

ADVANCED SEMINAR IN GEOMETRY AND TOPOLOGY, 2
“MODULI OF CURVES” 0366487801
(SPRING SEMESTER, 2011-12)

Lecturer: Prof. E. Shustin

Time and place: Wednesday 16-18 in Ornstein 102.

Program

1. Nodal and stable curves.
2. Deformation theory: Deformation of smooth curves. Basic deformation theory. Universal deformations of stable curves. Deformations of maps.
3. Stable reduction.
4. Moduli stack: Divisors. Existence of tautological families.
5. Grothendieck-Riemann-Roch and Porteous formulas: Grothendieck-Riemann-Roch formula. Chern classes of the Hodge bundle. Chern classes of the tangent bundle. Porteous' formula.
6. Hyperelliptic locus in \mathcal{M}_3 .
7. Construction of $\overline{\mathcal{M}}_g$. Background in geometric invariant theory.
8. Stability of Hilbert points of smooth curves.
9. Construction of $\overline{\mathcal{M}}_g$ via the potential stability theorem.
10. Geometry of moduli spaces: Irreducibility. Diaz' theorem. Moduli of hyperelliptic curves. Ample divisors on $\overline{\mathcal{M}}_g$. Irreducibility of Severi varieties. Kodaira dimension of \mathcal{M}_g .

Participants will be suggested to give talks by their choice.

Preliminary knowledge of basic algebraic geometry should be sufficient.

Literature:

Main reading: J. Harris and I. Morrison. Moduli of curves. Springer, 1998.

Other sources:

E. Arbarello, M. Cornalba, P. Griffiths, and J. Harris. Geometry of algebraic curves, I. Springer, 1985.

E. Arbarello, M. Cornalba, P. Griffiths, and J. Harris. Geometry of algebraic curves, II. 2011.