ARTIFICIAL INTELLIGENCE, M.S.

Saint Louis University’s master’s program in artificial intelligence prepares students to apply artificial intelligence methods both efficiently and ethically in order to solve difficult problems and impact the well-being of society.

This graduate program provides students with a depth of knowledge regarding the models and technologies used to make advances in underlying artificial intelligence and machine learning. Through a partnership with faculty across the University, students may choose to apply these techniques in specialized areas of application such as:

- Autonomous systems
- Bioinformatics
- Data science
- Health outcomes
- Image processing
- Natural language processing

Curriculum Overview

Students in SLU's artificial intelligence degree program engage in the theory of artificial intelligence (AI) and machine learning (ML) and in applying AI/ML in practice, including a culminating research thesis or team-based capstone project. Students also consider important questions regarding the impact of AI on society, implicit bias that may result from AI systems, and the ethical development and deployment of technologies.

Fieldwork and Research Opportunities

From SLU’s location in the Midtown area of St. Louis, our students have access to a strong technology community, operations of many Fortune 500 companies and a vibrant startup community. This provides outstanding opportunities for summer internships, part-time work during the academic year and jobs after graduation.

Employers in St. Louis who show great interest in computer science students include Boeing, Centene, Citi, Deloitte, Enterprise, Express Scripts, KPMG, Maritz, MasterCard, Microsoft, Bayer and World Wide Technologies. Other graduates have worked for smaller companies or even started their own companies.

Our campus is within walking distance of the Cortex Innovation Community (https://cortexstl.com/), a vibrant 200-acre (and growing) innovation hub and technology district. Cortex is home to SLU’s Research Innovation Group (https://www.slu.edu/research/faculty-resources/research-innovation-group/), which works on technology transfer and commercial partnerships. Cortex is also home to the weekly Venture Cafe (https://venturecafestl.org/), which is a great place for students to connect with members of the tech community in a friendly and informal setting. Also in downtown St. Louis is the T-REX Technology Entrepreneur Center (http://www.downtowntrex.org/), a co-working space and technology incubator.

Careers

Careers related to artificial intelligence and computer science are routinely found on various "best jobs" lists because of their wonderful combination of excellent pay, satisfying work-life balance, and personal reward in seeing the great impact that computing can have throughout society. As a sample of such listings:

- Glassdoor’s 50 Best Jobs in America (https://www.glassdoor.com/List/Best-Jobs-in-America-LST_KQ020.htm) list for 2021 named data scientist as #2 and machine learning engineer as #17. Other computing jobs in the top 25 include java developer (#1), enterprise architect (#4), devops engineer (#5), information security engineer (#6), mobile engineer (#8), software engineer (#9), front end engineer (#11), back end engineer (#16), cloud engineer (#23) and UX designer (#24).
- Indeed.com’s Best Jobs of 20 (https://www.indeed.com/lead/best-jobs-2020/20 (https://www.indeed.com/lead/best-jobs-2020/) named Software Architect as #1 and Full Stack Developer as #2. Also included in the top 25 were Java Developer (#7), Data Scientist (#8), IT Security Specialist (#9), Data Engineer (#12) and Cloud Engineer (#20).

Admission Requirements

A bachelor's degree in a science, technology, engineering or math major (STEM) is typical. Most successful applicants have an undergraduate grade point average of 3.00 or better on a 4.00 scale. Applicants should have evidence of strong computational skills (generally through prior coursework in programming and data structures), as well as evidence of strong mathematical skills, (generally through prior coursework in calculus and statistics).

Application Requirements

- Transcript(s)
- One letter of recommendation is required; two more are optional
- Résumé
- Statement of professional goals
- GRE general scores recommended

Requirements for International Students

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency
- A letter of financial support must include:
  - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
  - A letter from the sponsor’s bank verifying that the funds are available and will be so for the duration of study at the University
- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.
Application Deadlines
Applications for January admission must be completed by the preceding
Nov. 1, while applications for August admission must be completed by
June 1. Applicants seeking scholarships or graduate assistantships are
encouraged to apply earlier.

Review Process
Applications will be reviewed as they are completed. A panel of faculty
members from the Department of Computer Science will decide on
acceptance, and all applicants will be evaluated for potential scholarships
or assistantships.

Scholarships, Assistantships and
Financial Aid
The computer science department offers several forms of merit-based
financial support for graduate students. These include possible tuition
scholarships and graduate assistantships that may include full or partial
tuition, health insurance and a stipend for living expenses in exchange
for the assistant’s contributions to the teaching or research mission of
the department. Students may also seek their own scholarships from a
variety of independent organizations that support graduate education in
STEM fields.

For more information, visit the student financial services office online

Learning Outcomes
1. Graduates will be able to select the most appropriate choice among
   artificial intelligence methods for solving a given problem.
2. Graduates will be able to design an experiment to evaluate the quality
   of a machine learning model and predict its accuracy in a solution
   environment.
3. Graduates will be able to apply techniques from artificial intelligence
   to solve complex problems in an application domain.
4. Graduates will be able to design and implement a software solution
   that meets a given set of computing requirements.
5. Graduates will be able to make informed and ethical decisions
   regarding the impact of artificial intelligence technologies.
6. Graduates will be able to assess literature and technical documents
   in the fields of artificial intelligence and machine learning.
7. Graduates will be able to effectively communicate methods and
   results to both professional and general audiences in both oral and
   written form.

Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCI 5030</td>
<td>Principles of Software Development</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5050</td>
<td>Computing and Society</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5740</td>
<td>Introduction to Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5750</td>
<td>Introduction to Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>Artificial Intelligence Foundations course (p. 2)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Artificial Intelligence Applications course (p. 2)</td>
<td></td>
<td>3</td>
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<tr>
<td>Artificial Intelligence Electives (p. 3)</td>
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<td>6</td>
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Choose the non-thesis or thesis Option

Non-thesis Option:
Additional Foundations or Applications course

Artificial Intelligence Capstone Project
CSCI 5961

Thesis Option:
CSCI 5990 Thesis Research

Total Credits 30

Artificial Intelligence Foundations
These courses have a primary focus on techniques in artificial
intelligence and/or machine learning that have wide application to a
variety of domain areas. Students must take at least one such course.
The full list of approved courses is maintained by the computer science
department and includes:

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<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>CSCI 5730</td>
<td>Evolutionary Computation</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5745</td>
<td>Advanced Techniques in Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5760</td>
<td>Deep Learning</td>
<td>3</td>
</tr>
<tr>
<td>STAT 5087</td>
<td>Applied Regression</td>
<td>3</td>
</tr>
<tr>
<td>STAT 5088</td>
<td>Bayesian Statistics and Statistical Computing</td>
<td>3</td>
</tr>
</tbody>
</table>

Artificial Intelligence Applications
These courses explore how tools or techniques from artificial intelligence
are applied to solve problems in a specific domain area. Students
must take at least one such course. The full list of approved courses is
maintained by the computer science department and includes:

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>BCB 5350</td>
<td>Machine Learning in Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>BME 5150</td>
<td>Brain Computer Interface</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5070</td>
<td>Algorithmic Fairness</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5570</td>
<td>Machine Learning for Networks</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5830</td>
<td>Computer Vision</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5845</td>
<td>Natural Language Processing</td>
<td>3</td>
</tr>
<tr>
<td>GIS 5092</td>
<td>Machine Learning for GIS and Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>HDS 5330</td>
<td>Predictive Modeling and Machine Learning</td>
<td>3</td>
</tr>
</tbody>
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Artificial Intelligence Supporting Courses
AI supporting courses must serve one of three purposes:

1. Provide knowledge in a specific domain area that prepares students
to apply artificial intelligence or machine learning to solve problems
   in that particular domain.
2. Provide richer foundational knowledge in a supporting area (e.g.
   algorithms, statistics) that prepares students to understand, enhance,
   or implement artificial intelligence techniques.
3. Provide exploration of the broader impacts of artificial intelligence.
   Students may apply at most six credits of such courses to the degree.

The full list of approved courses is maintained by the computer science
department and includes:

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<tr>
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<tbody>
<tr>
<td>BCB 5200</td>
<td>Introduction Bioinformatics I</td>
<td>3</td>
</tr>
<tr>
<td>BCB 5250</td>
<td>Introduction Bioinformatics II</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5100</td>
<td>Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5530</td>
<td>Computer Security</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5550</td>
<td>Computer Networks</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5610</td>
<td>Concurrent and Parallel Programming</td>
<td>3</td>
</tr>
</tbody>
</table>
Artificial Intelligence Electives
The remaining electives can be taken from any of the foundations, applications or supporting categories.

Continuation Standards
Students must maintain a cumulative grade point average (GPA) of 3.00 in all graduate/professional courses.

Roadmap
Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CSCI 5620</td>
<td>Distributed Computing</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5710</td>
<td>Databases</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 5910</td>
<td>Internship with Industry</td>
<td>1-3</td>
</tr>
<tr>
<td>CSCI 5970</td>
<td>Research Topics</td>
<td>1-3</td>
</tr>
<tr>
<td>CSCI 5980</td>
<td>Graduate Reading Course</td>
<td>1-3</td>
</tr>
<tr>
<td>ECE 5153</td>
<td>Image Processing</td>
<td>3</td>
</tr>
<tr>
<td>ECE 5226</td>
<td>Mobile Robotics</td>
<td>3</td>
</tr>
<tr>
<td>LAW 8235</td>
<td>Information Privacy Law</td>
<td>3</td>
</tr>
<tr>
<td>PSY 5120</td>
<td>Memory &amp; Cognition</td>
<td>3</td>
</tr>
<tr>
<td>SOC 5670</td>
<td>Spatial Demography. Applied Statistics for Spatial Data</td>
<td>3</td>
</tr>
</tbody>
</table>

Artificial Intelligence Electives
The remaining electives can be taken from any of the foundations, applications or supporting categories.

Contact Us
For questions about admissions, applicants currently in the United States should contact Cory Washington (cory.washington@slu.edu) and applicants elsewhere should contact globalgrad@slu.edu.

For other questions about the program or curriculum, contact the department’s graduate coordinator, Kevin Scannell, Ph.D. (kevin.scannell@slu.edu)