Semester	JAN 2022
Open to semester	6,8,22
Course code	**EC3214/EC6214**
Course title	**Geo and Cosmochemistry**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Shreyas Managave
Nature of Course	Lectures and Tutorials
Pre-requisites	Earth and Planetary Materials (EC3164)
Objectives (goals, type of students for whom useful, outcome etc)	This course focuses on developing an understanding of the chemical behavior of elements and processes that lead to the distribution of elements inside the earth. High-temperature processes will be discussed to make students understand the formation of planetary objects such as the earth and their chemical differentiation. Low-temperature processes are introduced to explain earth surface processes such as weathering and ocean chemistry. Applications of stable and radiogenic isotopes are also introduced. After successful completion, the students will be able to use geochemical principles to understand the formation and chemical evolution of various earth-system reservoirs.
Course contents (details of topics /sections with no. of lectures for each)	Origin of elements; Properties of elements (volatiles, semi-volatiles, alkalis, alkaline earths, REE, HFS); Classification of elements (Siderophile, chalcophile, lithophile); concept of distribution coefficients; Mass conservation and elemental fractionation; Rayleigh fractionation; Differentiation of the Earth and resultant elemental distribution in the core-mantle-crust system; Basic Thermodynamic concepts: Energy, enthalpy, phase changes and equilibrium reactions; Cation substitution; Low-temperature aqueous geochemistry; Carbonate Equilibria; Chemistry of natural water; Chemical weathering; Igneous processes; Biogeochemistry; Radiogenic and stable isotopes; Isotope fractionation; Radioactive decay schemes.
Evaluation /assessment	End-Sem Examination-35% Mid-Sem Examination-35%

	Others-30%
Suggested readings (with full list of authors, publisher, year, edn etc.)	1. W. M. White : Geochemistry, 2013, Wiley-Blackwell 2. K. C. Misra: Geochemistry: Principles and applications. 2012, Wiley-Blackwell. 3. F. Albarede: Geochemistry-An introduction. Second Edition, 2009, Columbia University Press.