Semester	AUG 2022
Open to semester	5,7,21
Course code	**EC3174/EC6324**
Course title	**Structural Geology and Tectonics**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Shreyas Managave,Durga Mohanty (SPPU Pune)
Nature of Course	Lectures and Tutorials
Pre-requisites	None
Objectives (goals, type of students for whom useful, outcome etc)	Objectives: This course is offered to enable the students to understand crustal deformation and its association with plate tectonics. Outcomes: This will help students in geological mapping and understanding patterns of rock deformation. In the end, the students will be able to interpret geological and structural maps. This has bearing on the exploration of hydrocarbon and economic mineral deposits. The students will also appreciate multiphase crustal deformation in relation to regional tectonics.
Course contents (details of topics /sections with no. of lectures for each)	Behavior of rock material under stress, strain. Dynamic and kinematic analyses of rocks in two dimensions, stress and strain. Stress: Uni-axial and Bi-axial stress analysis. Mohr's Circle and its applications; Mohr-Coulomb failure Criterion. Strain: Bi-axial strain analysis. Strain ellipsoids: Flinn's diagram of strain ellipsoids. (6) Folds, Classification and genesis of folds. Mechanism of folding, Biot's law - strain within a buckled layer, similar fold and shear fold, kink bands, chevron folds and conjugate fold. Theory of progressive evolution of fold shapes in single competent layers, Layer parallel shortening, Dependence of fold shape on high and low viscosity contrast between different layers, Superimposed folding, type 1, 2 and 3 interference pattern. (6) Faults– classification and genesis, Mechanism of faulting.

	Thrust systems. Strike slips fault systems. Joints and fractures. Classification and Significances. (4) Lineations. Classification and significance. Boudinage and Fold relations. Foliations, cleavage. Classification and Significances. Scope of structural analysis, concept of Tectonite fabric and Tectonite Symmetry (4) Shear Zones–classification, ductile shear zone. Structural analysis on microscopic, mesoscopic and macrosopic scales Microdeformation, plastic and brittle deformation, Deformation of planar structures by flexural slip folding and shear folding. (4) Structure and physical characters of continental and oceanic crust Continental drift, Sea - floor spreading and Plate Tectonics, Structure and Tectonics of divergent margins, transform faults, convergent margins (4) Tectonic framework of India, Different tectonics blocks, Cratons and Mobile Belts Dharwar, Southern Granulite Terrain, Eastern Ghats Mobile Belt, Aravalli and Delhi Fold Belts, Central Indian Tectonic Zone, Neotectonics - Features and evidences-characteristic landforms, Methods of analysis, Case studies of Orogenic belts (4)
Evaluation /assessment	End-Sem Examination-40% Mid-Sem Examination-30% Others-Quiz:30%
Suggested readings (with full list of authors, publisher, year, edn etc.)	Ramsay, J. G. Folding and fracturing of rocks. McGraw Hills, 1967. Haakon Fossen, Structural Geology. Cambridge University Press. Davis, G. H., Reynolds, S. J. and Kiutth, C. C. 2013. Structural Geology of Rocks and Regions, John Wiley and Sons, 3rd Ed. Philip Keary and Frederick Vine, Global Tectonics, Blackwell Science, 1996