Name of Programme: M. Sc. Applied Geology
Course Code: GEO-604
Title of the Course: Micropaleontology
No of Credits: 03
Effective from AY: 2023-24

Prerequisites for the course:	Students should have undergone M.Sc. Semester I and II.	
Objective:	To impart knowledge of microfossils. To provide skills on the application of microfossils in biostratigraphy, hydrocarbon exploration, understanding causes and types of bioevents, paleoclimate and paleoceanography.	
Content:	**Module 1** Scope of micropaleontology, methods of exploring deep Ocean, Ocean drilling programs, introduction to important deep sea drilling vessels, sample processing techniques and idea about equipment like mass spectrometer, scanning electron microscope and stereo zoom binocular microscope which are used for micropaleontological studies. **Module 2** Calcareous microfossils: Planktic and benthic foraminifera, their biogeography, morphology, calcareous nanofossils. Application of foraminifera in stratigraphy with special reference to Jurassic, Cretaceous and Tertiary periods in India. Siliceous microfossils: Radiolaria, diatoms and silicoflagellates, their morphology and biogeography. Phosphatic microfossils: Conodonts, outline of morphology and paleoecology. **Module 3** Application of microfossils: Application of microfossils in biostratigraphy - First Appearance Datum (FAD) and Last Appearance Datum (LAD), units of biostratigraphy and biostratigraphic correlation. Application of microfossils in understanding patterns, causes and types of global events. Micropaleontology in hydrocarbon exploration. Application of microfossils in interpretation of paleoenvironment and paleoclimate: paleo-temperature estimation and sea-level change. Application of micropaleontology in oceanography, paleogeography and engineering geology.	15 hours 15 hours 15 hours
Pedagogy:	Lectures, Case studies, Discussions and Assignments.	
References/ Readings	1. Armstrong, H. A., & Brasier, M. D. (2005). *Microfossils*. 296 Malden. 2. Bignot, G. (Ed.). (1985). *Elements of micropalaeontology*. Springer Science & Business Media. 3. Brasier, M. D. (1980). *Microfossils*. George Allen and Unwin. 4. Gross, M. G. (1977). *Oceanography: A view of the Earth*. Prentice	

	Hall. 5. Haq, B. U., & Boersma, A. (Eds.). (1998). *Introduction to marine micropaleontology*. Elsevier. 6. Haslett, S. K. (Ed.). (2002). *Quaternary environmental micropalaeontology*. Oxford University Press. 7. Jones, R. W. (1996). *Micropalaeontology in petroleum exploration* (p. 432). Oxford: Clarendon Press. 8. Kennett, J. P., & Srinivasan, M. S. (1983). *Neogene planktonic foraminifera. A phylogenetic atlas*, *265*, 546-548. 9. Martin, R. E. (Ed.). (2000). *Environmental micropaleontology: the application of microfossils to environmental geology* (Vol. 15). Springer Science & Business Media. 10. Sinha, D. K. (2007). *Micropaleontology: application in stratigraphy and paleoceanography*. Narosa Publishing House.
Course Outcome	1. Students will get acquainted with various ocean drilling programmes and sampling strategies. 2. They will be able to identify different types of microfossils. 3. Use microfossils to decipher paleo-oceanographic changes. 4. Understanding applications of microfossils in paleoclimate.