NETWORKED AND SOCIAL SYSTEMS ENGINEERING, BSE

The Rajendra and Neera Singh Program in Networked and Social Systems Engineering (NETS), is the world's first course of study to fully integrate the disciplines needed to design and analyze the complex networks that are reshaping our society. This program prepares students to shape the technologies that underpin Internet-based search and electronic commerce, financial networks, social networks, and even such exchanges as the power grid. Graduates of this program will be prepared to engineer networks that work for both end-users and investors. Other graduates may become the policy-makers who are urgently needed to regulate these networks for the protection of commercial property and societal good.

For more information: https://www.seas.upenn.edu/prospective-students/undergrad/majors/networked-social-systems-engineering/

Networked and Social Systems Engineering (NETS) Major Requirements

37 course units are required.

Code	Title	Course Units
Engineering		
CIS 110	Introduction to Computer Programming	1
CIS 120	Programming Languages and Techniques I	1
CIS 121	Programming Languages and Techniques II	1
CIS 320	Introduction to Algorithms	1
ESE 204	Decision Models	1
or ESE 504	Intro to Linear, Nonlinear and Integer Optimization	
ESE 303	Stochastic Systems Analysis and Simulation	1
ESE 305	Foundations of Data Science	1
NETS 112	Networked Life	1
NETS 150	Market and Social Systems on the Internet	1
NETS 212	Scalable and Cloud Computing	1
NETS 312	Theory of Networks	1
NETS 412	Algorithmic Game Theory	1
CIS 400	Senior Project	1
or CIS 410	CIS Senior Thesis	
or ESE 450	Senior Design Project I - EE and SSE	
CIS 401	Senior Project	1
or CIS 411	CIS Senior Thesis	
or ESE 451	Senior Design Project II - EE and SSE	
Math and Natural Science		
MATH 104	Calculus, Part I	1
MATH 114	Calculus, Part II	1
MATH 240	Calculus, Part III	1
CIS 160	Mathematical Foundations of Computer Science	1
MATH 312	Linear Algebra	1
or MATH 313	Computational Linear Algebra	
or MATH 314	Advanced Linear Algebra	
CIS 261	Discrete Probability, Stochastic Processes, and Statistical Inference	1
or ESE 301	Engineering Probability	
or ENM 321	Engineering Statistics	
or STAT 430	Probability	
MEAM 110 & MEAM 147	Introduction to Mechanics and Introduction to Mechanics Lab	1.5
or PHYS 150	Principles of Physics I: Mechanics and Wave Motion	
or PHYS 170	Honors Physics I: Mechanics and Wave Motion	
PHYS 151	Principles of Physics II: Electromagnetism and Radiation	1.5
or PHYS 171	Honors Physics II: Electromagnetism and Radiation	
or ESE 112	Engineering Electromagnetics	
Technical Electives		
Department Approval Required [1]		6
General Electives [2]		
ECON 101	Intermediate Microeconomics	1
or BEPP 250	Managerial Economics	
ECON 212	Game Theory	1
or ECON 682	Game Theory and Applications.	
EAS 203	Engineering Ethics	1
Select 2 Social Science or Humanities courses		2
Select 2 Social Science or Humanities or Technology in Business & Society courses		2
Free Elective		
Select 1 course unit of free electives		1
Total Course Units		37

1. At least four courses from an approved depth area required. For the remaining courses you may use (1) courses from any approved depth area, and/or (2) courses approved by the department. In general, approved courses must be advanced courses that are rigorous/quantitative and have at least one nontrivial prerequisite. See the NETS website for a list of depth areas and approved courses.
2. Must include a Writing Seminar (a list of approved Writing Seminars can be found in the SEAS Undergraduate Handbook (https://ugrad.seas.upenn.edu/student-handbook/courses-requirements/writing-courses/))

Concentrations

Students may select one of five concentrations:

- Data Science
- Economics and Networked Markets
- Networked and Cloud Services
- Technology and Society
- Theory of Networks and Dynamics

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2020 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.