Possible student talks:

1. State and sketch a proof of the holomorphic implicit function theorem. **Hint.** An elementary proof is presented on p 5 of the referrence D. You could use it.

2. Explain why there is no "algebraic implicit function theorem" by giving an example of an algebraic curve $F(x, y) = 0$ which cannot be locally parameterized by a pair $t \mapsto (x(t), y(t))$ of algebraic functions.

3. Describe elliptic functions and some of their properties. Describe the Weierstrauss P-function. Give a mini-course on elliptic curves (over the complex numbers). Good source: Ahlfors.

4. Describe the j-function for uniformizing the basic modular curve. The field structure of the field of elliptic functions. Good source: Ahlfors.

5. Give a talk on some integrals you can and can't do in freshman calculus. Good source: first section of Griffiths, "Variation on a Theme of Abel" .

6. Give a mini-course on modular functions, including dimension counting for spaces of modular functions.

7. Find a basis for the holomorphic differentials on concrete hyperelliptic RSs, or of other concrete RSs such as the Fermat curves $x^n + y^n = z^n$.

8. Go through using the Newton-Puiseux expansion to parameterize nbhds of algebraic curves $F(x, y) = 0$ near singular or regular points. Use the expansion to resolve or "normalize" singularities of curves.

9. Explain why the link of every algebraic curve singularity $F(x, y) = 0$ is an iterated torus knot. REF: Brieskorn-Knorrer, Plane Algebraic Curves, or that Intelligencer paper by the guy who first showed the complement of the figure eight knot (or trefoil , maybe?) has a hyperbolic structure.

10. Present the solution to any one of the homeworks, including surrounding or related material when so moved.

11. Present a solution to any of the exercises in D. Exercises are found at the ends of chapters.