**Sam's inventory of Past exam questions**
**Link to all old exams: https://mitmath.github.io/1806/old.html**
**(Note: every semester tends to have slightly different emphasis so interpret problems in context )**
**(Note: we believe that 18.06 is the most open class worldwide with so many materials available. We hope you not only find our openness useful, but maybe advocate for openness in your own future work.)**

**Fall 18**
Exam 2:
- Q1 (Projections and fundamental subspaces)
- Q2 (Least-squares)

Exam 3:
- Q1 (Markov matrices & Diagonalization)
- Q3 (Eigenvalues & matrix exponential)

Final:
- Q1 (Diagonalization & ODEs)
- Q2 (QR factorization - Gram Schmidt **not** needed here)
- Q4 (least squares/projections)
- Q6 (least squares)
- Q7 (Block matrices)

**Spring 18**
Exam 2:
- Q2 (least squares)
- Q3 (svd, projections & fundamental subspaces)
- Q4 (determinants - axiomatic definition)

Exam 3:
- Q1 (eigenvalues/eigenvectors/diagonalization)
- Q2 (eigenvalues and singular values)
- Q3 (positive definiteness)

**Fall 17**
Exam 1:
- Q1 (linear systems/complete solution to Ax =b)

Exam 2
- Q3 (Least squares/Block matrices)

Exam 3
- Q1 (determinants/eigenvalues/diagonalization)

Final
- Q3 (Projections/least squares)

**Spring 17**
Exam 1:
- Q2 (Complete solution to Ax = b)

Final:
- Q1 (Fundamental subspaces/projections)
- Q2 (Least squares)
- Q3 (orthogonal matrices and the SVD - part (a) will seem unfamiliar, but solution should make sense)
- Q4 (Fundamental subspaces/projections/eigenvalues)

## Fall 14
Exam 1:
- Q2 (Vector subspaces)

Exam 2:
- Q2 (Determinants/inverses/eigenvalues)
- Q3 (Eigenvalues/diagonalization)
- Q4 (Markov matrices)

Exam 3:
- Q1 (Eigenvalues/ODEs/singular values)
- Q2 (Positive definiteness/eigenvalues/similar matrices)
- Q3 (Eigenvalues/svd)
- Q4 (linear transformations)

## Spring 14
Final:
- Q1 (fundamental subspaces/complete solution to Ax = b)
- Q7 (svd)

## Fall 13
Exam 1:
- Q3 (fundamental subspaces)
- Q4 (bases)

Exam 2:
- Q1 (determinants)
- Q2 (determinants/eigenvalues)
- Q3 (determinants/cofactors)
- Q4 (Projections/volumes)

Exam 3:
- Q2 (general review - true or false)

Final:
- Q1 (projections)
- Q5 (bases and linear transformations)
- Q6( general review - except part g)

## Fall 12
Exam 1:

- Q2 (vector subspaces)

Exam 2:
- Q2 (determinants)

Exam 3:
- Q1 (positive definiteness)
- Q2 a-c (eigenvalues and singular values)
- Q3 (Markov matrices)
- Q4 (permutation matrices)

Final:
- Q2 (cofactors)
- Q3a,b (eigenvalues and fundamental subspaces)

## Fall 11

Exam 1:
- Q1 (fundamental subspaces and complete solution to Ax = b)

Exam 2:
- Q3 (Determinants)

Exam 3:
- Q2 (SVD)
- Q3 (eigenvalues)
- Q4 (positive definiteness)

Final:
- Q3 (Eigenvalues and similar matrices)
- Q5 (linear transformations)
- Q6 (positive definiteness/eigenvalues/projection matrices/orthogonal matrices)
- Q7 (least squares)