CO 487/687 Applied Cryptography

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This course is an introduction to applied cryptography aimed primarily at undergraduate students.

Topics:
* Symmetric-key encryption: Classical ciphers, one-time pad, stream ciphers (RC4, ChaCha20), Feistel networks, DES, AES, modes of operation.
* Hash functions and data integrity: Hash functions (SHA256), parallel collision search, message authentication codes (CBC-MAC, HMAC).
* Authenticated encryption: Encrypt-then-MAC, AES-GCM.
* Public-key encryption: RSA, elliptic curves.
* Signature schemes: RSA, ECDSA, quantum-safe signature schemes.
* Key establishment: Elliptic curve Diffie-Hellman key agreement (ECDH).
* Key management: Certification authorities, public-key infrastructures.

Suggested reading: None (the course is self-contained).

Prerequisites: None.