



**School of Physical Sciences  
Jawaharlal Nehru University  
New Delhi, 110067**

**Schedule for GIAN Course on “Hyperbolic geometry,  
Riemann surfaces and Teichmüller spaces”**

<b><u>Day 1</u></b>  Date: 27 <sup>th</sup> January, 2025 Lecture 1: 2:00 p.m. - 4:00 p.m. (AP) High Tea: 4:00 p.m. – 4:30 p.m. Lecture 2: 4:30 p.m. - 5:30 p.m. (RS)	<b><u>Day 2</u></b>  Date: 28 <sup>th</sup> January, 2025 Lecture 1: 2:00 p.m. - 4:00 p.m. (AP) High Tea: 4:00 p.m. – 4:30 p.m. Lecture 2: 4:30 p.m. - 5:30 p.m. (RS)
<b><u>Day 3</u></b>  Date: 29 <sup>th</sup> January, 2025 Lecture 1: 2:00 p.m. - 3:30 p.m. (AP) High Tea: 3:30 p.m. – 4:00 p.m. Lecture 2 *: 4:00 p.m. - 5:00 p.m. (AP) Discussion: 5:00 p.m.-5:30 p.m.	<b><u>Day 4</u></b>  Date: 30 <sup>th</sup> January, 2025 Lecture 1: 2:00 p.m. - 4:00 p.m. (AP) High Tea: 4:00 p.m. – 4:30 p.m. Lecture 2 *: 4:30 p.m. - 5:30 p.m. (BT)
<b><u>Day 5</u></b>  Date: 31 <sup>st</sup> January, 2025 Lecture 1: 2:00 p.m. - 4:00 p.m. (AP) High Tea: 4:00 p.m. – 4:30 p.m. Lecture 2 *: 4:30 p.m. - 5:30 p.m. (KG)	<b><u>Day 6</u></b>  Date: 1 <sup>st</sup> February, 2025 Lecture 1: 10:00 a.m. - 12:30 p.m. (AP) Discussion/ Closing: 12:30 p.m. – 1:15 p.m.

\*special lecture

**Course Instructors:**

1. Prof. Athanase Papadopoulos (AP).
2. Prof. Riddhi Shah (RS).
3. Prof. Banktेशwar Tiwari (BT).
4. Prof. Krishnendu Gongopadhyay (KG).

**Venue:** Seminar room, SPS, JNU

## Details of Special lectures:

1. **Instructor:** Prof. Athanase Papadopoulos.

**Time:** 4:00 p.m.-5:00 p.m. (29<sup>th</sup> January, 2025).

**Title:** Best maps between surfaces.

**Abstract:** The mathematical theory of best maps between surfaces that appear in conformal and metric geometries, description of applications in mathematics (the moduli spaces of surfaces), geography (the construction of geographical maps), biology (the growth of living beings) and art.

2. **Instructor:** Prof. Banktेशwar Tiwari.

**Time:** 4:30 p.m.-5:30 p.m. (30<sup>th</sup> January, 2025).

**Title:** A brief introduction to Finsler geometry.

**Abstract:** Finsler geometry is a natural generalization of Riemannian geometry. It has been a very active field of research, with a particular stress on the use of purely metric methods in the investigation of various Finsler metrics that appear naturally in geometry, topology and convexity theory. For instance, Teichmüller and Thurston metrics are natural examples of Finsler metrics on Teichmüller spaces of a surface. In some sense it is wider in scope and richer in content than Riemannian geometry. A Riemannian metric on a smooth manifold is a smoothly varying family of inner products on the manifold, whereas a Finsler metric on a manifold is a smoothly varying family of a kind of non-symmetric norm, what is called Minkowski norm. In the present talk we first introduce the Minkowski norm on a Vector space and then we discuss a Finsler metric as a family of such norms in each tangent space. Funk and Hilbert metrics in a convex subsets of the Euclidean space arise naturally as examples of Hilbert's fourth problem, i.e., metrics whose geodesics are line segments. It turns out that the infinitesimally these metrics are examples of the Finsler metric. In this talk we will also present another viewpoint of Funk metric as a solution of the Zermelo Navigation problem and if time permits we will discuss some recent work on Funk-Finsler structure in hyperbolic and spherical geometry.

3. **Instructor:** Prof. Krishnendu Gongopadhyay.

**Time:** 4:30 p.m.-5:30 p.m. (31<sup>st</sup> January, 2025).

**Title:** Complex hyperbolic quasi-Fuchsian groups.

**Abstract:** Complex hyperbolic quasi-Fuchsian groups are certain discrete subgroups of the isometry group of the complex hyperbolic space. Such groups are complex hyperbolic generalizations of the fuchsian groups and are related to the complex hyperbolic analogue of the Teuchmüller space. Not much is understood about these groups. In this talk, we shall give an introduction to these objects and if time permits, will survey some known results.