

Artificial Intelligence: Theory, Methods, and Applications, Minor

The minor in artificial intelligence: theory, methods, and applications requires 15 s.h. Students must maintain a grade-point average of at least 2.00 in all work for the minor. Coursework in the minor may not be taken as pass/nonpass. Enrollment in some courses for the minor may require prerequisites that will not count toward the minor. A maximum of 3 s.h. of transfer credit may be counted toward the minor with approval from the Electrical and Computer Engineering Undergraduate Committee.

The minor may be earned by students enrolled in an undergraduate degree-seeking program at the University of Iowa. Through the choice of electives, students may tailor the minor to align with their academic interests and career goals.

The minor in artificial intelligence: theory, methods, and applications requires the following coursework.

Required Course

| Course # | Title | Hours |
|--------------|---|-------|
| This course: | | |
| ENGR:3110 | Introduction to Artificial Intelligence and Machine Learning in Engineering | 3 |

The required course may be replaced by an electrical and computer engineering course (prefix ECE) numbered 5000–5999 listed in the theory, methods, or applications course lists that follow; see the "Electives" section.

Electives

Students complete at least 12 s.h. in elective courses selected from at least two of the three categories: theory, methods, and applications. Students may count one elective from the support category. A maximum of one AI-related course that is not an electrical and computer engineering course (prefix ECE) may be counted toward the methods or applications category, and a maximum of one AI-related course that is not an electrical or computer engineering course (prefix ECE) may be counted toward the support category, both with approval from the Electrical and Computer Engineering Undergraduate Committee.

Students completing a major that does not require a computer programming course may count ENGR:1300 Introduction to Engineering Computing as a minor elective.

Theory

| Course # | Title | Hours |
|----------|---|-------|
| ECE:5200 | Machine Learning | 3 |
| ECE:5225 | Statistical Foundations of Inference and Machine Learning | 3 |
| ECE:5240 | Deep Learning Theory | 3 |

Methods

| Course # | Title | Hours |
|----------|--|-------|
| ECE:5215 | Applied Machine Learning | 3 |
| ECE:5250 | Large Language Models | 3 |
| ECE:5485 | Intelligent Vision and Image Understanding | 3 |

Applications

| Course # | Title | Hours |
|----------|--|-------|
| ECE:5230 | Generative AI Tools: ChatGPT and Beyond | 3 |
| ECE:5290 | Artificial Intelligence: Experiential Learning | 3 |
| ECE:5550 | Internet of Things | 3 |
| ECE:5830 | Software Engineering Project | 3 |
| ECE:5845 | Modern Databases | 3 |

Support

Courses that address AI ethics may also count as a support course with approval from the Electrical and Computer Engineering Undergraduate Committee.

| Course # | Title | Hours |
|----------------------------|--|-------|
| No more than one of these: | | |
| ECE:5320 | High Performance Computer Architecture | 3 |
| ECE:5420 | Power Electronics | 3 |

Students completing a major that does not require a matrix algebra course may count MATH:2550 Engineering Matrix Algebra or MATH:2700 Introduction to Linear Algebra as the support course.

Students completing a major that does not require a probability course may count ECE:3995 Undergraduate Contemporary Topics in Electrical and Computer Engineering (when topic is introduction to probability and statistics), STAT:2020 Probability and Statistics for the Engineering and Physical Sciences, or STAT:3120 Probability and Statistics as their support course.

Students may declare the artificial intelligence: theory, methods, and applications minor and request an audit for the minor on MyUI.