


**Department of Earth Sciences  
Indian Institute of Technology Kanpur**

1. **Course Title:** Applied methods in structural geology
2. **Course Number:** ES4XX 
3. **Department:** Earth Sciences
4. **Proposing Instructor(s):** Amar Agarwal
5. **Units:** [Lectures: 3 (L), Tutorial: 0 (T), Laboratory: 0 (P), Additional Hours [0-2]: 0(A)], Credits (3\*L+0\*T+0\*P+0\*A): 9
6. **Course Type:** Departmental Elective (UG)
7. **Prerequisite:** none
8. **Other Interested Faculty:** none
9. **Course Description:**
  - a) **Objectives:** Introduce students with structural geological techniques having industrial applications.
  - b) **Contents** (*preferably in the form of 5 to 10 broad titles*):

S. No.	Broad Title	Topics	No. of Lectures
1	Introduction	• Introduction to structural discontinuities (SD) at outcrop scale	5
2	Mapping and representation	• Stereographic projections and structural maps	7
3	Characterization and analysis of SD	• Characterizing SD from point cloud data using open-source software • Kinematic analysis	7
4	Understanding natural fractures	• Nomenclature • Characteristics and dimension • Mechanics of extension and shear fractures	6
5	Measurement and analysis of fractures	• Measuring and analysing fracture data in cores and hand samples	5
6	Effects of natural fractures on reservoirs	• Effects of fracture system • Volumetrics • Interactions between natural and hydraulic fractures	5
7	Techniques for damage and fatigue quantification	• Spectroscopic (XRD, Raman) • Rock magnetic • Acoustic	5
		Total	40

**10. Recommended books:**

1. Applied concepts in fractured reservoirs. J.C. Lorenz and S.C. Cooper.

Proposers: \_\_Amar Agarwal\_\_

Date: 03/October/2024

This course is APPROVED/NOT APPROVED

Convener, DUGC, ES

This course is APPROVED/NOT APPROVED

Chairman, SUGC