1016-11-2 **Christopher Skinner***, Department of Mathematics, 2074 East Hall, 530 Church Street, Ann Arbor, MI 48109-1043. *Modular forms and special values of L-functions.*

L-functions - the Riemann zeta function $\zeta(s)$, the Dirichlet L-series, the L-functions of elliptic curves and modular forms, etc. - are ubiquitous in modern number theory. It has long been recognized that their zeros carry arithmetic information (think Riemann Hypothesis and distribution of primes). However, it has also been recognized that "special values" of these functions reflect additional information. For example, the divisibility of the numerator of $\zeta(1-2k)$, $k>0$ an integer, by a prime p is generally reflected in the non-triviality of a piece of the class group of $\mathbf{Q}(\zeta_p)$. Another example, is the conjecture of Birch and Swinnerton-Dyer about the behavior and value at $s=1$ of the L-function $L(E,s)$ of a rational elliptic curve E: the order of vanishing of $L(E,s)$ at $s=1$ should equal the rank of the group of rational points $E(\mathbf{Q})$ and its first non-vanishing Taylor series coefficient (at $s=1$) should reflect additional information about $E(\bar{\mathbf{Q}})$. There are now many conjectures consolidating and generalizing these. This talk will explain results of efforts to prove these conjectures for the L-functions of modular forms, which includes those of elliptic curves. Much of the work reported on is joint with E. Urban. (Received February 11, 2006)