Syllabus

1. Introduction: motivations and relations with other fields [Week 1]

2. $K_0$ and classification of modules
   (a) Definition and elementary properties of $K_0$ [Weeks 1 to 5]
      i. Group completion
      ii. Grothendieck groups
      iii. Devissage
      iv. The Resolution Theorem
      v. Stability
      vi. Multiplicative structure
   (b) Functoriality of $K_0$ [Weeks 6 to 8]
      i. Exact functors
      ii. Naturality of $K_0(R)$
      iii. Localization

3. $K_1$ and classification of invertible matrices [Weeks 9 to 11]
   (a) Elementary matrices and commutators
   (b) Definition and elementary properties of $K_1$
   (c) Generalized determinants
   (d) $K_1$ as a Grothendieck group

4. $K_2$ and relations among matrices
   (a) Definition and elementary properties of $K_2$ [Week 12]
   (b) Exact sequences [Weeks 13]
      i. The relative sequence
      ii. Excision and the Mayer-Vietoris sequence
      iii. The localization sequence
   (c) Matsumoto’s Theorem [Week 14]
Bibliography

This course will be based primarily on Chapters 3, 4, 5, 6, 9, 12, 13, and 14 of the following text.