Special features of our syllabus. Number theory sometimes serves as an introduction to "proof techniques". We give many exercises to practice those techniques, but to make it less boring, we do so while developing certain themes as the book progresses, for examples, the theory of recurrence sequences, and properties of binomial coefficients. We dedicate a preliminary chapter to induction and use it to develop the theory of sums of powers. Here is a list of the main supplementary themes which appear in the book:

Special numbers: Bernoulli numbers; binomial coefficients and Pascal's triangle; Fermat and Mersenne numbers; and the Fibonacci sequence and general second-order linear recurrences.

Subjects in their own right: Algebraic numbers, integers, and units; computation and running times: Continued fractions; dynamics; groups, especially of matrices; factoring methods and primality testing; ideals; irrationals and transcendentals; and rings and fields.

Formulas for cyclotomic polynomials, Dirichlet L-functions, the Riemann zeta-function, and sums of powers of integers.

Interesting issues: Lifting solutions; polynomial properties; resultants and discriminants; roots of polynomials, constructibility and pre-Galois theory; square roots $(\text{mod } n)$; and tests for divisibility.

Fun and famous problems like the *abc*-conjecture, Catalan's conjecture, Egyptian fractions, Fermat's Last Theorem, the Frobenius postage stamp problem, magic squares, primes in arithmetic progressions, tiling with rectangles and with circles.

Our most unconventional choice is to give a version of Rousseau's proof of the law of quadratic reciprocity, which is directly motivated by Gauss's proof of Wilson's Theorem. This proof avoids Gauss's Lemma so is a lot easier for a beginning student than Eisenstein's elegant proof (which we give in section 8.10 of appendix 8A). Gauss's original proof of quadratic reciprocity is more motivated by the introductory material, although a bit more complicated than these other two proofs. We include Gauss's original proof in section 8.14 of appendix 8C, and we also understand $(2/n)$ in his way, in the basic course, to interest the reader. We present several other proofs, including a particularly elegant proof using Gauss sums in section 14.7.