MATH 535: LIE THEORY II. ALGEBRAIC GROUPS

Algebraic groups are algebraic varieties with a compatible group structure. There
are two main extreme cases: a projective variety with an abelian group structure,
or an affine variety. This course is concerned with the latter case; it turns out that
then such an algebraic group can be embedded (as a closed subgroup) into $GL(n)$
for some $n$, and this is why such groups are called linear algebraic groups. This
course is aimed at the study of algebraic groups over an algebraically closed field of
characteristic zero; other topics (such as the situation over non-algebraically closed
fields) might be introduced.

Approximate syllabus:
(1) Algebraic groups: the definition and basic properties.
(2) Derivations and the Lie algebras.
(3) Solvable algebraic groups. Borel subgroups.
(4) Classification of reductive algebraic groups over an algebraically closed field.
(5) Other topics, e.g. rationality questions: non-algebraically closed fields of
characteristic zero; or real forms of a complex algebraic group.

Suggested textbook: Springer, "Linear algebraic groups" (2nd edition)
Prerequisites (for this version): Math 534 and ideally, Math 532 (the latter not
really required this year).