ENGG1500 FINAL EXAM CONCEPT REVIEW OUTLINE

**NOTE: THIS IS A TEMPLATE, CHECK YOUR COURSE OUTLINE AND LECTURE NOTES FOR CONCEPTS THAT WILL BE ON YOUR FINAL EXAMINATION. THIS IS A TEMPLATE THAT YOU CAN WORK OFF OF.**

When looking at this template of concepts discussed within the course, it can be helpful to fill in definitions, formulas, helpful notes to the template and use this to organize the content of this course!

# CHAPTER 1: EUCLIDEAN VECTOR SPACES

* Vectors in R2 and R3
  + Vector equation of a line in both
  + Vector addiction and multiplication
  + Subspaces
  + Linear independence
* Length and dot products
* Projections
* Cross-products

# CHAPTER 2: SYSTEMS OF LINEAR EQUATIONS

* Systems of linear equations and elimination
* RREF
* Rank
* Homogeneous systems
* Application to spanning and linear independence

# CHAPTER 3: MATRICES, LINEAR MAPPINGS, AND INVERSES

* Operations on matrices
  + Equality
  + Addition
  + Scalar multiplication of matrices
* Matrix mappings and linear mappings
* Special subspaces for systems and mappings: rank theorem
  + Solution space and nullspace
  + Bases for Row(A), Col(A), Null(A)

# CHAPTER 4: VECTOR SPACES

* Vector spaces
  + Subspaces
* Bases
* Dimensions
* General linear mapping
  + The matrix of L wrt the basis B

# CHAPTER 5: DETERMINANTS

* Determinants in terms of cofactors
* Row operations and the determinant
* Matrix inverse by cofactors and Cramer’s rule

# CHAPTER 6: EIGENVECTORS AND DIAGONILIZATION

* Eigenvectors and eigenvalues
* Solving for eigenvectors and eigenvalues
* Diagonalization

# CHAPTER 9: COMPLEX VECTOR SPACES

* Complex numbers
  + The complex plane
  + Polar form
* Systems with complex numbers