

Spring 2026 Courses in Machine Learning and Communication Systems

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Here's a schedule of [ECE electives to be offered from fall 2025 to spring 2027](#) and info about spring courses on machine learning and communication systems to help you plan.

Design of cellular systems is increasingly embracing machine learning (ML) for offline and online learning due to the complexity of cellular standards and interference conditions.

Courses below can be used in a [Technical Core](#) or as a [Free Elective](#). Links to courses are to the [spring course schedule](#). New ECE 379K courses are described on the next page.

Communication Systems

Analog Continuous-Time Circuits and Systems

- [ECE 325 Electromagnetic Engineering](#): sequels include ECE 325K Antennas & Wireless Propagation and ECE 363M Microwave & RF Engineering (Spring)
- [ECE 438 Fundamentals of Electronic Circuits Lab I](#): modeling of transistors and diodes; design of amplifiers; building blocks used in ECE 438K to design filters and oscillators.
- [ECE 363M Microwave and RF Engineering](#). Pre-requisite: ECE 325.

Digital Discrete-Time Communication Systems

- [ECE 445S Real-Time Digital Signal Processing Lab](#). Sampling; filters; pulse shaping; matched filtering; carrier recovery; symbol synch; equalization; acoustic modems. *Pre-requisite*: EE 312 Programming, ECE 313 Linear Systems & Signals and ECE 319K Intro to Embedded Systems. *Co-Requisites*: ECE 333T and ECE 351K Probability.
- [ECE 360K Digital Communications](#). Digital modulation; pulse shaping; optimum receivers; matched-filtering; machine learning; bit error probability; inter-symbol interference; equalization; multicarrier modulation; orthogonal frequency-division multiplexing; info theory, channel capacity, error control codes, Viterbi decoding. *Pre-requisites*: ECE 313 Linear Systems & Signals, and ECE 351K Probability. *Co-requisite* [ECE 445S Real-Time DSP Lab](#) or ECE 351M DSP. **Offered in the Spring of even years.**
- [ECE 372N Telecommunication Networks](#). Modern communication networks; reliable end-to-end communications; service interfaces and peer-to-peer protocols; TCP/IP; network-layer and transport-layer issues; link layer with focus on contention-based access; and Wi-Fi and cellular networks. *Pre-requisites*: ECE 313 Linear Systems & Signals, ECE 351K Probability, and M 340L Matrices and Matrix Computation,

Machine Learning Related to Networking

- [ECE 361E ML/Data Analytics for Edge AI](#). IoT; cyber-physical systems; energy-aware ML; deep learning; model compression; federated learning; ML security; model-architecture co-design. Image processing. *Pre-requisite*: ECE 460J Data Science Lab

Mathematical Foundations

- [M 346 Applied Linear Algebra](#): numerical algorithms involving matrices, as used in signal processing & ML algorithms. *Pre-requisite*: M 340L Matrices & Matrix Comp.
- [M 362M Intro to Stochastic Processes](#): modeling and processing of random signals, including thermal noise and additive interference. *Pre-requisite*: ECE 351K Probability.

- [M 365C Real Analysis I](#): analysis of iterative numerical algorithms to prove convergence which underlies adaptive algorithms. *Pre-requisite*: M 325K and M 340L
- [M 368K Numerical Methods of Applications](#): splines, smoothing of data, approximation of eigenvalues, signal processing, optimization, and Monte Carlo methods
- [M 378K Intro to Mathematical Statistics](#): statistical distributions; estimation of distribution parameters; hypothesis testing. *Pre-requisite*: EE 351K Probability.

Machine Learning

- ECE 360C Algorithms: *pre-reqs* ECE 312 Programming I and M 325K Discrete Math
- [ECE 460J Data Science Laboratory](#): *pre-reqs include* ECE 313 Lin Sys & ECE 351K Prob.
- [ECE 361E ML/Data Analytics for Edge AI](#) (see above)
- [ECE 461P Data Science Principles](#): *pre-reqs include* ECE 313 Lin Sys & ECE 351K Prob.
- [ECE 374N Neural Engineering](#)

Mathematical Foundations

- [M 346 Applied Linear Algebra](#) (see first page)
- [M 378K Intro to Mathematical Statistics](#) (see first page).