DEPARTMENT OF GEOLOGY

COURSE CURRICULUM & MARKING SCHEME

B.Sc. I, II, III, IV Semester

GEOLOGY

(Based on Choice Based Credit System)

SESSION : 2023-24

ESTD : 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A+, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

Website - www.govtsciencecollegedurg.ac.in, Email – autonomousdurg2013@gmail.com

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG
Approved Syllabus for
B.Sc. GEOLOGY by the members of Board of Studies for Session 2023-24
Scheme and Syllabus for B.Sc. Year 1 (Semester I & II)

Scheme for B.Sc. Program with Geology - First Year
(with 3 Subjects A, B*, C*Subject A- Geology)

Semester	Discipline Specific Course/ Core Course DSC (Credit-4)	Generic Elective Course GEC (Credit-4)	Skill Enhancement Course SEC (Credit-2)	Ability Enhancement Course AEC (Credit-2)	Value Added Course VAC (Credit-2)	Total Credits
1	Geodynamics & Geomorphology (Course code :- BGL101) (Th=3, P=1) SubjectB1 (Th=3, P=1) Subject C1(Th=3, P=1)	Choose any one course other than DSC (Th=3, P=1)	Choose 1 from pool of SEC (Th=1, P=1)	Hindi Language (Th-2)	Sports (for Bio Group)/ Yoga (for Maths Group (Th=1, P=1)	22
2	Mineralogy & Crystallography (Course code :- BGL201) (Th=3, P=1) SubjectB2 (Th=3, P=1) Subject C2(Th=3,P=1)	Choose any one course other than DSC (Th=3, P=1)	Choose 1 from pool of SEC (Th=1, P=1)	English Language(Th -2)	Sports/Yoga (Th=1, P=1)	22
Students on exit shall be awarded undergraduate certificate (in the field of Multidisciplinary Study) after securing the requisite 44 credits in Semester I and II						

*Maths/Physics/Botany/Zoology/Microbiology/Zoology/Geology/Biotechnology/Biochemistry/IndustrialChemistry/Anthropology

Chairperson /H.O.D

Subject Expert

Subject Expert

Subject Expert

Senior Professor of Science Faculty

Departmental members

Alumnus

Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG
Approved Syllabus for
B.Sc. GEOLOGY by the members of Board of Studies for the Session 2023-24
Scheme and Syllabus for B.Sc. Year 1 (Semester I & II)

Courses and Marking Scheme for First-year B.Sc. with Geology

Year	Sem.	Course Code	Paper Title	Theory/ Practical	Credits	Marks	Sem End	IA
Certificate in Science								
Discipline Specific Courses – DSC (Core Courses)								
I	I	BGL101	Geodynamics & Geomorphology	Theory	3	75	60	15
		BGL101P	Geodynamics & Geomorphology Lab Course	Practical	1	25		
	II	BGL201	Mineralogy & Crystallography	Theory	3	75	60	15
		BGL201P	Mineralogy & Crystallography Lab Course	Practical	1	25		
	Skill Enhancement Courses - SEC							
	I & II	BGLS01	Topographic Map Skills	Theory	1	25	20	05
				Practical	1	25		
		BGLS02	Attitude and its measurment	Theory	1	25	20	05
				Practical	1	25		

Note: Semester End – 80% and Internal Assessment (IA) – 20% (Weightage of marks internal examinations will be included as per guidelines of Autonomous Examination Cell)
Minimum Pass: **40% End Semester and IA separately**

Chairperson /H.O.D

Subject Expert

Subject Expert

Subject Expert

Senior Professor of Science Faculty

Departmental members

Alumnus

Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - I Semester Geology 2023 – 2024

DSC- I GEODYNAMICS & GEOMORPHOLOGY

(Course Code – BGL101) (3 Credits) **Max. Marks- 75**

Course Outcome: - After completion of this course, the student will be able to

1. Understand basics of Geology, Solar system and internal structure of the Earth, origin and age of the Earth
2. Understand the theories of continental drift and plate tectonics
3. Understand causes and effects of earthquakes and explain weathering and its products.
4. Describe concepts of geomorphology and landforms developed by various geological agencies.
5. Explain about the climate change and salient features of physiographic and tectonic divisions of India.

Unit I i). Introduction to Geology and its branches sand importance.
ii). Introduction to solar system: Star, planet, satellite, asteroid and meteorite Earth in the solar system.
iii). Origin of Earth.
iv). Internal structure of the Earth, Crust, Mantle and Core.
v). Age of Earth: Various methods of determination of age of the Earth.

Unit II i). Concept & theories of continental-drift, isostacy.
ii). Sea floor spreading and evidences.
iii). Concept of plate tectonics, tectonic plates and types, and plate boundaries.
iv). Introduction to paleomagnetism and polar wandering.
v). Mid-oceanic ridges, trenches and island arcs.

Unit III i). Earthquakes: Causes and effects, Earthquake Belts, measurement of earthquakes. Seismic zones of India.
ii). Volcanoes: Types & distribution.
iii). Fundamental concepts of geomorphology.
iv). Geomorphic agents and processes of rock weathering.
v). Soil formation, soil profile and types of soil.

Unit IV i). Geological work of rivers; fluvial landforms.
ii). Drainage system.
iii). Geological work of groundwater and karst topography.
iv). Geological work of wind; Aeolian landforms.
v). Geological work of Glaciers; glacial landforms.

Unit V i). Geological work of oceans; coastal landforms.
ii). Volcanic landforms.
iii). Earth's heat budget.
iv). Climate change, global warming, greenhouse effect.
v). Physiographic and tectonic divisions of India.

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - I Semester Geology 2023 – 2024

Books Recommended

1- भौतिक–भूविज्ञान –डॉ.मुकुलघोष

2- भौतिक–भूविज्ञान –डॉ. जे.पी. तिवारी एव बी.के.सिंह

3- भूआकृतिविज्ञान –डॉ.सविन्द्र सिंह

4- भूविज्ञान एक परिचय –डॉ.विद्यासागर दुबे

5- भूगतिकी एंव भूआकृतिविज्ञान –डॉ. दीपक राज तिवारी

6. Ahmad, A. F., Principles of Geomorphology.
7. Mahapatra, G. B., Textbook of Physical Geology, CBS,India,2018.
8. Mathur, S. M., Physical Geology of India, NBT India,1991.
9. Miller, William J., Physical Geology: An Introduction, D Van Nostrand Co., 5thEd., 1949.
10. Thornbury, W.D., Principles of Geomorphology. New Age International, 2nd Edition, 1969
11. Mukherjee, P. K., Text Book of Geology. World Press Private Ltd,2013.
12. Holmes, A. Doris L Holmes Edit., Principles of Physical Geology, Van Nostr and Reinhold, 1978

MARKS DISTRIBUTION

Internal assessment				15 marks
Semester end examination question paper	Very short answer type questions	1 X 10	10 marks	60 Marks
	Short answer type questions	3 X 5	15 marks	
	Long answer type questions	7 X 5	35 marks	
Grand Total				**75 Marks**

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

Senior Professor of Science Faculty Departmental members Alumnus Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - I Semester Geology 2023 – 2024

GEODYNAMICS & GEOMORPHOLOGY LAB-COURSE

(Course Code – BGL101P) (1 Credit) **Max Marks- 25**

Course Outcome: - After completion of this course, the student will be able to

1. Acquire a solid base of knowledge in the science of geology as interpreting geomorphic processes.
2. Interpret topographic maps and terrain models, structural models and types of landforms.
3. Demonstrate the ability to draw three dimensional views of various landforms.
4. Compute morphometric parameters from a drainage pattern.

Exercises: -

1. Study of geomorphic features from models, map and photographs.
2. Numbering of Topographical maps (Survey of India Toposheets) on various scales.
3. Interpretation of various landforms and drainage patterns on topographical maps.
4. Plotting of major mountain ranges, lakes and rivers on the outline map of India.
5. Plotting of seismic observatories on the outline map of India, Plotting of epicenter and magnitudes of major earthquakes of India.

Books Recommended

1- भौतिक–भूविज्ञान – डॉ. मुकुल घोष

2- भौतिक–भूविज्ञान –डॉ. जे. पी. तिवारी एव बी. के. सिंह

3- भूआकृति विज्ञान –डॉ. सविन्द्रसिंह

4. भूविज्ञान एक परिचय –डॉ. विद्यासागर दुबे

5- भूगतिकी एंव भूआकृतिविज्ञान–डॉ.दीपकराज तिवारी

6- प्रायोगिक भू–विज्ञान भाग–1 –डॉ.र.प्र.मांजरेकर

7- Ahmad, A. F., Principles of Geomorphology.

8- Mahapatra, G. B., Textbook of Physical Geology, CBS, India,2018.

9- Mathur, S. M., Physical Geology of India, NBT India,1991.

10- Miller, William J., Physical Geology: An Introduction, D Van Nostrand Co., 5thEd., 1949.

11- Thornbury, W.D., Principles of Geomorphology. New Age International, 2nd Edition, 1969

12- Mukherjee, P. K., Text Book of Geology. World Press Private Ltd,2013.

13- Holmes, A. Doris L Holmes Edit., Principles of Physical Geology, Van Nostr and Reinhold, 1978

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - II Semester Geology 2023 – 2024

DSC- I Mineralogy and Crystallography

(Course Code – BGL201) (3 Credits) **Max. Marks- 75**

Course Outcome: - On completion of Course, the students should be able to

1 Explain about the basics of crystallography, crystallographic axes and symmetry elements
2 Describe various forms of normal classes of various crystal systems
3 Classify the minerals in various silicate groups and explain their varieties
4 Describe the physical properties of various minerals.
5 Describe the optical characteristics of various minerals

UNIT-I (i) Definition of Mineral and Crystal.
(ii) Crystal structures, Unit cells
(iii) Elements of crystal. Crystal forms.
(iv) Crystallographic axes and axial angles.
(v)Weiss Parameters and Miller Indices systems of crystal notation

UNIT-II (i)Interfacial angle and its measurement. Laws of Crystallography
(ii) Crystal symmetry: plane , axis and centre of symmetry
(iii) Classification and symmetry of normal classes of seven crystal systems
(iv) Forms of normal classes.
(v) Twinning in crystals

UNIT-III (i) Silicate structures and classification of silictes.
(ii) Bonding in Minerals.
(iii) Isomorphism. Polymorphism and Pseudomorphism.
(iv) Solid solution
(v) Physical properties of minerals

UNIT-IV (i) Nature of light : reflection and refraction of light.
(ii) Refractive index. Critical angle. Total internal reflection and Becke effect.
(iii) Double refraction. Nicol prism, it's construction and working.
(iv) Polarizing Microscope- its parts & functions.
(v) Optical properties of minerals.

UNIT- V (a) Study of Composition, classification, physical and optical properties of the following mineral groups: (i) Olivine, Garnet and Mica groups.
(ii) Pyroxenes (iii) Amphiboles
(iv) Feldspars (v) Silica

(b) Composition of lithosphere

(c) Industrial and other uses of various minerals

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

Senior Professor of Science Faculty Departmental members Alumnus Student

DEPARTMENT OF GEOLOGY
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B.Sc. - II Semester Geology 2023 – 2024

Books Recommended

खनिज तथा क्रिस्टल विज्ञान – डॉ.बी.सी.जैश

खनिज विज्ञान के सिद्धांत – डॉ.ए.पी.अग्रवाल

प्रकाशीय खनिज विज्ञान के मूलतत्व – विंचेल

खनिज तथा क्रिस्टलविज्ञान – डॉ.दीपकराज तिवारी

Gribble,C.D.;Rutley's Elements of Mineralogy.CBS,2005.

Ford W.E.;Dana's Text Book of Mineralogy.CBS,2006.

Perkins,D.;Mineralogy, Prentice HallIndia,3rd ed.2012.

Rathore,B.S.; Basics of Crystallography Mineralogy and Geochemistry. Notion Press India,2020

MARKS DISTRIBUTION

Internal assessment				15 marks
Semester end examination question paper	Very short answer type questions	1 X 10	10 marks	60 Marks
	Short answer type questions	3 X 5	15 marks	
	Long answer type questions	7 X 5	35 marks	
Grand Total				**75 Marks**

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - IISemesterGeology 2023 – 2024

MINERALOGY AND CRYSTALLOGRAPHY LAB-COURSE

(Course Code – BGL201P) (1 Credit) **Max Marks- 25**

Course Outcome: -After completion of this course, the student will be able to

1. Describe crystal symmetry of various crystal systems
2. Identify various crystal forms.
3. Distinguish various minerals on the basis of their physical properties.
4. Distinguish various minerals on the basis of their optical properties.

Exercises: -

1. Study of symmetry elements of crystals /crystal models of normal classes.
2. Study of fundamental forms of crystals /crystal modelsof normal classes.
3. Verification of Euler's theorem.
4. Study of physical properties of minerals. Identification of minerals on the basis of their physicalproperties
5. Study of optical properties of important rock formingMinerals using polarizing microscope.Identification of minerals on the basis of their optical properties

Books Recommended

खनिजतथाक्रिस्टलविज्ञान–डॉ.बी.सी.जैष

खनिजविज्ञानकेसिद्धांत – डॉ.ए.पी.अग्रवाल

प्रकाशीयखनिजविज्ञानके मूलतत्व– विंचेल

खनिजतथाक्रिस्टलविज्ञान–डॉ.दीपकराजतिवारी

Gribble,C.D.;Rutley's Elements of Mineralogy.CBS,2005.

Ford W.E.;Dana'sText Book of Mineralogy.CBS,2006.

Perkins,D.;Mineralogy,Prentice HallIndia,3rd ed.2012.

Rathore,B.S.; Basics of Crystallography Mineralogy and Geochemistry. Notion Press India,2020

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
2023 – 2024
Skill Enhancement Course (SEC-1) Course Code- BGL S01

Course Outcome

After the completion of this course, the student will be able to

1. Explain various types of maps and scales
2. Describe map projections
3. Identify and discuss features on topographic maps
4. Explain the shape of contour pattern
5. Interpret topographic maps and identify landforms on topographic map

Topographic Map Skills

Session 2023-2024

No. of Credits – 01 Credits **Max. Marks – 25**

- Maps: Classification and types.
- Coordinate systems: Polar and rectangular.
- Survey of India topographical maps: Reference scheme of old and open series.
- Information on a topographic map.

Learning Resources:

A Guide to Field Geology by N.W. Gokhale, CBS Publishers , New Delhi. 2009.

Field Geology by Frederic H. Lahee. McGraw-Hill Book Company, 1961

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/earthsciences/pdf/topo101/pdf/mapping_basics_e.pdf

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

Senior Professor of Science Faculty Departmental members Alumnus Student

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2023 – 2024

Practicals

No. of Credits – 01 Credits **Max. Marks – 25**

- Natural features and cultural features on topographic maps.
- Topographic Map and Contour Lines. Contour patterns, Rule of Vs and its significance.
- Measurement of distance on topographic maps.
- Interpretation of topographic maps.

Question Paper Format and Distribution of Marks for Under Graduate Examination

1. The question paper will consist of 10 questions and any 5 will have to be attempted.

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

Senior Professor of Science Faculty Departmental members Alumnus Student

DEPARTMENT OF GEOLOGY
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2023 – 2024
Skill Enhancement Course (SEC-2) Course Code- BGL S02

Course Outcome

After the completion of this course, the student will be able to

1. Explain the meaning of attitude of rock bed.
2. Describe the construction and workings of Clinometer compass.
3. Describe the construction and workings of Brunton compass.
4. Measure the attitude of rock beds using clinometer and Brunton compass.
5. Calculate value of true dip when two values of apparent dip are given.

Attitude and its measurement

Session 2023-2024

No. of Credits – 01 Credits **Max. Marks – 25**

- Basic concepts of attitude of rock beds
- Dip: True dip and apparent dip, strike, plunge and pitch.
- Clinometer compass construction and working.
- Brunton compass construction and working.

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
2023 – 2024

Practical

No. of Credits – 01 Credits **Max. Marks – 25**

- Measurement of attitude of rock beds using clinometer compass.
- Measurement of attitude of rock beds using Brunton compass.
- Calculation of true dip using geometrical method on the basis of two values of apparent dip.

Question Paper Format and Distribution of Marks for Under Graduate Examination

1. The question paper will consist of 10 questions and any 5 will have to be attempted.

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

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Approved Syllabus for
B.Sc. GEOLOGY by the members of Board of Studies for Session 2023-24
Scheme and Syllabus for B.Sc. Year 2 (Semester III & IV)

Scheme for B.Sc. Program with Geology - Second Year
(with 3 Subjects A, B*, C*Subject A-Geology)

Semester	Discipline Specific Course/ Core Course DSC (Credit-4)	Generic Elective Course GEC/ Discipline Specific Elective DSE (Credit-4)	Skill Enhancement Course SEC (Credit-2)	Ability Enhancement Course AEC (Credit-2)	Value Added Course VAC (Credit-2)	Total Credits
3	Petrology (Course code :- BGL301) (Th=3, P=1) Subject B3 (Th=3, P=1) Subject C3 (Th=3, P=1)	Choose one from a pool of courses DSE-1 A/B/C Or Choose one from a pool of courses GEC-3 (Th=3, P=1)	Choose 1 from pool of SEC (Th=1, P=1) Or Internship/ Apprenticeship /Project/ Community outreach (2)	EVS Theory (2)	Choose one from a pool of courses (2)	22
4	Structural Geology (Course code : BGL401) (Th=3, P=1) Subject B4 (Th=3, P=1) Subject C4 (Th=3, P=1)	Choose one from a pool of courses DSE-2 A/B/C Or Choose one from a pool of courses GEC-4 (Th=3, P=1) (Th=3, P=1)	Choose 1 from pool of SEC (Th=1, P=1) Or Internship/ Apprenticeship /Project/ Community outreach (2)	EVS Project (2)	Choose one from a pool of courses (2)	22

Students on exit shall be awarded undergraduate Diploma (in the Field of Multidisciplinary study) after securing the requisite 88 credits on completion of Semester IV

(Total Credits: Sem 1 - 22, Sem 2 – 22, Sem 3 – 22 and Sem 4 – 22; TOTAL - 88 credits)

***Subjects B/C:**
Maths/Physics/Botany/Zoology/Microbiology/Zoology/Geology/Biotechnology/Biochemistry/ Industrial Chemistry/Anthropology

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

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Scheme and Syllabus for B.Sc. Year 2 (Semester III & IV)

Courses and Marking Scheme for Second-year B.Sc. with Geology

Year	Sem.	Course Code	Paper Title	Theory/ Practical	Credits	Marks	Sem End	IA
For Diploma								
Discipline Specific Courses – DSC (Core Courses)/Generic Elective Course - GEC								
2	III	BGL301	Petrology	Theory	3	75	60	15
		BGL301P	Petrology Lab Course	Practical	1	25		
	IV	BGL401	Structural Geology	Theory	3	75	60	15
		BGL401P	Structural Geology Lab Course	Practical	1	25		
2	**Skill Enhancement Courses - SEC**							
	III & IV	BGLS01	Topographic Map Skills	Theory	1	25	20	05
				Practical	1	25		
		BGLS02	Attitude and its measurment	Theory	1	25	20	05
				Practical	1	25		
Discipline Specific Electives – DSE (Core Courses)								
2	III	BGL302	Elements of Geology	Theory	3	75	60	15
		BGL302P	Elements of Geology Lab Course	Practical	1	25		
	IV	BGL402	Fuel Geology	Theory	3	75	60	15
		BGL402P	Fuel Geology Lab Course	Practical	1	25		

Note: Semester End – 80% and Internal Assessment (IA) – 20% (Weightage of marks internal examinations will be included as per guidelines of Autonomous Examination Cell)
Minimum pass requirement : 40% in End Semester and IA separately.

Chairperson /H.O.D

Subject Expert

Subject Expert

Subject Expert

Senior Professor of Science Faculty

Departmental members

Alumnus

Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. – III Semester Geology 2023 – 2024

DSC- I PETROLOGY

(Course Code – BGL301) (3 Credits) **Max. Marks- 75**

Course Outcome: - After completion of this course, the student will be able to

1. Discuss about the formation of Igneous rocks, their texture and structures
2. Explain about forms and classification of igneous rocks
3. Identify, describe and classify sedimentary rocks using hand specimens
4. Describe the formation of sedimentary rocks, their textures and structures
5. Explain about the formation of Metamorphic rocks, their texture and structure
6. Identify and classify various types of metamorphic rocks.
7. Explain the concept of metamorphic facies, ACF, AKF and AFM diagrams

UNIT-I (i) Magma: definition, origin & composition
(ii) Bowen's reaction series, magmatic differentiation & assimilation
(iii) Introduction to crystallisation of Uni component (Silica), Bi component (albile-anorthile and diposide-anorthite) and tricomponent magma (diopside-albilte-anorthite).
(iv) Texture, structures & forms of igneous rocks
(v)Classification of igneous rocks: Mineralogical, chemical &Tabular classification

UNIT-II (i)Brief idea of formation of igneous rocks in relation to plate Tectonics
(ii)Introduction to petrology of Acid igneous rocks.
(iii)Introduction to petrology of Alkaline igneous rocks
(iv) Introduction to petrology of Basic igneous rock
(v) Introduction to petrology of Ultrabasic igneous rocks.

UNIT-III (i) Origin, transportation & deposition of sediments
(ii) Sedimentary depositional environments ; Aeolian, fluvial, coastal and abyssal environment.
(iii) Introduction to sedimentary facies. Lithification & Digenesis.
(iv) Textures & structures of sedimentary rocks.
(v) Brief idea of formation of sedimentary rocks in relation to plate Tectonics

UNIT-IV (i) Classification of sedimentary rocks: Clastic, non-clastic and biogenic rocks.
(ii) Petrographic description of Breccia, Conglomerate, sandstone, shale, siltstone and limestone.
(iii) Metamorphism: Definition, agents, facies & grades
(iv) Textures, structures & classification of metamorphic rocks.
(v) Phase rule in metamorphism. Elementary idea about Paragenetic diagrams & projective analysis.

UNIT-V (i) A.C.F & A.K.F. diagrams
(ii) Progressive metamorphism of Argillaceous rocks and thermal metamorphism of impure limestone.
(iii) Progressive metamorphism of basic igneous rocks
(iv)Petrographic description of slate, phyllite, schist, gneiss, marble, quartzite, amphibolite, Khondalite, Gondite, Kodurite & Charnockite.
(v) Introduction to Paired Metamorphic Belts

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

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B.Sc. – III Semester Geology 2023 – 2024

Books Recommended

(1) शैलिकी के सिद्धान्त – डॉ.अंबिका प्रसाद अग्रवाल

(2) शैलिकी के सिद्धान्त – ए.जी. झिंगरन

(3) Principles of petrology - G.W. Tyrell

(4) Petrology - H.William, F.J. Turner & E.M. Gilbert

(5) Petrology of igneous & metamorphic rocks of India- S.C. Chattarjee

(6) A text book of sedimentary petrology - Verma & Prasad

(7) Metamorphism & Metamorphic rocks of India- S.Ray

(8) Sedimentary rocks - F.J. Pettijohn

(9) Introduction of sedimentology - S.Sengupta

(10) Sedimentary environment - H.G. Readings

MARKS DISTRIBUTION

Internal assessment				15 marks
Semester end examination question paper	Very short answer type questions	1 X 10	10 marks	60 Marks
	Short answer type questions	3 X 5	15 marks	
	Long answer type questions	7 X 5	35 marks	
Grand Total				**75 Marks**

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. – III Semester Geology 2023 – 2024

PETROLOGY LAB-COURSE

(Course Code – BGL301P) (1 Credit) **Max Marks- 25**

Course Outcome: - After completion of this course, the student will be able to

1. Identify igneous, sedimentary and metamorphic rocks in hand specimen
2. Describe microscopic properties of igneous, sedimentary and metamorphic rocks
3. Discuss structures and textures of igneous, sedimentary and metamorphic rocks
4. Draw ACF, AKF and AFM diagrams

Exercises: -

1. Study of igneous, sedimentary and metamorphic rocks in hand specimen
2. Study of microscopic properties of igneous, sedimentary and metamorphic rocks
3. Study of structures and textures of igneous, sedimentary and metamorphic rocks
4. Plotting ACF, AKF and AFM diagrams

Books Recommended

(1) शैलिकी के सिद्धान्त – डॉ.अंबिका प्रसाद अग्रवाल

(2) शैलिकी के सिद्धान्त – ए.जी. झिंगरन

(3) Principles of petrology - G.W. Tyrell

(4) Petrology - H.William, F.J. Turner & E.M. Gilbert

(5) Petrology of igneous & metamorphic rocks of India- S.C. Chattarjee

(6) A text book of sedimentary petrology - Verma & Prasad

(7) Metamorphism & Metamorphic rocks of India- S.Ray

(8) Sedimentary rocks - F.J. Pettijohn

(9) Introduction of sedimentology - S.Sengupta

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. – IV Semester Geology 2023 – 2024

DSC- I STRUCTURAL GEOLOGY

(Course Code – BGL 401) (3 Credits) **Max. Marks- 75**

Course Outcome: - After completion of this course, the student will be able to

1. Demonstrate the use of clinometer compass and Brunton compass in measurement of attitude of rock bed.
2. Explain about parts of fold and classify various folds
3. Recognize and classify the faults in the field and on geological map
4. Identify and classify Unconformities
5. Discuss about various types of Joints
6. Explain various types of foliations and lineations
7. Identify the top and bottom of rock beds in a series of rocks

UNIT-I
(i)Structural Geology: Definition and scope. Study of outcrops. Identification of bedding.
(ii)Dip and strike: definition & measurement. Effects of Dip and slope on outcrops: Rule of 'Vs'.
(iii) Clinometer and Brunton compass: Understanding and use in measuring attitude of rock
(iv) Unconformity: Definition & types.
(V) Outlier and inlier. Overlap & offlap. Recogntion of unconformity.

UNIT-II
(i) Fold: Definition and morphology.
(ii)Geometric and genetic classification of folds.
(iii) Recognition of folds in the field and on geological maps.
(iv) Effect of folds on outcrops.
(v) Elementary idea of mechanics of folding.

UNIT-III
(i)Fault: Definition and morphology.
(ii) Geometric and genetic classification of faults.
(iii) Recognition of faults in the field and on geological maps.
(iv)Effect of faults on outcrops.
(v) Elementary idea of mechanics of faulting.

UNIT-IV
(i) Joint: Definition, geometric & genetic classification of joints. Significance of joints.
(ii)Foliation: terminology, kinds, origin and relation to major structures.
(iii) Lineation: terminology, Kinds, origin and relation to major structures.
(iv) Plutons; tectonics & emplacement
(v) Recognition of top and bottom of beds

UNIT-V
(i) Concept of rock deformation.
(ii) Stress and Stress Ellipsoids.
(iii)Tectonic framework of India
(iv)Contours: Definition, patterns. Introduction to geological maps and their interpretation.
(v) Stereographic projection & it use in Structural geology.

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Books Recommended

(1) संरचनात्क भूविज्ञान – डॉ.डी.के. श्रीवास्तव

(2) भूवैज्ञानिक संरचनाएँ – डॉ. भरत सिंह राठौर

(3) प्रायोगिक भूविज्ञान (भाग–2) – आर.पी. मांजरेकर

(4) Structural Geology. M.P. Billings.

(5) Theory of Structural Geology; Gokhale, N.W. CBS

(6) Exercises on Geological maps and dip-Strike: Gokhale, N.W. CBS.

(7) Outlines of structural Geology. E.S. Hills.

(8) Structural Geology- Hobbs. Means and Williams.

(9) Geological maps- Chiplonkar and Pawar.

MARKS DISTRIBUTION

Internal assessment				15 marks
Semester end examination question paper	Very short answer type questions	1 X 10	10 marks	60 Marks
	Short answer type questions	3 X 5	15 marks	
	Long answer type questions	7 X 5	35 marks	
Grand Total				**75 Marks**

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. – IV Semester Geology 2023 – 2024

STRUCTURAL GEOLOGY LAB-COURSE

(Course Code – BGL401P) (1 Credit) **Max Marks- 25**

Course Outcome: - After completion of this course, the student will be able to

1. Analyze the contour maps
2. Complete the outcrop in a three-point problem.
3. Compute the thickness of the outcrop.s
4. Identify the true and apparent dip through trigonometrical calculation and graphical method.
5. Construct geological cross section from given geological map and discuss its geological history.
6. Measure attitude of rock using Clinometer and Brunton compass.

Exercises: -

1. Study of geological maps and calculation of dip of rock beds
2. Study of geological structures like folds, faults and unconformities on geological map
3. Study of geological structures in block models, hand specimens and photographs
4. Construction of geological cross section from given geological map
5. Measurement of attitude of rock using Clinometer and Brunton compass

Books Recommended

(1) संरचनात्क भूविज्ञान – डॉ.डी.के. श्रीवास्तव

(2) भूवैज्ञानिक संरचनाएँ – डॉ. भरत सिंह राठौर

(3) प्रायोगिक भूविज्ञान (भाग–2) – आर.पी. मांजरेकर

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(7) Outlines of structural Geology. E.S. Hills.

(8) Structural Geology- Hobbs. Means and Williams.

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Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - III Semester Geology 2023 – 2024

DSE- I Elements of Geology

(Course Code – BGL302) (3 Credits) Max Marks- 75

Course Outcome: -After completion of this course, the student will be able to

1. Explain the scope and importance of geology
2. Describe earth surface processes.
3. Discuss the Earth's spheres.
4. Explain the reason behind the Earth's magnetic field.
5. Describe the process of mountain building and ice age.
6. Explain the important ores and demarcate their distributions in India.
7. Discuss various coal fields and oilfields in India.
8. Evaluate the principles of Stratigraphy and Geological Time scale
9. Explain the fundamental concept of fossils and their preservation.

UNIT-1. i). Introduction to Geology and its relation to other branches of science.
ii). Scope and subdisciplines of Geology, importance of Geology, Geology in daily life.
iii). Earth Surface Processes: Significance of geological processes.
iv). Endogenetic processes and exogenetic Processes.
v). Mass wasting.

UNIT-2. i). Earth's Spheres: Hydrosphere, Atmosphere, Biosphere, Lithosphere.
ii). Lithosphere: Materials of the Earth's Crust: Rocks and Minerals.
iii). Classification of rocks and minerals. Rock cycle.
iv). Hydrosphere: Water cycle, Ocean Floor and Relief Features.
v). Convections in the Earth's mantle; Earth's Magnetic field.

UNIT-3. i). Mountain building and its causes; Evidences of mountain building processes; Classification of Mountains.
ii). Mountain building and plate tectonics.
iii). Origin and evolution of Himalaya.
iv). Classification of the Himalayan Mountain range.
v). Global climate change, Ice age: causes of ice age.

UNIT-4. i). Ore Geology: Ores, gangue and industrial minerals; Tenor, grade and specifications.
ii). Resources and reserves; classification of reserves.
iii). Distribution of iron, copper, manganese and gold deposits in India.
iv). Distribution of coal fields in India.
v). Distribution of petroleum fields in India.

UNIT-5. i). Stratigraphy: Definition, basic principles of stratigraphy.
ii). Geological time scale.
iii). Physiographic and tectonic divisions of India.
iv). Introduction to Palaeontology: Definition, fossils and index fossils.
v). Mode of preservation and significance of fossils.

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B.Sc. - III Semester Geology 2023 – 2024

Books Recommended

Jain,P.C., and Anantharaman, M.S., 1996:Palaeontology – Evolution and animal distribution. Vishal Publications.

Kumar, Ravindra,1985: Fundamentals of Historical Geology and Stratigraphy of India. Wiley Eastern Ltd.

Umeshwar Prasad, Economic mineral deposits of India, CBS Publishers and Distributers, India,2008

Singh, Savindra, 2007: Geomorphology. Prayag Pustak Bhavan, Allahabad.

Holmes, A. Doris L Holmes Edit., Principles of Physical Geology,VanNostrandReinhold,1978.

Mahapatra,G.B.,TextbookofPhysicalGeology,CBS Publishers and Distributers, India,2018.

Mukherjee,P.K.,TextBookofGeology.WorldPressPrivateLtd.2013

MARKS DISTRIBUTION

Internal assessment				15 marks
Semester end examination question paper	Very short answer type questions	1 X 10	10 marks	60 Marks
	Short answer type questions	3 X 5	15marks	
	Long answer type questions	7 X 5	35 marks	
Grand Total				75 Marks

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Departmental members

Alumnus

Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - III Semester Geology 2023 – 2024

ELEMENTS OF GEOLOGY LAB COURSE

(Course Code – BGL302P) (1 Credit) Max Marks- 25

Course Outcome: - After completion of this course, the student will be able to

1. Demarcate coal fields in the map of India and Chhattisgarh.
2. Demarcate oilfields in the map of India.
3. Identify minerals in hand specimen and mention their uses.
4. Identify rocks in hand specimen and mention their uses.
5. Delineate major mountain ranges in outline map of India.
6. Plot various localities of Iron ore, Copper ore, Manganese ore and Gold deposits in outline map of India.
7. Plotphysiographic and tectonic divisions on outline map of India.

Exercises: -

1. Identification of minerals in hand specimens.
2. Identification of rocks in hand specimens.
3. Demarcation of major mountain ranges in outline map of India.
4. Delineation of various parts of Himalayan Mountain range.
5. Identification of ore minerals in hand specimen and their uses.
6. Demarcation of various localities showing Iron ore, Copper ore, Manganese ore and gold deposits in outline map of India.
7. Demarcation of coal field in map of India.
8. Demarcation of coal field in map of Chhattisgarh.
9. Demarcation of oilfield in map of India.
10. Demarcation of physiographic and tectonic divisions of India.

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - IV SemesterGeology 2023 – 2024

DSE-II Fuel Geology
(Course Code – BGL402)(3 Credits) Max Marks- 75

Course Outcome: - After completion of this course, the student will be able to

1. Describe origin, mode of occurrence and distribution of coal in India and Chhattisgarh.
2. Explain the fundamental concept of maturation of coal bed methane.
3. Classify kerogen into various types.
4. Explain origin, mode of occurrence and distribution of petroleum in India and World.
5. Discuss origin, mode of occurrence and distribution of radioactive minerals in India.

Unit 1. i). Definition and origin of coal.Sedimentology of coal bearing strata.
ii). Rank of coal peat lignite bituminous and anthracite,
iii). grade and type of coal.
iv). Chemical characterization: proximate and ultimate analyses.
v). Macroscopic ingredients and microscopic constituents. concept of maceral and microlith

Unit 2. i). Coal gasification and coal hydrogenation.
ii). Coal carbonization (coke manufacture)
iii). Geographical distribution of coal deposits in India.
iv). Geological distribution of coal deposits in India
v). Coalfields of Chhattisgarh.

Unit 3. i).Problems of coal industry in India.
ii). Role of geologist in coal industry
iii) Coal bed methane: a new energy resource. maturation of coal and generation of methane coal beds.
iv). Transformation of organic matter into kerogen
v). Classification of kerogen.

Unit 4. i). Origin, nature and migration of oil and gas.
ii) Composition of petroleum and its different fractions.
iii). Characteristics of reservoir rocks and traps(structural, stratigraphic and combination).
iv). Oil bearing basins of India.
v). Geological and Geographical distribution of oilfields in India.

Unit 5. i). Mode of occurrence and association of atomic minerals in nature.
ii). Atomic minerals as source of energy.
iii). Methods of prospecting of atomic minerals.
iv). Nuclear power stations of the country and future prospects.
v). Atomic fuels and environmental hazards

Books Recommended

Chandra, D., Singh, R.M. and Singh, M.P., 2000: Textbook of Coal (Indian Context). Tara Book Agency, Varanasi.
Singh, M.P.(Ed.) 1998: Coal and Organic Petrology. Hindustan Publ. Corp., New Delhi.

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

Senior Professor of Science Faculty Departmental members Alumnus Student

DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
B.Sc. - IV SemesterGeology 2023 – 2024

Holson and Tiratsoo,E.N.,1985: Introduction to Petroleum Geology. Gulf. Publ. Houston, Texas.Selley, R.C., 1998: Elements of Petroleum Geology. Academic Press.
Durrance, E.M., 1986: Radioactivity in Geology. Principles and Applications. Ellis Hoorwool.
Dahlkamp, F.J., 1993: UraniumOre Deposits. Springer Verlag.

MARKS DISTRIBUTION

Internal assessment				15 marks
Semester end examination question paper	Very short answer type questions	1 X 10	10 marks	60 Marks
	Short answer type questions	3 X 5	15 marks	
	Long answer type questions	7 X 5	35 marks	
Grand Total				75 Marks

FUEL GEOLOGY LAB COURSE
(Course Code – BGL402P) (1 Credit) Max Marks- 25

Course Outcome: - After completion of this course, the student will be able to

1. Identify various types of coal.
2. Distinguish macroscopic constituents of coal.
3. Demarcate coal fields in the map of India and Chhattisgarh.
4. Demarcate oilfields in the world map and map of India.
5. Demarcate the occurrences of atomic minerals on the map of India.
6. Demarcate Nuclear power stations in India.
7. Delineate barren zone in a geological map.

Exercises: -

1. Megascopic characterization of banded coals. Proximate analysis of coal.
2. Completion of outcrops in the given map and calculation of coal reserves.
3. Demarcation of coal field in map of India.
4. Demarcation of coal field in map of Chhattisgarh.
5. Demarcation of oilfield in map of India.
6. Demarcation of oilfield in map of World.
7. Demarcation of Atomic mineral deposits in India.
8. Demarcation of Nuclear power station in India.
9. Identification of barren zone in a geological map.

Chairperson /H.O.D Subject Expert Subject Expert Subject Expert

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