Outline of content of Bryant's lecture series

(tentative--subject to revision based on audience needs)

Lecture 1: Special Holonomy in Riemannian Geometry
- Principal bundles, connections, and G-structures
- Holonomy and parallel tensor fields, Kahler as example
- de Rham Splitting and Ambrose-Singer holonomy theorem
- The Berger classification
- Some algebra of the exceptional cases (time permitting)

Lecture 2: Differential forms and spinors
- Intrinsic torsion of G-structures
- Characterizations in terms of differential forms
- Chern's generalization of the Kahler type-decomposition
- The space of curvature tensors
- Consideration of special cases, particularly G_2 and Spin(7)

Lecture 3: Local existence and generality
- The Calabi-Yau case and Monge-Ampere (local theory)
- Cohomogeneity one examples in the various cases and their geometry
- The local generality of G_2-holonomy metrics
- The local generality of Spin(7)-holonomy metrics
- General techniques

Lecture 4: Algebra and geometry of G_2 and Spin(7)
- Some representation theory
- Consequences for Hodge and curvature identities
- Structure equations and decompositions of operators

Lecture 5: Closed G_2 structures
- The general structure equations and G_2-identities
- Special results in the case of closed G_2-structures
- The Laplacian flow