



Module PMRF-ISSS057/2025

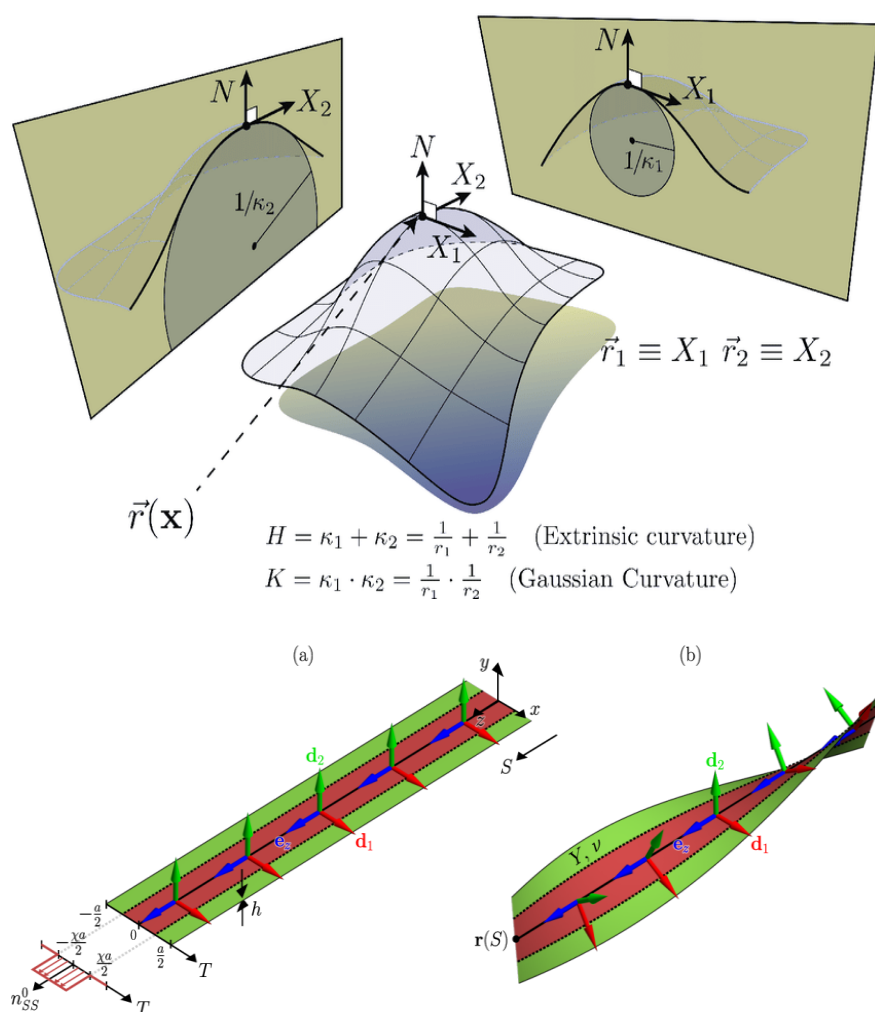
## Applied Differential Geometry in Mechanics

### Name of the PMRF student

G R Krishna Chand Avatar

### Required background of the students taught

Aerospace Engineering, Civil Engineering,  
Mechanical Engineering



$$H = \kappa_1 + \kappa_2 = \frac{1}{r_1} + \frac{1}{r_2} \quad (\text{Extrinsic curvature})$$
$$K = \kappa_1 \cdot \kappa_2 = \frac{1}{r_1} \cdot \frac{1}{r_2} \quad (\text{Gaussian Curvature})$$

### Details of the content of the module

#### Module 1: Review of Curves and Surfaces

Space curves, Curvature, Frenet-Serret frame, Parametrization of surfaces, Smooth surfaces, Ruled surfaces, First and second fundamental forms, Curvature of surfaces, Curves on surfaces.

#### Module 2: Review of Tensor Calculus

Definition, Tensor Operations, Curvilinear coordinates, Covariant and contravariant derivatives, Christoffel symbols.

#### Module 3: Applications in mechanics

Principles of elasticity, Mechanics of elastic slender structures.

### Schedule of the module

Course Start Date – June 10, 2025

Course End Date – July 15, 2025

Total Duration – 14 hours

Weekly sessions - 4 hrs per week (2 hours on Tuesdays and Thursdays or recorded lectures) (tentative)

Session Timings: 6-8 PM (tentative)

Meeting link : Will be shared later

[Link](#)

Contact email ID: [issf.forum@gmail.com](mailto:issf.forum@gmail.com)

Registration link:

<https://forms.gle/JnyRsYdg3moDSxbP6>