

DISCIPLINE SPECIFIC CORE COURSE – 5 (DSC-5): Igneous Petrology

Credit distribution, Eligibility and Prerequisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Igneous Petrology (DSC-5)	4	3	0	1	12th Pass	----

Learning Objectives

To develop an understanding of the types of magma as well as types of igneous rocks. Magma generation in relation to different geodynamic settings and its relation with the petrological and geochemical features of the igneous rocks.

Learning outcomes

On completion of the course, the student should be able to:

- a) Identify the igneous rocks using petrographical, mineralogical and geochemical indices
- b) Determine the evolution of igneous rocks in relation to different geodynamic settings

SYLLABUS OF DSC- 5

UNIT – I (09 Hours)

Introduction to Igneous Petrology: Scope of Igneous petrology, classification of Igneous rocks, igneous textures, igneous structures.

UNIT – II (09 Hours)

Introduction to silicate melts and magmas: Physical properties of magma, the ascent of magmas, magmatic differentiation.

UNIT – III (09 Hours)

Introduction to Igneous Phase diagrams. The phase rule, the lever rule, Two Component systems involving melt: Binary system with a Eutectic, Binary system with a peritectic, Binary system thermal barrier, Binary system with solid solution.

UNIT – IV (09 Hours)

The chemistry of igneous rocks. Modal mineralogy, normative mineralogy, variation diagrams based on major elements, trace elements and their significance, application of radioactive isotopes in igneous petrology.

UNIT – V (09 Hours)

Introduction to igneous environments: Basalts and mantle structure, Magma generation and igneous rocks associated with various plate tectonic settings.

Practical component : 30 Hours

Study of important igneous rocks in hand specimens and thin sections- granite, granodiorite, diorite, gabbro, anorthosites, ultramafic rocks, basalts, andesites, trachyte, rhyolite.

Classification of Igneous Rocks.

Plotting and interpretation of variation diagrams.

Igneous rock occurrences in Indian context.

Essential/recommended readings

Winter, J. D. (2014). Principles of igneous and metamorphic petrology. Pearson.

Wilson, M. (1989) Igneous Petrogenesis, Springer-Verlag Berlin Heidelberg.

Frost, B. R. and Frost, C. D., (2013) Essentials of Igneous and Metamorphic Petrology Cambridge University Press.

Suggestive readings (if any)

Frost, B. R. and Frost, C. D., (2013) Essentials of Igneous and Metamorphic Petrology Cambridge University Press.

Philpotts, A., & Ague, J. (2009). Principles of igneous and metamorphic petrology. Cambridge University Press.

Winter, J. D. (2014). Principles of igneous and metamorphic petrology. Pearson.

Rollinson, H. R. (2014). Using geochemical data: evaluation, presentation, interpretation. Routledge.

Sen, G. (2014) Petrology Principles and Practice, Springer-Verlag Berlin Heidelberg

Bose M.K. (1997). Igneous Petrology.

Wilson, M. (1989) Igneous Petrogenesis, Springer-Verlag Berlin Heidelberg.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.