Hamiltonian mechanics 2019 Fall
Final exam topics list
Prof. Krichever

1. Least action principle; Euler – Lagrange equations

2. D'Alamber principle. First integrals and symmetries of action (Noether theorem).

3. Basics of Hamiltonian formalism: phase space; Legendre transform.

4. Basics of differentials forms calculus and applications: Cartan identity, Poincare lemma, Liouville theorem

5. Darboux theorem

6. Least action in Hamiltonian formalism.

7. Maupertuis' Principle: Minimum Action Path at Fixed Energy

8. Canonical transformations

9 . Separations of variables and integrability: Hamiltonian – Jacobi equations

10. Completely integrable systems: Arnold -– Liouville theorem.

11 Poisson brackets and symplectic structure. Weinstein-Darboux theorem

12. Lax representation of solid body equations.