

Mathematics Syllabus for Summer School

February 10, 2014

1 Combinatorics

Class 1.0(45 mins):

Fundamental Principles of counting-1;

- Number of ways to distribute distinct objects in distinct places.
- Number of ways to pickup distinct objects from a bunch of distinct objects.

Class 1.5 (45 mins):

Fundamental Principles of counting-2;

- Counting number of arrangements with repeated objects.
- Cyclic arrangements with repeated objects.

Class 2.0:(45 mins)

Polya Theory; The necklace problem, Counting chemical Isomers.

Class 2.5:(45 mins)

Fibonacci Numbers; Recursive formula, Growth, tiling visualisation.

2 Number Theory

Class 1.0:

Integers, Prime numbers, Divisibility.

Class 1.5:

Congruences and residue classes, Fermat's Little theorem.

Class 2.0:

Rational and Irrational numbers and their decimal expansions.

Class 2.5:

Diophantine equations.

3 Geometry

(1.5hr)

- Congruence of triangles.
- Similarity of triangles.
- Some properties of triangles; Circumcircle, Incircle, Centroid.
- Circles and tangents.
- Cyclic quadrilaterals.

4 Tutorial

Geometry (1.5 hr)

Combinatorics and Numbertheory (1.5 hr)