

# COMPUTER SCIENCE DEGREE

Students must also complete the Undergraduate Registration Requirement (<https://catalogs.northwestern.edu/undergraduate/requirements-policies/undergraduate-registration-requirement>) and the degree requirements of their home school.

Course	Title
<b>Requirements (48 units)</b>	
<i>Core Courses (32 units)</i> <sup>1</sup>	
4 mathematics courses:	
EECS 212-0	Mathematical Foundations of Comp Science
MATH 220-0	Differential Calculus of One-Variable Functions
MATH 224-0	Integral Calculus of One-Variable Functions
MATH 230-0	Differential Calculus of Multivariable Functions
4 engineering analysis and computer proficiency courses:	
GEN_ENG 205-1 & GEN_ENG 205-2 & GEN_ENG 205-3 or GEN_ENG 206-1 & GEN_ENG 206-2 & GEN_ENG 206-3	Engineering Analysis I and Engineering Analysis II and Engineering Analysis III Honor Engineering Analysis and Honors Engineering Analysis and Honors Engineering Analysis
EECS 111-0	Fundamentals of Computer Programming
4 units of basic science chosen according to McCormick basic science guidelines	
3 design and communications courses ( <a href="https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext">https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext</a> )	
5 basic engineering courses:	
EECS 211-0	Fundamentals of Computer Programming II
EECS 302-0 or IEMS 201-0 or IEMS 303-0	Probabilistic Systems Introduction to Statistics Statistics
3 courses from at least two of the remaining basic engineering areas: computer architecture and numerical methods, electrical science, fluids and solids, materials science and engineering, systems engineering and analysis, and thermodynamics	
7 social sciences/humanities courses ( <a href="https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext">https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext</a> )	
5 unrestricted electives ( <a href="https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext">https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext</a> )	
<i>Major Program (16 units)</i>	
<b>3 required courses:</b>	
EECS 101-0	Computer Science: Concepts, Philosophy, and Connections
EECS 213-0	Introduction to Computer Systems
EECS 214-0	Data Structures & Algorithms
<b>5 breadth courses, 1 from each of the following areas (see department website for changes to this list):</b>	
Theory (p. 1)	
Systems (p. 1)	
Artificial intelligence (p. 1)	
Interfaces (p. 1)	
Software development (p. 2)	
<b>6 technical electives:</b>	
Technical electives (p. 2)	
<b>2 project courses:</b>	
Project courses (p. 2)	

<sup>1</sup> See general requirements (<https://catalogs.northwestern.edu/undergraduate/engineering-applied-science/#requirementstext>) for details.

- Sections of EECS 395-0 Special Topics in Electrical Engineering and Computer Science, EECS 397-0 Special Projects in Computer Science, and EECS 399-0 Projects may be used for technical elective and project requirements, if appropriate; **consult your CS adviser** for information.
- Courses at the 400 level are primarily for graduate students but may be open to advanced undergraduate students with the consent of the instructor.
- EECS 110-0 Introduction to Computer Programming may be used as an unrestricted elective if taken before EECS 111-0 Fundamentals of Computer Programming. It may not, however, be applied to the computer science major requirements.

## Breadth Courses

### Theory

Course	Title
EECS 328-0	Numerical Methods for Engineers
EECS 335-0	Introduction to the Theory of Computation
EECS 336-0	Design & Analysis of Algorithms
EECS 356-0	Introduction to Formal Specification & Verification

### Systems

Course	Title
EECS 303-0	Advanced Digital Design
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 345-0	Distributed Systems
EECS 346-0	Microprocessor System Design
EECS 350-0	Introduction to Computer Security
EECS 358-0	Introduction to Parallel Computing
EECS 361-0	Computer Architecture I
EECS 440-0	Advanced Networking
EECS 441-0	Resource Virtualization
EECS 443-0	Advanced Operating Systems
EECS 450-0	Internet Security

### Artificial Intelligence

Course	Title
EECS 325-1	Artificial Intelligence Programming
EECS 337-0	Natural Language Processing
EECS 344-0	Design of Computer Problem Solvers
EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 360-0	Introduction to Feedback Systems

### Interfaces

Course	Title
EECS 330-0	Human Computer Interaction
EECS 332-0	Introduction to Computer Vision
EECS 351-1	Introduction to Computer Graphics

EECS 352-0	Machine Perception of Music & Audio
EECS 370-0	Computer Game Design

## Software Development

Course	Title
EECS 338-0	Practicum in Intelligent Information Systems
EECS 394-0	Agile Software Development

## Technical electives

### Technical elective list

Course	Title
EECS 301-0	Introduction to Robotics Laboratory
EECS 303-0	Advanced Digital Design
EECS 313-0	Tangible Interaction Design and Learning
EECS 314-0	Technology and Human Interaction
EECS 315-0	Design, Technology, and Research
EECS 321-0	Programming Languages
EECS 322-0	Compiler Construction
EECS 323-0	Code Analysis and Transformation
EECS 325-1	Artificial Intelligence Programming
EECS 330-0	Human Computer Interaction
EECS 331-0	Introduction to Computational Photography
EECS 332-0	Introduction to Computer Vision
EECS 335-0	Introduction to the Theory of Computation
EECS 336-0	Design & Analysis of Algorithms
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 344-0	Design of Computer Problem Solvers
EECS 345-0	Distributed Systems
EECS 346-0	Microprocessor System Design
EECS 348-0	Introduction to Artificial Intelligence
EECS 349-0	Machine Learning
EECS 350-0	Introduction to Computer Security
EECS 351-1	Introduction to Computer Graphics
EECS 351-2	Intermediate Computer Graphics
EECS 352-0	Machine Perception of Music & Audio
EECS 354-0	Network Penetration & Security
EECS 361-0	Computer Architecture I
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
EECS 368-0	Programming Massively Parallel Processors with CUDA
EECS 371-0	Knowledge Representation and Reasoning
EECS 372-0	Designing & Constructing Models with Multi-Agent Language
EECS 376-0	Computer Game Design and Development
EECS 377-0	Game Design Studio
EECS 396-0	Special Topics in Computer Science
EECS 397-0	Special Projects in Computer Science
EECS 433-0	Statistical Pattern Recognition
EECS 440-0	Advanced Networking
EECS 441-0	Resource Virtualization
EECS 443-0	Advanced Operating Systems
EECS 445-0	Internet-scale Experimentation

EECS 446-0	Kernel and Other Low-level Software Development
EECS 450-0	Internet Security
EECS 468-0	Programming Massively Parallel Processors with CUDA
EECS 472-0	Designing & Constructing Models with Multi-Agent Language
EECS 473-1	NUvention: Web - Part 1
EECS 473-2	NUvention: Web - Part 2
EECS 474-0	Probabilistic Graphical Models
EECS 496-0	Special Topics in Computer Science
EECS 497-0	Special Projects in Computer Science

## Project courses

### Project course list

Course	Title
EECS 315-0	Design, Technology, and Research
EECS 322-0	Compiler Construction
EECS 330-0	Human Computer Interaction
EECS 332-0	Introduction to Computer Vision
EECS 337-0	Natural Language Processing
EECS 338-0	Practicum in Intelligent Information Systems
EECS 339-0	Introduction to Database Systems
EECS 340-0	Introduction to Networking
EECS 343-0	Operating Systems
EECS 344-0	Design of Computer Problem Solvers
EECS 345-0	Distributed Systems
EECS 351-1	Introduction to Computer Graphics
EECS 351-2	Intermediate Computer Graphics
EECS 354-0	Network Penetration & Security
EECS 367-0	Wireless and Mobile Health: Passive Sensing Data Analytics
EECS 370-0	Computer Game Design
EECS 371-0	Knowledge Representation and Reasoning
EECS 376-0	Computer Game Design and Development
EECS 377-0	Game Design Studio
EECS 394-0	Agile Software Development
EECS 397-0	Special Projects in Computer Science
EECS 441-0	Resource Virtualization
EECS 450-0	Internet Security
EECS 474-0	Probabilistic Graphical Models
EECS 473-2	NUvention: Web - Part 2
EECS 497-0	Special Projects in Computer Science