Supergeometry and its applications in Physics
Syllabus.

I. Super Linear Algebra

Super vector spaces and sign rule.
Commutative superalgebras.
Modules over commutative superalgebras.
Super trace.
Super determinant (Berezinian).
Geometric constructions of super trace and super determinant.

II. Supermanifolds.

Basic definitions.
Definition as functors of points. Families of super geometric objects.
Tangent spaces. Vector fields. Lie super algebras.
The inverse and implicit function theorems.
Super Lie groups and their actions. Lie derivatives.
Calculus of differential forms.
Vector bundles. Connections, curvature. Chern classes.
Calculus of integral forms.
Stokes theorem.
Distributions and Frobenius integrability criterion.
Odd cohomological vector fields.
Examples of differential geometric structures on supermanifolds.

III. Real structures and relation with Hilbert spaces.

IV. Complex super manifolds.

SUSY curves and spin curves.

V. Relation to Quantum Field Theories (QFT).

Supersymmetries.
Construction of some supersymmetric QFT using supermanifolds.
σ-models and super σ-models
Strings and super strings.