

Lesson plan- Jagriti pal**Session- 2020-2021(November 2020 to 31st august 2021)****Mode- Online****SEM- III****Course Title- Paleontology (Theory+ practical)****Course code- BGELCCHC303 (CC-7)**

Program specific objective- In paleontology students learn about evolution by taking into consideration chrono-species which is bio species along with a 3rd dimension called Lineage since bio events are more or less synchronous throughout the world and the very much ambient environment sensitive , this particular domain of knowledge is used as a tool to interpret past.

Module	Sub Module	Class needed	Teaching – learning methodology
Fossilization and fossil record *Duration of each class is 1 hour	Definition of fossil, fossilization processes and modes of preservation, exceptional preservation	2	Lecture + discussion on the topic
	Taphonomy: definition, different types of taphonomic filters	2	Lecture+ queries on the topic
	*Class test after the completion of the module		
Taxonomy and Systematics	Concept of taxonomy and taxonomic hierarchy	1	Lecture
	Biological and morphological species concept	1	Lecture
	*Surprise test after completion of module and doubt clearance		
Evolution and History of Life	Theory of organic Evolution: theory, concept of adaptation and variation, Natural Selection.	2	Lecture
	Precambrian - doubtful organic traces of life during the Precambrian, Ediacaran fauna	2	Lecture
	Paleozoic – Cambrian Explosion of life. Episodes of mass extinction	2	Lecture

	Plants: Appearance of angiosperma and gymnosperma		1	Lecture
	Appearance of fish, amphibia, reptiles, birds, mammals and humans		2	Lecture
	Mass extinction: five major extinction episodes and their causes; effect of extinction		1	Lecture +Audio visual presentation
	*Student feedback after completion of module & question answering session			
Invertebrates and Vertebrates	Brief introduction to important invertebrate groups and their bio-stratigraphic significance	Bivalvia	2	Lecture +Audio visual presentation
		Gastropoda	2	Lecture +Audio visual presentation
		Brachiopoda	2	Lecture +Audio visual presentation
	Significance of ammonites in Mesozoic biostratigraphy and their paleo-biogeographic implications.		1	Lecture

	Functional adaptation in trilobites and ammonoid	1	Lecture +Audio visual presentation
	Origin of vertebrates and major steps in vertebrate evolution	1	Lecture + Audio visual presentation
	Mesozoic reptiles with special reference to origin, diversity and extinction of dinosaurs	2	Lecture +Audio visual presentation
	Evolution of horse and intercontinental migrations	1	Lecture
	Human evolution	2	Lecture
	*Student feedback after completion of module & question answering session		
Introduction to Paleobotany, Gondwana Flora Introduction to Ichnology	Introduction to Paleobotany,	1	Lecture
	Gondwana Flora,	1	Lecture +Audio visual presentation
	Plants as indicator of past climate	1	Lecture

	Ichnology and its application in paleoecology		1	Lecture
	*Exam on the topic in Google form format			
Application of fossils in Stratigraphy	Definitions & Examples:	Biozones	1	Lecture
		Index fossils	1	Lecture
		Stratigraphic correlation	1	Lecture
	Significance of ammonites in Mesozoic paleo-biostratigraphy		1	Lecture
	Application of fossils in Paleo-environmental analysis		2	Lecture
	*Discussion on the topic after completion of the module			
Practical	1. Study of fossils with various modes of preservation 2. Study of systematic position, stratigraphic position and age of various invertebrate, vertebrate and plant fossils from India 3. Study of functional morphological characters of different groups (Bivalvia, Gastropods, Brachiopoda, Echinodermata, Ammonoidea, Gondwana flora, vertebrates) 4. Identification of feeding habits from vertebrate (horse, elephants, Sus) teeth 5. Hard part morphology and identification of common Brachiopoda, Anthozoa, Trilobita, Echinoidea, Gastropoda. Identification of Gondwana flora		30	provides a comprehensive and thematic treatment of applied paleontology, covering the use of fossils in the ordering of rocks in time and space, in biostratigraphy, paleo-biology and sequence stratigraphy.
Internal assessment (by assignment of project/or questionnaires in Google form, seminar in either mode) for university examination at the end of semester				

Lesson plan- Sayantan Dattta Session- 2020-2021(November 2020 to 31st august 2021) Mode- Online SEM- I Course Title- Mineral science (Theory+ practical) Course code- BGELCCHC102 (CC-2)			
Program specific objective- Mineral science imparts a thorough knowledge of minerals which is fundamental unit of rock. Theory and practical mode of teaching aim to inculcate holistic knowledge on mineralogy.			
Module	Sub Module	Class needed	Teaching – learning methodology
Mineralogical structure *Duration of each class is 1 hour	Ionic radius and coordination,	2	Lecture + interactive session
	Pauling's rules	1	Lecture
	Solid Solution	2	Lecture + interactive session
	Polymorphism	1	Lecture
	Pseudomorphism	1	Lecture
	*Surprise test after completion of module and doubt clearance		
Rock forming minerals	Minerals - definition and classification, physical and chemical properties	5	Lecture
	Chemical classification of minerals	2	Lecture + interactive session
	Composition of common oxides, carbonated, sulphides and sulphates and phosphates	7	Lecture

	Composition of common rock-forming minerals	7	Lecture + interactive session
	*Surprise test after completion of module and doubt clearance		
Optical Mineralogy	Nature of light and optical behaviour of minerals	10	Lecture
	Introduction to petrological microscope	2	Lecture + interactive session
	*Surprise test after completion of module and doubt clearance		
Practical	Study of physical properties of minerals in hand specimen	24	
* Internal assessment(by assignment of project/or questionnaires in Google form, seminar in either mode) for university examination at the end of semester			

Course code- BGELCCHC202(CC-4)

Program specific objective- Structural geology is a critical part of geology which is interested in the physical and mechanical properties of rocks. It is to use measurements of present day rock geometries to uncover information about the history of deformation (strain) and structural evolution in the rocks and ultimately, to understand the stress field (lithospheric deformation) that resulted in the observed strain and geometries.

Module		Sub Module	Class needed	Teaching – learning methodology
Basic structural elements 				

	Concept of scale of observation of structures		1	Lecture+ Audio-visual presentation
	Topographic maps. Outcrop patterns of different structures		1	Lecture+ Audio-visual presentation
	*basic concepts of structural elements and their measurements using clinometer compass.			
	Fold morphology		1	Lecture + Audio-visual presentation
	Geometric and genetic classification of folds		2	Lecture+ Audio-visual presentation
Folds	Introduction to the mechanics of folding:	Buckling	1	Lecture+ Audio-visual presentation
		Bending	1	Lecture+ Audio-visual presentation
		Flexural slip	1	Lecture+ Audio-visual presentation
		Flow folding	1	Lecture+ Audio-visual presentation
	* solving field problems using stereographic projection.			

Fractures and faults	Geometric and genetic classification of fractures and faults Effects of faulting on the outcrops	2	Lecture Audio-visual presentation
	Geologic/geomorphic criteria for recognition of faults and fault plane solutions	2	Lecture Audio-visual presentation
	*solving real time field problems using block models.		
Practical	1. Basic idea of topographic maps, Topographic sheets of various scales 2. Interpretation of topographic maps 3. Interpretation of Geological maps with unconformity, fault, fold and igneous bodies Construction of structural cross section 4. Stereographic projections of planes and lines 5. True dip and apparent dip problems, fold problems, fault problems and their solutions through stereographic projection methods	20	Lecture Audio-visual presentation
	*class assignments which are relevance to practical problems in mineral and petroleum exploration, engineering geology, geomorphology, petrology and tectonics.		
- Internal assessment(by assignment of project/or questionnaires in Google form, seminar in either mode) for university examination at the end of semester - Note: As structural geology deals with present day lithospheric deformation, field work is an integral part of this course curriculum.			