Syllabus

1. (September 4, 5.) Fundamentals of number theory. Theorems about primes. Congruences.
2. (September 11, 12.) Linear congruences. Simultaneous congruence systems. Euler-Fermat theorem, little Fermat theorem.
3. (September 18, 19.) Number theoretic algorithms: basic operations, exponentiation, Euclidean algorithm, its application for solving linear congruences.
4. (September 25, 26.) Primality testing, public key criptography, RSA-encoding. Geometry of 3-space: equations of planes, lines; intersections.
5. (October 3.) $\mathbb{R}^n$, operations in $\mathbb{R}^n$. Subspaces of $\mathbb{R}^n$.
6. (October 9, 10.) Linear combination, spanned (generated) subspace, generating system, linear independence.
7. (October 16, 17.) Exchange theorem, I-G inequality, basis, dimension.
8. (October 24.) Standard basis, the dimension of $\mathbb{R}^n$ and its subspaces.
10. (November 3.) **First midterm.** Material: up to dimension.
11. (November 6, 7.) Determinants, ways of evaluation, expansion theorem. Cross product.
15. (December 1.) **Second midterm.** Material: up to rank.
16. (December 4, 5.) Changing bases, the matrix of a linear transformation in a given basis. Eigenvalues and eigenvectors of matrices, characteristic polynomial. Diagonalisation.