FYUGP FRAMEWORK FOR BACHELORS WITH GEOLOGY AS MAJOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	PRACTICAL / TUTORIAL
I	GLY122J	CT - I	**GEOLOGY:** FUNDAMENTALS OF GEOLOGY	4	2
II	GLY222J	CT -I	**GEOLOGY:** CRYSTALLOGRAPHY AND PETROLOGY	4	2
III	GLY322J	CT - I	**GEOLOGY:** SEDIMENTOLOGY	4	2
IV	GLY422J1	CT -I	**GEOLOGY:** PALEONTOLOGY AND STRATIGRAPHY	3	1
	GLY422J2	CT - II	**GEOLOGY:** ENGINEERING GEOLOGY	4	2
	GLY422J3	CT -II	**GEOLOGY:** MEDICAL GEOLOGY	4	2
V	GLY522J1	CT - I	**GEOLOGY:** GEOCHEMISTRY AND GEOPHYSICS	3	1
	GLY522J2	CT -II	**GEOLOGY:** REMOTE SENSING AND GEOLOGICAL HAZARDS	4	2
	GLY522J3	CT - III	**GEOLOGY:** ADVANCED GEOCHEMISTRY	4	2
VI	GLY622J1	CT - I	**GEOLOGY:** STRUCTURAL GEOLOGY AND TECTONICS	3	1
	GLY622J2	CT - II	**GEOLOGY:** HYDROGEOLOGY AND ENVIRONMENTAL GEOLOGY	4	2
	GLY622J3	CT - III	**GEOLOGY:** MINING AND EXPLORATION GEOLOGY	4	2
FYUGP HONOURS					
VII	GLY722J1	CT - I	**GEOLOGY:** ADVANCED STRUCTURAL GEOLOGY	3	1
	GLY722J2	CT - II	**GEOLOGY:** PALEOBIOLOGY AND STRATIGRAPHY	4	2
	GLY722J3	CT - III	**GEOLOGY:** APPLIED CRYSTALLOGRAPHY AND MINEROLOGY	4	2
VIII	GLY822J1	CT - I	**GEOLOGY:** APPLIED SEDIMENTOLOGY	3	1
	GLY822J2	CT - II	**GEOLOGY:** GLOBAL TECTONICS AND IGNEOUS PETROLOGY	4	2
	GLY822J3	CT - III	**GEOLOGY:** METAMORPHIC PETRLOGY AND GEMOLOGY	4	2
FYUGP HONOURS WITH RESEARCH					
VII	GLY822J1	CT - I	**GEOLOGY:** ADVANCED STRUCTURAL GEOLOGY	3	1
	GLY822J2	CT - II	**GEOLOGY:** PALEOBIOLOGY AND STRATIGRAPHY	4	2
	GLY822J3	CT - III	**GEOLOGY:** APPLIED CRYSTALLOGRAPHY AND MINEROLOGY	4	2
VIII	GLY822J1	CT - I	**GEOLOGY:** AAPPLIED SEDIMENTOLOGY	3	1
	GLY822JP	PROJECT	**GEOLOGY:** PROJECT WITH DISSERTATION	12	

HEAD OF THE DEPARTMENT / CONVENER BOUGS

BACHELORS WITH GEOLOGY AS MAJOR
SEMESTER 1st

GLY122J: GEOLOGY _ FUNDAMENTALS OF GEOLOGY

CREDITS: 4 + 2

Objective/Expected learning outcomes:

The study of this course will strengthen student's knowledge with respect to understanding the essentials of the structural dynamics of the earth. The students will understand the origin of our solar system and planets, including earth. The students will understand the different surface processes and geomorphological features and their development. Besides, studying the basics of mineralogy will help the students in understanding and building the overall knowledge in Geology.

THEORY (4 CREDITS)

UNIT-1

Introduction to the science of geology: Definition, branches, scope and importance, History of Geology origin and evolution of Geological thoughts; Modern theories about the origin of the solar system; Origin of the Earth exogenous and endogenous process. Relation with other branches of sciences; Role of physics, chemistry, and paleobiology in the development of ideas about the earth. Role of Physics in crystallography, gravity, geomagnetism, isostasy, earthquakes and microscopy. Role of Chemistry in chemical bonds, crystal chemistry, solution chemistry, chemical energetic, introduction to fossils.

UNIT -2

Fundamental concepts: Catastrophism, uniformitarianism, Davis cycle of erosion, and base level of erosion. Weathering: definition and types, agents of weathering. Epeirogenesis and orogenesis. Mountains and types. Volcanoes: types, distribution, and eruptional features. Glaciers: Definition and types, snowline, glacial movements, and crevasses. Geological work of glaciers: Erosion and deposition. Aeolian processes: erosional and depositional features. Geological work of river: erosional and depositional features. Drainage patterns. Karst topography: Surface and sub-surface features. Structural landforms: Definition and types, Inversion of topography. Climate and landforms. Soils: Soil formation, Soil profiles. Oceans: Topography of seafloor. - Continental shelves, slope, abyssal plains, Ocean ridges, submarine valleys, canyons, deep-sea trenches, and guyots. Oceanic erosion and deposition. Coral reefs and types.

UNIT -3

Introduction to rocks and minerals: Rocks as natural mineral aggregates; types of rocks: igneous rocks; sedimentary rocks; metamorphic rocks. Preliminary knowledge about the most common rock-forming and economic minerals. Structure of earth: physical properties. Geology as the history of Earth: How the rocks record history, Geological Time Scale, Mineralogy and the texture, Structures, introduction to paleoclimate and paleogeography, Surface relief of the earth, Topography of sea floor. Various Geospheres.

UNIT -4

Mineralogy: Definition, scope, and classification of silicate minerals and ore-forming minerals. Scalar and vector properties of minerals. Moho's scale of hardness. Physical properties and mode of occurrence: Quartz, Feldspar, Mica, Amphibole, Pyroxene, Olivine, Garnet, Chlorite, and Carbonate. Optical Mineralogy: Polarizing microscope, mechanism of polarization and interference of light, use of accessory plates. Elements of optics, isotopic medium, anisotropic medium, refractive index, Snell's law of critical angle, Optical indicatrix: isotropic, uniaxial, and biaxial. Pleochroism and Birefringence. Optical properties of minerals under plane-polarized and cross-polarized light: Forms, cleavage, fractures and parting, refractive index and relief, Becke line and its use.

PRACTICAL (2 CREDITS)

Field work (7 days in a semester)

Field Work: Study of landforms, erosional and depositional features. Handling of Clinometer and Brunton compass for measuring dip and strike, and plotting of field data on toposheets.

Mineralogy: Study of the physical properties of important rock-forming minerals as included in the theory paper. Study of optical properties of important rock-forming minerals as included in the theory paper.

SUGGESTED READINGS:

- Berry & Mason, 1988: Mineralogy. CBS Pub.
- Burbank, D. W. and Anderson, R.S., 2001: Tectonic Geomorphology Blackwell Sciences
- Dexter Perkin: Minerals in Thin Sections
- Gribble, D. D., 1988: Rutley's Elements of Mineralogy, DBS Publications.
- Holmes, A., 1996: Principles of Physical Geology, EUBS, Chapman.
- Judson, S. and Kaufman, M. E., 1990: Physical Geology, Prentice Hall.
- Kerr, P. F., 1984. Optical Mineralogy.
- Lutgens, F. K. and Tarbuck, E. J., 1998: Essentials of Geology, Prentice Hall.
- Phillips, Wm, R. and Griffen, D.T., 1986: Optical Mineralogy. CBS Edition.
- Press, F. and Seiver, R., 1989: The Earth, W. H. Freeman.
- Putnis, A., 2001: Introduction to mineral Science. Cambridge University Press.
- Read, H. H., 1986: Rutleys Elements of Mineralogy.
- Richard, V. G., 1997: Dana's new Mineralogy. John Wiley.
- Ritter, D. F., 1978: Process Geomorphology. Wm. C. Brown Publishers,
- Tarbuck, E. J. and Lutgens, F. K., 1997: Earth Science, Prentice Hall.
- Terrly, G. W., 1958: Principles of Petrology, Mathuen.
- Vishwas, S. K and Gupta, A., 2001: Introduction to Geomorphology Orient Longman.
- S.N. Mathur, www.GSI. Govt. in (Field Manual of GSI).

FYUGP FRAMEWORK FOR BACHELORS WITH GEOLOGY AS MINOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	PRACTICAL / TUTORIAL
I	GLY122N	CT - I	**GEOLOGY:** FUNDAMENTALS OF GEOLOGY	**4**	**2**
II	GLY222N	CT -I	**GEOLOGY:** CRYSTALLOGRAPHY AND PETROLOGY	**4**	**2**
III	GLY322N	CT - I	**GEOLOGY:** SEDIMENTOLOGY	**4**	**2**
IV	GLY422N	CT - I	**GEOLOGY:** PALEONTOLOGY AND STRATIGRAPHY	**3**	**1**
V	GLY522N	CT - I	**GEOLOGY:** GEOCHEMISTRY AND GEOPHYSICS	**3**	**1**
VI	GLY622N	CT - I	**GEOLOGY:** STRUCTURAL GEOLOGY AND TECTONICS	**3**	**1**
VII	GLY722N	CT - I	**GEOLOGY:** ADVANCED STRUCTURAL GEOLOGY	**3**	**1**
VIII	GLY822N	CT - I	**GEOLOGY:** AAPPLIED SEDIMENTOLOGY	**3**	**1**

HEAD OF THE DEPARTMENT / CONVENER BOUGS

BACHELORS WITH GEOLOGY AS MINOR
SEMESTER 1st

GLY122N: GEOLOGY (FUNDAMENTALS OF GEOLOGY)

CREDITS: 4 + 2

Objective/Expected learning outcomes:

The study of this course will strengthen student's knowledge with respect to understanding the essentials of the structural dynamics of the earth. The students will understand the origin of our solar system and planets, including earth. The students will understand the different surface processes and geomorphological features and their development. Besides, studying the basics of mineralogy will help the students in understanding and building the overall knowledge in Geology.

THEORY (4 CREDITS)

UNIT-1

Introduction to the science of geology: Definition, branches, scope and importance, History of Geology origin and evolution of Geological thoughts; Modern theories about the origin of the solar system; Origin of the Earth exogenous and endogenous process. Relation with other branches of sciences; Role of physics, chemistry, and paleobiology in the development of ideas about the earth. Role of Physics in crystallography, gravity, geomagnetism, isostasy, earthquakes and microscopy. Role of Chemistry in chemical bonds, crystal chemistry, solution chemistry, chemical energetic, introduction to fossils.

UNIT -2

Fundamental concepts: Catastrophism, uniformitarianism, Davis cycle of erosion, and base level of erosion. Weathering: definition and types, agents of weathering. Epeirogenesis and orogenesis. Mountains and types. Volcanoes: types, distribution, and eruptional features. Glaciers: Definition and types, snowline, glacial movements, and crevasses. Geological work of glaciers: Erosion and deposition. Aeolian processes: erosional and depositional features. Geological work of river: erosional and depositional features. Drainage patterns. Karst topography: Surface and sub-surface features. Structural landforms: Definition and types, Inversion of topography. Climate and landforms. Soils: Soil formation, Soil profiles. Oceans: Topography of seafloor. - Continental shelves, slope, abyssal plains, Ocean ridges, submarine valleys, canyons, deep-sea trenches, and guyots. Oceanic erosion and deposition. Coral reefs and types.

UNIT -3

Introduction to rocks and minerals: Rocks as natural mineral aggregates; types of rocks: igneous rocks; sedimentary rocks; metamorphic rocks. Preliminary knowledge about the most common rock-forming and economic minerals. Structure of earth: physical properties. Geology as the history of Earth: How the rocks record history, Geological Time Scale, Mineralogy and the texture, Structures, introduction to paleoclimate and paleogeography, Surface relief of the earth, Topography of sea floor. Various Geospheres.

UNIT -4

Mineralogy: Definition, scope, and classification of silicate minerals and ore-forming minerals. Scalar and vector properties of minerals. Moho's scale of hardness. Physical properties and mode of occurrence: Quartz, Feldspar, Mica, Amphibole, Pyroxene, Olivine, Garnet, Chlorite, and Carbonate. Optical Mineralogy: Polarizing microscope, mechanism of polarization and interference of light, use of accessory plates. Elements of optics, isotopic medium, anisotropic medium, refractive index, Snell's law of critical angle, Optical indicatrix: isotropic, uniaxial, and biaxial. Pleochroism and Birefringence. Optical properties of minerals under plane-polarized and cross-polarized light: Forms, cleavage, fractures and parting, refractive index and relief, Becke line and its use.

PRACTICAL (2 CREDITS)

Field work (7 days in a semester)

Field Work: Study of landforms, erosional and depositional features. Handling of Clinometer and Brunton compass for measuring dip and strike, and plotting of field data on toposheets.

Mineralogy: Study of the physical properties of important rock-forming minerals as included in the theory paper. Study of optical properties of important rock-forming minerals as included in the theory paper.

SUGGESTED READINGS:

Berry & Mason, 1988: Mineralogy. CBS Pub.
Burbank, D. W. and Anderson, R.S., 2001: Tectonic Geomorphology Blackwell Sciences
Dexter Perkin: Minerals in Thin Sections
Gribble, D. D., 1988: Rutley's Elements of Mineralogy, DBS Publications.
Holmes, A., 1996: Principles of Physical Geology, EUBS, Chapman.
Judson, S. and Kaufman, M. E., 1990: Physical Geology, Prentice Hall.
Kerr, P. F., 1984. Optical Mineralogy.
Lutgens, F. K. and Tarbuck, E. J., 1998: Essentials of Geology, Prentice Hall.
Phillips, Wm, R. and Griffen, D.T., 1986: Optical Mineralogy. CBS Edition.
Press, F. and Seiver, R., 1989: The Earth, W. H. Freeman.
Putnis, A., 2001: Introduction to mineral Science. Cambridge University Press.
Read, H. H., 1986: Rutleys Elements of Mineralogy.
Richard, V. G., 1997: Dana's new Mineralogy. John Wiley.
Ritter, D. F., 1978: Process Geomorphology. Wm. C. Brown Publishers,
Tarbuck, E. J. and Lutgens, F. K., 1997: Earth Science, Prentice Hall.
Terrly, G. W., 1958: Principles of Petrology, Mathuen.
Vishwas, S. K and Gupta, A., 2001: Introduction to Geomorphology Orient Longman.
S.N. Mathur, www.GSI. Govt. in (Field Manual of GSI).

SEMESTER 1st to 3rd
MULTIDISCIPLINARY COURSE

GLY022I GEOLOGY (PHYSICAL GEOLOGY)

CREDITS: 3

OBJECTIVE/EXPECTED LEARNING OUTCOMES:

The study of this course will help learners to grasp basic concepts in physical geology, in addition, will help them to understand the dynamic nature of the Earth's surface, various processes, and landforms. After the completion of this course, students should be able to:
1 Define the field of Geomorphology and explain its essential principles.
2 Outline the mechanism of the dynamic nature of the Earth's surface and interior of the Earth.
3 Illustrate and explain the forces affecting the crust of the earth and its effect on it.
4 Understand the conceptual and dynamic aspects of landform development and their identification

UNIT-1 (16 Hours)
Origin and evolution of Earth: Catastrophism, uniformitarianism, Epeirogenesis and orogenesis, and base level of erosion. Origin and evolution of Earth`s crust. Theory of Isostasy, Earthquakes: Distribution and types

UNIT-2 (15 Hours)
Introduction to different types of rocks, Rock cycle; cycle of erosion, weathering: definition and types, agents of weathering. Soils: Soil formation and soil profile; Soils of Jammu and Kashmir; Karewas of Kashmir

UNIT-3 (15 Hours)
Geomorphic processes and resulting landforms: Geological work of river, wind, and glaciers; erosional and depositional features. Volcanoes: types, distribution, and eruptional features. Karst topography: Surface and sub-surface features.

SUGGESTED READINGS:

Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of

India, New Delhi.

Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.

Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed.,

Macmillan Publishing Company

Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.

Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.

Richards K. S., 1982: Rivers: Form and Processes in Alluvial Channels, Methuen, London.

Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP

Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology,

4th Edition, John Wiley and Sons

Thornbury W. D., 1968: Principles of Geomorphology, Wiley.

Gautam, A (2010): Bhautik Bhugol, Rastogi Punlications, Meerut

Tikkaa, R N (1989): Bhautik Bhugol ka Swaroop, Kedarnath Ram Nath, Meerut

Singh, S (2009):Bhautik Bhugol ka Swaroop, Prayag Pustak,Allahabad

Burbank, D. W. and Anderson, R.S., 2001: Tectonic Geomorphology Blackwell Sciences

Easterbrook, Easterbrook, 1994: Surface Processes and Land Forms. Prentice Hall. McCalpin, J., 1996: Paleoseismology Academic

Press

Summerfield M.A 2011: Geomorphology and Global Tectonics, Wiley India Pvt Ltd.

Thornbury, W.D. 2004: Principles of Geomorphology. 2nd edition CBS Publication

BACHELORS WITH GEOLOGY AS MAJOR

3rd SEMESTER

CREDITS: THEORY: 4, PRACTICAL: 2

GLY322J: GEOLOGY _ SEDIMENTOLOGY

Objective/Expected learning outcomes

Upon studying this course, the students will gain an understanding of the processes involved in the formation of sedimentary rocks, their textures, structures, classifications and their importance. They will also be able to identify primary and secondary sedimentary structures and their depositional environments. Upon completion of this course, students will be able to identify sedimentary rocks and their depositional environments with stratigraphic sequence aspects.

UNIT -1 (15 HOURS)

Introduction to sedimentology: Origin of sediments. Grain size, concept and scale. The process involved in the formation of sedimentary rocks: erosion, transportation, deposition, and lithification. Sedimentary Textures, structures and environment. Primary and syn-sedimentary structures

UNIT -2 (15 HOURS)

Basic Hydraulics: sediment transport mechanism, Fluid flow: flow regime, laminar and turbulent flow. Mass flow types and deposits. Particle entrainment, transport and deposition. Paleocurrent analysis: data acquisition, methodology, different palaeocurrent patterns.

UNIT -3 (15 HOURS)

Siliciclastic rocks: components and classification(s) of conglomerates, sandstones, mudrocks. General introduction to carbonate rocks, BIF, chert; Components and classifications of limestone, dolomites and dolomitisation.

UNIT -4 (15 HOURS)

The elementary idea on sedimentary facies and environment. Classification of sedimentary facies. Facies models for glacier, meandering, fluvial, deltaic, and shelf depositional settings. Diagenesis, Concepts of Diagenesis, Stages of diagenesis, Compaction and cementation.

PRACTICAL (2 CREDITS: 60 HOURS)

Identification of sedimentary structures in hand specimens. Statistical analysis of particle size distribution. Paleocurrent analysis. Petrographic study of clastic and non-clastic rocks in thin sections. Field visit for identification of various sedimentary structures.

BOOKS RECOMMENDED

Allen, J.R.L. (1985). Principles of Physical Sedimentology. George Allen and Unwin, London. Prothero, D. R. and Schwab, F. (2004). Sedimentary geology. Macmillan.

Tucker, M. E. (2001). Sedimentary Petrology, Third Edition Blackwell Science.

Collinson, J. D. and Thompson, D. B. (1988). Sedimentary structures. Unwin- Hyman, London. Nichols, G. (2009). Sedimentology and Stratigraphy. Second Edition. Wiley Blackwell.

Folk, R. L. (1974). Petrology of Sedimentary Rock. Hemphill Publishing Company, Austin, Texas.

BACHELORS WITH GEOLOGY AS MINOR

3rd SEMESTER

CREDITS: THEORY: 4, PRACTICAL: 2

GLY322N: GEOLOGY _ SEDIMENTOLOGY

Objective/Expected learning outcomes

Upon studying this course, the students will gain an understanding of the processes involved in the formation of sedimentary rocks, their textures, structures, classifications and their importance. They will also be able to identify primary and secondary sedimentary structures and their depositional environments. Upon completion of this course, students will be able to identify sedimentary rocks and their depositional environments with stratigraphic sequence aspects.

UNIT -1 (15 HOURS)

Introduction to sedimentology: Origin of sediments. Grain size, concept and scale. The process involved in the formation of sedimentary rocks: erosion, transportation, deposition, and lithification. Sedimentary Textures, structures and environment. Primary and syn-sedimentary structures

UNIT -2 (15 HOURS)

Basic Hydraulics: sediment transport mechanism, Fluid flow: flow regime, laminar and turbulent flow. Mass flow types and deposits. Particle entrainment, transport and deposition. Paleocurrent analysis: data acquisition, methodology, different palaeocurrent patterns.

UNIT -3 (15 HOURS)

Siliciclastic rocks: components and classification(s) of conglomerates, sandstones, mudrocks. General introduction to carbonate rocks, BIF, chert; Components and classifications of limestone, dolomites and dolomitisation.

UNIT -4 (15 HOURS)

The elementary idea on sedimentary facies and environment. Classification of sedimentary facies. Facies models for glacier, meandering, fluvial, deltaic, and shelf depositional settings. Diagenesis, Concepts of Diagenesis, Stages of diagenesis, Compaction and cementation.

PRACTICAL (2 CREDITS: 60 HOURS)

Identification of sedimentary structures in hand specimens. Statistical analysis of particle size distribution. Paleocurrent analysis. Petrographic study of clastic and non-clastic rocks in thin sections. Field visit for identification of various sedimentary structures.

BOOKS RECOMMENDED

Allen, J.R.L. (1985). Principles of Physical Sedimentology. George Allen and Unwin, London. Prothero, D. R. and Schwab, F. (2004). Sedimentary geology. Macmillan.

Tucker, M. E. (2001). Sedimentary Petrology, Third Edition Blackwell Science.

Collinson, J. D. and Thompson, D. B. (1988). Sedimentary structures. Unwin- Hyman, London. Nichols, G. (2009). Sedimentology and Stratigraphy. Second Edition. Wiley Blackwell.

Folk, R. L. (1974). Petrology of Sedimentary Rock. Hemphill Publishing Company, Austin, Texas.

SEMESTER 1st to 3rd
MULTIDISCIPLINARY COURSE

GLY022I GEOLOGY (PHYSICAL GEOLOGY)

CREDITS: 3

OBJECTIVE/EXPECTED LEARNING OUTCOMES:

The study of this course will help learners to grasp basic concepts in physical geology, in addition, will help them to understand the dynamic nature of the Earth's surface, various processes, and landforms. After the completion of this course, students should be able to:
1 Define the field of Geomorphology and explain its essential principles.
2 Outline the mechanism of the dynamic nature of the Earth's surface and interior of the Earth.
3 Illustrate and explain the forces affecting the crust of the earth and its effect on it.
4 Understand the conceptual and dynamic aspects of landform development and their identification

UNIT-1 (16 Hours)
Origin and evolution of Earth: Catastrophism, uniformitarianism, Epeirogenesis and orogenesis, and base level of erosion. Origin and evolution of Earth`s crust. Theory of Isostasy, Earthquakes: Distribution and types

UNIT-2 (15 Hours)
Introduction to different types of rocks, Rock cycle; cycle of erosion, weathering: definition and types, agents of weathering. Soils: Soil formation and soil profile; Soils of Jammu and Kashmir; Karewas of Kashmir

UNIT-3 (15 Hours)
Geomorphic processes and resulting landforms: Geological work of river, wind, and glaciers; erosional and depositional features. Volcanoes: types, distribution, and eruptional features. Karst topography: Surface and sub-surface features.

SUGGESTED READINGS:

Bloom A. L., 2003: Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Prentice-Hall of

India, New Delhi.

Bridges E. M., 1990: World Geomorphology, Cambridge University Press, Cambridge.

Christopherson, Robert W., (2011), Geosystems: An Introduction to Physical Geography, 8 Ed.,

Macmillan Publishing Company

Kale V. S. and Gupta A., 2001: Introduction to Geomorphology, Orient Longman, Hyderabad.

Knighton A. D., 1984: Fluvial Forms and Processes, Edward Arnold Publishers, London.

Richards K. S., 1982: Rivers: Form and Processes in Alluvial Channels, Methuen, London.

Selby, M.J., (2005), Earth's Changing Surface, Indian Edition, OUP

Skinner, Brian J. and Stephen C. Porter (2000), The Dynamic Earth: An Introduction to physical Geology,

4th Edition, John Wiley and Sons

Thornbury W. D., 1968: Principles of Geomorphology, Wiley.

Gautam, A (2010): Bhautik Bhugol, Rastogi Punlications, Meerut

Tikkaa, R N (1989): Bhautik Bhugol ka Swaroop, Kedarnath Ram Nath, Meerut

Singh, S (2009):Bhautik Bhugol ka Swaroop, Prayag Pustak,Allahabad

Burbank, D. W. and Anderson, R.S., 2001: Tectonic Geomorphology Blackwell Sciences

Easterbrook, Easterbrook, 1994: Surface Processes and Land Forms. Prentice Hall. McCalpin, J., 1996: Paleoseismology Academic

Press

Summerfield M.A 2011: Geomorphology and Global Tectonics, Wiley India Pvt Ltd.

Thornbury, W.D. 2004: Principles of Geomorphology. 2nd edition CBS Publication

BACHELORS WITH GEOLOGY AS MINOR (CT – I)
5th SEMESTER

GLY522N GEOLOGY _ GEOCHEMISTRY AND GEOPHYSICS

CREDITS: THEORY:3, PRACTICAL:1

OBJECTIVE/EXPECTED LEARNING OUTCOMES

This course deals with extracting geological information out of geochemical and geophysical datasets. The student will acquire skills to use various geochemical, and geophysical methods and basic principles of radioactivity for age determination the composition and age of rocks, and mineral exploration.

UNIT -1 (15 HOURS)

Introduction to geochemistry: Crystal chemistry-chemical bonds, coordination number, radius ratio, ionization potential, electro-negativity, atomic substitution, phase rule. Cosmic abundance of elements. Chemical differentiation and composition of the Earth. Major elements, Trace elements and Rare earth elements, Large ion lithophile elements and High field strength elements.

UNIT-2 (15 HOURS)

Goldschmidt's geochemical classification of elements. Geochemical characteristics of crust, mantle and core. Geochronology and Age of Earth. Relative and absolute dating techniques for age determination. Radioactivity and concept of half-life, decay constant, natural radioactive isotopes.

UNIT-3 (15 HOURS)

Introduction and scope of geophysics, Spheroidal shape of the earth and Geoid, the magnetic field of the earth, paleo-magnetism, Exploring Earth's interior. Applications of geophysics in mineral and energy resources exploration. Earth's thermal history: Heat conduction and heat flow. The thermal gradient of the earth. Convection currents-evidence. Gravity measuring instruments: Pendulum gravimeters, Shipborne measurements. Units of gravity, gravity anomaly - definition, types (Free- air, Bouguer), local and regional concepts

PRACTICAL (1 CREDIT: 30 HOURS)

Types of geochemical data analysis and interpretation of common geochemical plots.

BOOKS RECOMMENDED

- Miall, A. D., 1999: Principles of Sedimentary Basin Analysis. Springer-Verlag.
- Pettijohn, F. J., Potter, P.E. and Siever, R, 1990: Sand and Sandstone. Springer Verlag.
- Reading, J. G. 1996: Sedimentary Environment and Facies. Black well.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Sengupta, S., 1997: Introduction to Sedimentology. Oxford-IBH.
- Collinson, J. D, 1999: Sedimentary Structures. Springer Verlag.
- Einsele, G., 1992: Sedimentary Basins. Springer Verlag.
- Friedman, G. M. and Sander, J. E., 1978: Principles of Sedimentology. John Wiley. 0
- Krishanan, M. S., 1968: Geology of India and Burma. Higginbothams Pvt. Ltd., Madras.
- Albarede, F., 2003: Geochemistry - An Introduction, Cambridge.
- Gunter, F., 1991: Principles and Applications of Inorganic Geochemistry, Prentice Hall.
- Marshal, C. P. & Fairbridge, R. W., 1999: Encyclopaedia of Geochemistry, Kluwer Academic.
- Moore M. 1982: Principles of Geochemistry, Wiley.