical- Practical Based on Core course Section A and B of Semester IV

- 1) Study of Structural Geological Maps Covering Faults, Unconformity, Folds, Sill and Dykes.
- 2) Orthographic Methods of Solving Structural Problems.
- 3) Stereographic Methods of Solving Structural Problems
- 4) Study of Following Sedimentary Rocks in Hand Specimen:
Sandstone and its types, Grit, Carbonaceous Shale, Fossiliferous Limestone, Shelly Limestone, Breccia, Marl, Mudstone, Greywacke, Conglomerate, Arkose, Quartzite,
- 5) Study of the Optical Properties of Following Sedimentary Rocks :
Sandstone, Limestone, Breccia, Conglomerate, Oolitic limestone, Fossiliferous limestone, Quartzite, Shale. Quartzite
- 6) Study of structures of Sedimentary Rocks in hand specimen.
- 7) Study of Following Metamorphic Rocks in Hand Specimen
Marble, Mica-Garnet schist, Actinolite schist, Sillimanite Schist, Gneisses, Granulite, Eclogite, Schorl, Amphibolite.
- 8) Study of the Optical Properties of Following metamorphic Rocks
Marble, Mica-Garnet schist, Actinolite schist, Sillimanite Schist, Trimolite Schist, Augen Gneiss, Granulite. Schorl, Eclogite
- 9) Study of structures of Metamorphic Rocks in hand specimen.
- 10) Preparation of Geological report based on field tour of four days duration.

Skill enhancement Course in Geology

Skill enhancement Course in Geology-I

(Credits -2)

A) Water quality analysis

Introduction, sampling methods, materials and methods of Water quality analysis, permissible limits of water quality, health hazards in relation to surface or groundwater.

or

B) Soil Analysis

Introduction, formation of soil, types of soils, sampling methods, materials and methods of soil analysis, physical and chemical characteristics of soil, problems and potentials of soil.

Skill enhancement Course in Geology-II

(Credits -2)

A) Roof water harvesting

Hydrological Cycle, scarcity of water, Water conservation and awareness. Introduction to Water Harvesting tools and techniques of Roof Water Harvesting.

or

B) Sieve Analysis of Soil

Introduction, sampling methods, materials and methods of sieve analysis, grain size analysis of soil/sediments, scientific significance and practical application.

THEORY QUESTION PAPER PATTERN

Faculty of Science

B. Sc. (Second year) Semester III/IV

GEOLOGY

Paper VI/VII/VIII/IX

Time 1 hr. 30 min each paper

Marks 40 each paper

Q.1 Full length question based on Unit I and Unit II

15 marks

Or

a) Question based on Unit I

08 marks

b) Question based on Unit II

07 marks

Q.2 Full length question based on Unit III and Unit IV

15 marks

Or

a) Question based on Unit III

08 marks

b) Question based on Unit IV

07 marks

Q. 3 Write Short notes on based Unit I to IV (Any Two)

10 marks

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B. Sc. II GEOLOGY

Annual Practical Examination

PRACTICAL QUESTION PAPER

(CCG P III): Core Course Geology –Practical-Paper No. X

Marks 40

- | | |
|--|----|
| 1. Identify and describe Physical properties of minerals from Table No. 1 to 5. | 05 |
| 2. Identify and describe Optical properties of minerals from Table No. 6 to 7 | 06 |
| 3. Describe the sign of elongation or optic sign of the mineral Table No. 8 to 9 | 04 |
| 4. Identify and describe igneous rocks in hand specimen from Table No. 10 to 13. | 08 |
| 5. Identify and describe optical properties of igneous rocks on Table No. 14 | 04 |
| 6. Identify and describe structures of igneous rocks from Table No. 15 to 16. | 03 |
| 7. Identify the mineral from the given Hess Metasilicate data | 05 |
| 8. Identify and describe plate margins in the given diagram | 05 |

Internal Practical Assessment (CA)

Marks 10

- | | |
|------------------|----|
| i) Unit Test | 05 |
| ii) Record Book. | 05 |

Swami Ramanand Teerth Marathwada University, Nanded

B. Sc. II GEOLOGY

Annual Practical Examination

PRACTICAL QUESTION PAPER

(CCG P IV): Core Course Geology –Practical-Paper No. XI

Marks 40

- | | |
|---|----|
| 1. Describe the Geography and Geology of the given Map and draw section along X-Y | 10 |
| 2. (a) Solve the structural problem by orthographic method | 04 |
| (b) Solve the structural problem by orthographic method | 04 |
| 3. Identify and describe the rocks in hand specimen from Table No. 1 to 5. | 10 |
| 4. Identify and describe optical properties of rocks on Table No. 06 and 07 | 04 |
| 5. Identify and describe structures of rocks from Table No. 08 to 09. | 03 |
| 6. Fieldwork and Viva | 05 |

Internal Practical Assessment (CA)

Marks 10

- | | |
|------------------|----|
| i) Unit Test | 05 |
| ii) Record Book. | 05 |

Books Recommended for B.Sc. II

1. Billings, M.P., 1972. Structural Geology. Prentice Hall.
2. Davis, G.R., 1984. Structural Geology of Rocks and Region. John Wiley
3. Hills, E.S., 1963. Elements of Structural Geology. Farrold and Sons, London.
4. Singh, R. P., 1995. Structural Geology, A Practical Approach. Ganga Kaveri Publ., Varanasi.
5. Nesse, D.W., 1986. Optical Mineralogy. McGraw Hill.
6. Read, H.H., 1968. Rutley's Element of Mineralogy (Rev. Ed.). Thomas Murby and Co.
7. Berry and Mason, 1961. Mineralogy. Freeman and Co. London.
8. W.H. Freeman & CoKerr, B.F., 1995. Optical Mineralogy 5th Ed. Mc Graw Hill, New York.
9. Turner, F.J. & Verhoogen, J., 1960, Igneous & Metamorphic petrology. McGraw Hill Co
10. Moorhouse, WW., 1969. The study of rocks in thin sections. Harper and sons.
11. Friedman & Sanders, 1978. Principles of Sedimentology. John Wiley and sons.
12. Pettijohn, F.J., 1975. Sedimentary rocks, Harper & Bros. 3rd Ed.
13. Prasad, C., 1980. A text book of sedimentology. CBS Publ.
14. Sengupta. S., 1997. Introduction to sedimentology. Oxford-IBH.
15. Turner, F.J., 1980. Metamorphic petrology. McGraw Hill.
16. Mason, R., 1978. Petrology of Metamorphic Rocks. CBS Publ.
17. Tyrell, G. W., 1989. Igneous petrology. World press 3.