MGH 403: STRATIGRAPHY AND PALAEONTOLOGY

Skills, employability and entrepreneurship: This subject is a good opportunity for students to study evolution of life as well the history of the earth. Students exit from this course, especially from the biological discipline have scope to work on many unsolvable problems which are directly related t the evolution of human beings. Similarly they have chance to work in fossil fuel exploration (coal and petroleum).

Stratigraphy

Unit 1	Introduction:Principles of stratigraphy, Concept of measurement of time, geological time scale and global stratigraphic chart. Stratigraphic classification: Litho, bio, chrono, seismic and magneto stratigraphic units and their inter-relationships. A brief review of global stratigraphy.	8 hrs
Unit 2	Physiographic and tectonic subdivisions of India; Evolution of the Indian subcontinent since the Archaean Eon.	4 hrs
Unit 3	Proterozoic basins of India with emphasis on lithological, geochemical, stratigraphic and geochronological aspects. Geological setting and important stratigraphic features of Phanerozoic formations in India such as Gondwana, Deccan Traps, Indo-Gangetic Plain and Himalaya.	8 hrs
Unit 4	Boundary problem and its significance in stratigraphy with emphasis on the Cretaceous - Tertiary boundary. Importance of Cenozoic Era with reference to evolution of climate and life. Quaternary period:Glacial and inter-glacial epochs. Sea-level fluctuations, causes and consequences. Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum. Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum.	6 hrs

Palaeontology

Unit 5	Introduction. Theories on origin of life. Organic evolution, mass extinctions and their causes. Fossils, fossilisation, conditions required for preservation of fossils. Species concept, trace fossils, index fossils and pseudo-fossils. Modes of preservation of fossils (petrification, mould, cast, compressions, impressions, tracks, trails, burrows, foot prints and resting marks). Applications of fossils in stratigraphic correlation.	8 hrs
Unit 6	Invertebrate and Vertebrate fossils - Morphology, classification, evolution, age and stratigraphic importance of Porifera, Coelenterata, Brachiopoda, Mollusca, Arthropoda and Echinodermata. Siwalik vertebrate fauna.	6 hrs
Unit 7	Palaeobotany: Evolution of plant life, plant fossils and fossilization. Gondwana and Tertiary flora. Description of Algae, Spores and Pollen.	6 hrs

Unit 8	Micropalaeontology: Extraction of microfossils from sediments. Microfossil groups: Foraminifera, Ostracoda, Acritarcha, Radiolaria, Diatoms. Nannoplankton and Dinoflagellates. Applications of microfossils and trace fossils in Earth Sciences, Environmental significance and in hydrocarbon exploration. Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum.	8 hrs

List of References:

1) Stratigraphic Principles and Practice - M .J. Weller (1960).
2) Fundamentals of Historical Geology and Srtatigraphy of India by Ravindrakumar - New Age International Publication.
3) Stratigraphy and Sedimentation, W.H. Freeman – Krumbein and Sloss (1963).
4) Principles of Paleontology – Raup and Stanley – CBS Publications.
5) Principles of Invertebrate Paleontology – Shrock and Twenhofel – CBS Publications.
6) Elemental Geosystem - Printice Hall, Inc.- R.W. Christopherson (1995)
7) The dynamic Earth: An introduction, Skinner and S.C. Porter, John Wiley and Sons.
8) Fossil Invertebrates, Cambridge Univ.- Lehmann, U and Hilimer, G. (1983)
9) Distribution and Ecology of Living Benthonic Foraminifera - Murry, J. (1973)
10) Principles of Micropaleontology, Hafner - Glassner, M.F. (1972)
11) Micropalaeontology, George Allen and Unwin -Brasier M.D. (1980)
12) Micropalaeontology, Graham and Trotman - Bignot, G. (1985)
13) Invertebrate Fossils, Mcgraw Hill - Moore, Lalicker and Fisher (1952)
14) Introduction to Micropalaeontology - Haq, B.U.
15) An introduction to Paleobotany - Arnold, Chester R.
16) Palaeontology - Invertebrate 8th Ed, CBS Publ. and Distributors - Woods Henry (1981).
17) Sedimentology and Stratigraphy: Gary Nichols - Willey Blackwell.