Revised Syllabus

DEPARTMENT OF GEOLOGY

COURSE CURRICULUM & MARKING SCHEME

B.Sc. I & II Semester
GEOLOGY

(Based on Choice Based Credit System)

SESSION : 2022-23

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

Part A Introduction				
Program: **Certificate Course**		Class: **B.Sc. I Semester**	Year: **2022**	Session:**2022-2023**
1	Course Code	BGL101 Core Course		
2	Course Title	Geodynamics & Geomorphology		
3	Course Type	Theory/		
4	Pre-requisite (if any)	To study this group, a student must have had passed in the subject of **Mathematics Group** or **Biology Group** in the class 12th.		
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able 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		
6	Credit Value	Theory: 3		
7	Total Marks	Maximum Marks: 75	MinimumPassingMarks:30	

Part B: **Content of the Course** Total No. of Lectures: 60		
Unit	Topics	No. of Lectures
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; size, shape, mass, & density. (iii) Origin of Earth. (iv) Internal structure of Earth, Crust, Mantle and Core. (v) Age of Earth: Various methods of determination of age of the Earth	12

Chairperson /H.O.D **Subject Expert** **Subject Expert** **Subject Expert** **Senior Professor of Science Faculty**

Departmental members **Departmental members** **Alumnus** **Student member**

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.	12
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.	12
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.	12
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.	12

Keywords:
Earth, Geodynamics, Geological work, plate tectonics, geomorphology, land forms, weathering, Earthquake, Volcanoes.

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Part C- Learning Resources

Text Books, Reference Books, Other resources Suggested Readings:

1- भौतिक – भूविज्ञान –डॉ. मुकुलघोष

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 भूआकृति विज्ञान –डॉ. दीपकराज तिवारी

6. Holmes, A. Doris L Holmes Edit., Principles of Physical Geology, Van Nostr and Reinhold, 1978.
7. Mahapatra, G.B., Text book 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 Nostr and Co., 5th Ed., 1949
10. Mukerjee, P.K., Text Book of Geology. World Press Private Ltd, 2013
11. Thornbury, W.D., Principles of Geomorphology. New Age International, 2nd Edition, 1969
12. Principles of Geomorphology: A.F. Ahmad

e-book:

1. Jain Sreepat, Fundamentals of Physical Geology. Springer India, 2013

2. Digital platform web links:

1. https://opentextbc.ca/physicalgeology2ed/front-matte/rdownload-a-pdf/
2. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
3. http://www.tulane.edu/~sanelson/eensl 110/index.htrnl [for introduction to folds, faults...]

Suggested equivalent online courses:

Part D- Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 75		
Internal Assessment: Continuous Comprehensive Evaluation (CCE) : 15	Class Test Assignment / Presentation	
External Assessment: University Examination (UE): 60	**Section(A)**: Ten Very Short Questions / Multiple-choice / Objective **Section(B)**: Five Short Questions **Section(C)**: Five Long Questions	**01 X 10 = 10** **04 X 05 = 20** **06 X 05 = 30** Total: **60**

Chairperson /H.O.D **Subject Expert** **Subject Expert** **Subject Expert** **Senior Professor of Science Faculty**

Departmental members **Departmental members** **Alumnus** **Student member**

Part A Introduction				
Program: **Certificate Course**		Class: **B.Sc. I ~~Year~~ Sem**	Year: **2022**	Session:**2022-2023**
1	Course Code	BGL101 P		
2	Course Title	Geodynamics & Geomorphology. (Practical)		
3	Course Type	Practical		
4	Pre-requisite (if any)	This practical Course is related to theory course Geology Semester I.		
5	Course Learning Outcomes (CLO)	1. Students will acquire a solid base of knowledge in the science of geology as interpreting geomorphic processes. 2. They will get developed the ability of interpreting topographic maps and terrain models, structural models and types of landforms. 3. Students will be able to draw three dimensional views of various landforms 4. The students will be able to compute morphometric parameters from a drainage pattern		
6	Credit Value	1		
7	Total Marks	Maximum Marks: 25	MinimumPassingMarks:10	

Part B: **Content of the Course**		
Geodynamics and Geomorphology		
Unit	Topics	No. of Lectures
1	Study of geomorphic features from models, map and photographs.	6
2	Numbering of Topographical maps (Survey of India Toposheets) on various scales.	6
3	Interpretation of various landforms and drainage patterns on topographical maps.	6
4	Plotting of major mountain ranges, lakes and rivers on the outline map of India.	6
5	Plotting of seismic observatories on the outline map of India, Plotting of epicenter and magnitudes of major earthquakes of India.	6

Keywords:
Geomorphological models, Topographical maps, Landforms, Drainage pattern, Earthquacke, Seismic observatories, Epicentre, Magnitude.

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Part C- **Learning Resource**
Text Books, Reference Books, Other Resources

Suggested Readings:

1-भौतिक – भूविज्ञान – डॉ. मुकुल घोष

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

3. भूआकृति विज्ञान – डॉ. सविन्द्र सिंह

4. भूविज्ञान एक परिचय – डॉ. विद्यासागर दुबे

5. भूगतिकी एंव भूआकृति विज्ञान – डॉ. दीपकराज तिवारी

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

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12- Principles of Geomorphology: A.F. Ahmad

13- प्रायोगिक भू–विज्ञान (भाग–1) – डॉ. र.प्र. मांजरेकर

Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks:		25
Internal Assessment: Continuous Comprehensive Evaluation(CCE)		5 Total Marks: 5
External Assessment:	Spotting and descriptive ectype questions as per available samples, models, maps and photographs in the department.	Total Marks 20

Chairperson /H.O.D **Subject Expert** **Subject Expert** **Subject Expert** **Senior Professor of Science Faculty**

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2022 – 2023

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 2022-2023

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

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2022 – 2023

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.

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Part A Introduction				
Program: **Certificate Course**		Class: **B.Sc. II Semester**	Year: **2022**	Session: **2022-2023**
1	Course Code	BGL201 Core Course		
2	Course Title	Mineralogy and Crystallography		
3	Course Type	Theory		
4	Pre-requisite (if any)	To study this group, a student must have had passed in the Subject of **Mathematics Group** or **Biology Group** in the class 12th.		
5	Course Learning Outcomes (CLO)	On completion of Course, the students should be able to 1 Explain about the basics of crystallography, various crystal forms, 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		
6	Credit Value	Theory: 3		
7	Total Marks	Maximum Marks: 75	Minimum Passing Marks: 30	

Part B: **Content of the Course** Total No. of Lectures: 60		
Unit	Topics	No. of Lectures
1	(i) Definition of Mineral and Crystal: Rock forming and ore minerals. (ii) Crystal structures, Unit cells (iii) Elements of crystal. Crystal forms. (iv) Crystallographic axes and axial angles. (v) Weiss's Parameters and Miller's Indices systems of crystal notations.	12

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2	(i) Interfacial angle and its measurement, Laws of Crystallography. (ii) Crystal symmetry: plane, axis and centre of symmetry. (iii) Classification of crystals into systems and classes. (iv) Symmetry and forms of normal classes. (v) Twinning in crystals.	12
3	(i) Silicate structures and classification of silicates. (ii) Bonding in Minerals. (iii) Isomorphism and Solid solution. (iv) Polymorphism and Pseudomorphism. (v) Physical properties of minerals.	12
4	(i) Nature of light: reflection and refraction of light. (ii) Refractive index. Critical angles. Total internal reflection and Becke effect. (iii) Double refraction. Nicol prism: construction and working. (iv) Polarizing Microscope- its parts& functions. (v) Optical properties of minerals.	12
5	5.1 Study of Composition, Classification, physical and optical properties of the following Mineral groups: (i) Olivine, Garnet and Micagroups. (ii) Pyroxenes and Amphiboles (iii) Feldspars, Feldspathoids and Silica 5.2 Composition of lithosphere. 5.3 Industrial and other uses of various minerals	12

Key words:
Mineral, crystals, elements of crystal, physical property optical property, rock forming minerals, olivine, garnet, mica, pyroxene, amphibole feldspar, silica.

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Part C- Learning Resources
Text Books, Reference Books, Other resources
Suggested Readings: 1- खनिज तथा क्रिस्टल विज्ञान – डॉ. बी.सी. जैष 2- खनिज विज्ञान के सिद्धांत –डॉ. ए.पी. अग्रवाल 3. प्रकाशीय खनिज विज्ञान के मूलतत्व – विंचेल 4. खनिज तथा क्रिस्टल विज्ञान – डॉ. दीपकराज तिवारी 5. Gribble, C.D.; Rutley's Elements of Mineralogy. CBS, 2005. 6. Ford W.E.; Dana's Text Book of Mineralogy. CBS, 2006. 7. Perkins, D.; Mineralogy, Prentice Hall India, 3rd ed. 2012. 8. Rathore, B.S.; Basics of Crystallography, Mineralogy and Geochemistry. Notion Press India, 2020. 9. Sharma, R.S. and Sharma, Anurag; Crystallography and Mineralogy-Concepts and Methods. Geol. Soc. Ind., Bengaluru, 2013. **2. Digital platform web links:** 1. https://www.mindat.org 2. https://www.mooc-list.com/tags /minerals 3. https://epgp.inflibnet.ac.in/Home
Suggested equivalent online courses:

Part D- Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 75		
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 15	Class Test Assignment/ Presentation	
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Part A Introduction				
Program: **Certificate Course**		Class: **B.Sc. II Semester**	Year: **2022**	Session: **2022-2023**
1	Course Code	BGL201 P		
2	Course Title	Mineralogy and Crystallography (Practical)		
3	Course Type	Practical		
4	Pre-requisite (if any)	This practical Course is related to theory course Geology Semester II		
5	Course Learning Outcomes (CLO)	1. This knowledge will make a student able to identify minerals on the basis of physical properties 2. This knowledge will make a student able to identify minerals on the basis ofoptical properties 3. Students will be able to describe the crystal symmetry 4. Students will acquire base knowledge of crystal forms through study of crystal symmetry and crystal parameters.		
6	Credit Value	1		
7	Total Marks	Maximum Marks: 25	Minimum Passing Marks:10	

Part B: **Content of the Course**		
Mineralogy and Crystallography		
Unit	Topics	No.of Lectures
1	Study of symmetry elements of crystals/ crystal models of normal classes.	06
2	Study of fundamental forms of crystals/ crystal models Of normal classes.	06
3	Verification of Euler's theorem.	03
4	Study of physical properties of minerals.	09
5	Study of optical properties of important rock forming Minerals using polarizing microscope.	06
Keywords: Crystal, forms, crystal element, mineral, physical properties, optical properties.		

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Part C- **Learning Resource**
Text Books, Reference Books, Other Resources

Suggested Readings:

1. प्रायोगिक भू–विज्ञान (भाग–1) – डॉ. र.प्र. मांजरेकर
2. खनिज तथा क्रिस्टल विज्ञान – डॉ.बी.सी. जैष
3. खनिज विज्ञान के सिद्धांत – डॉ. ए.पी. अग्रवाल
4. प्रकाशीय खनिज विज्ञान के मूलतत्व – विंचेल
5. खनिज तथा क्रिस्टल विज्ञान –डॉ. दीपकराज तिवारी
6. Gribble, C.D.; Rutley's Elements of Mineralogy. CBS, 2005.
7. Ford W.E.; Dana's Text Book of Mineralogy. CBS, 2006.
8. Perkins, D.; Mineralogy, Prentice Hall India, 3rd ed. 2012
9. Rathore, B.S.; Basics of Crystallography, Mineralogy and Geochemistry. Notion Press India, 2020 Sharma, R.S. and Sharma, Anurag; Crystallography and Mineralogy- Concepts and Methods. Geol. Soc. Ind., Bengaluru, 2013.
10. Online resources (similar courses available on SWAYAM / NPTEL/CEC etc.)

Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 25		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)		5 Total Marks: 5
External Assessment:	Spotting and descriptive type questions as per available samples, models, maps and photographs in the department.	Total Marks 20

Chairperson /H.O.D **Subject Expert** **Subject Expert** **Subject Expert** **Senior Professor of Science Faculty**

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
2022 – 2023
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 2022-2023

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

- Basic concept of outcrop.
- 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.

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DEPARTMENT OF GEOLOGY
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2022 – 2023

Practical

No. of Credits – 01 Credit **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.

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