CS B551: Elements of Artificial Intelligence  
Fall 2016, Bloomington (Online)

Lead instructor  
Dr. Sven Bambach  
611 N Park Ave  
Office hours: Thur 8-9pm ET* (online)

Co-instructor  
Prof. David Crandall  
611 N Park Ave  
Office hours: Tue 9:30-10:30am ET* (online)  
Wed 5-6pm ET* (in person)

Lead Associate Instructors  
Ali Varamesh  
TBA  
Office hours: Wed 5-6pm ET* (online)

Associate Instructors  
Tejashree Khot  
Hanfei Mei  
Yang Zhang  
Office hours: Mon noon-1pm ET* (online)  
Tue 4-5pm ET* (online)  
Thurs 2-3pm ET* (online)

* U.S. Eastern (New York) time. Daylight savings may cause a 1-hour shift relative to your time on Nov. 6.

Contacting course staff and other students: Communication between you, us, and other students is really important. Help us make this more efficient by following these guidelines!

- For asking questions of general interest to other students, e.g. regarding clarifications to course material, assignments, etc., please use Piazza so that others can benefit from the answers.

- For more informal interactions with other students in the class, e.g. for group projects, please use Slack, which you can join using your IU email at https://b551.slack.com/signup.

- For more personal matters like grading, email us at csb551+online@indiana.edu. Expect a reply from someone on the course staff within 24 hours; re-send your email if you do not get one.

- For more sensitive personal matters, email the instructor directly (sbambach@indiana.edu).

Meetings: This course meets entirely online. Course content will be hosted on IU Canvas, canvas.iu.edu. Coursework will include watching videos, reading from the textbook, completing individual and collaborative activities, discussions with other online students, completing programming and written assignments, and taking exams. Activities will have deadlines but will otherwise be self-paced (e.g., videos will be recorded for you to watch on your own schedule). Course staff will be readily available via online collaborative tools like Piazza and Slack, and available for office hours via video conferencing.

Three separate sections of B551 are being offered this semester. These sections will be run independently, with separate assignments, staff, exams, and policies. All three will give a solid introduction to AI and cover the same main subjects, but the order, emphasis, and selection of exact topics may differ.

Course overview: This course covers the fundamentals of Artificial Intelligence, and is aimed at M.S., early Ph.D., and advanced undergraduate students in Computer Science and Data Science, as well as students in other related fields who have a strong computing background. Topics will include (tentatively):

- **AI overview:** Goals, history, progress, challenges.
- **Problem solving and search:** Uninformed search, heuristics, A*, local search.
- **Applied search:** Game playing, constraint satisfaction, planning.
• **Reasoning under uncertainty:** Uncertainty representation, probabilistic models, probabilistic inference, Bayesian and Markov networks.

• **Machine learning:** Decision trees, neural networks, support vector machines.

• **Applications:** computer vision, natural language processing, robotics.

**Prerequisites:** Experience with programming, data structures, and algorithms will be assumed (CS C343 or equivalent). Assignments will involve substantial amount of programming in Python. If you do not know Python, we will expect you to learn it outside of class; Python has a reputation for being easy to learn, and those with strong programming background in another general-purpose programming language (like C/C++, Java, Ruby, etc.) can learn it within a few days. Please consult the instructor if you have concerns about your programming background. In addition, we will encounter math of various kinds, including linear algebra, probability theory, and basic calculus. We will review the key mathematical concepts as we go, but students with limited math backgrounds may need to do additional reading outside of class.


**Schedule, readings, and resources** will be available via Canvas.

**Grading and requirements:**

• **Assignments (50%),** approximately 6, most of which will require substantial programming projects.

• Activities and quizzes (20%). These are short assignments that are integrated into the weekly class videos and readings. These are not meant to be stressful events, but instead are ways to give you practice understanding course concepts. They also give instructors feedback on how well the class is progressing.

• **Midterm exam (10%).**

• **Final exam (20%).**

**Deadlines policy:** We understand that students taking online courses may require greater flexibility than residential students due to other commitments (including work schedules, limitations on Internet access, etc.). At the same time, we believe it is important for students to keep up with all course material, since the class moves quickly and it is easy to get behind. Our policy on deadlines tries to balance these two competing considerations.

• You’ll generally have one week to complete the activities and quizzes. Late submissions will not be accepted. However, to account for occasional difficulties including unexpected scheduling issues, Internet downtime, etc., we will drop the lowest week’s activity score.

• You’ll generally have at least two weeks to complete the assignments. Late assignments will be accepted up to 48 hours late with a penalty of 10%. Assignments submitted after 48 hours will not be awarded credit. **Note:** All assignments must be submitted according to the instructions given on the assignment hand-outs, which will typically require electronic (online) submission. We use the time that submissions are received by the servers to judge timeliness. **It is the student’s responsibility to upload submissions well ahead of the deadline to avoid last minute problems with network connectivity, browser crashes, etc.** It is a very good idea to make early submissions and then upload updates as the deadline approaches; we will grade the last submission received before the deadline.
**Academic Integrity Policy:**  *We take academic integrity very seriously.* You are required to abide by the Indiana University policy on academic integrity, as described in the Code of Student Rights, Responsibilities, and Conduct, as well as the Computer Science Statement on Academic Integrity (http://www.soic.indiana.edu/doc/graduate/graduate-forms/Academic-Integrity-Guideline-FINAL-2015.pdf). It is your responsibility to understand these policies. Briefly summarized, the work you submit for course assignments, projects, quizzes, and exams must be entirely your own (or entirely that of your group, if groupwork is permitted). If you use the ideas (including text, source code, algorithms, concepts, diagrams, slides, etc.) of others, you must give proper credit with a prominent citation and an explicit indication of which idea(s) or material(s) you borrowed so that another person (e.g. a grader) can easily separate your contribution from the work of others. You may discuss assignments with other students (or students in other groups) at a high level, by for example discussing general methods or strategies to solve a problem, but you must cite the other student in your submission. **Looking at someone else’s code related to an assignment, whether online or from another student, will almost certainly lead to academic dishonesty.** Sharing your assignment code with another student also almost certainly constitutes academic dishonesty.

The consequences of academic dishonesty are extremely serious. We will respond to acts of plagiarism and academic misconduct according to university policy. In assigning sanctions, we will follow CS Program policy: “The ordinary departmental level penalty for cheating is failure in the course” but “in all cases, the penalty will be more severe than not turning in the assignment.” In addition, “the student will no longer be eligible for the guaranteed financial aid provided by the CS program.” Moreover, University policy requires us to report the incident to the Dean of Students, who may apply additional sanctions, including expulsion from the university.

Students agree that by taking this course, papers and source code submitted to us may be subject to textual similarity review, for example by Turnitin.com. These submissions may be included as source documents in reference databases solely for the purpose of detecting plagiarism of such papers or codes.

**Religious Holidays:** Indiana University respects the right of all students to observe religious holidays and will make reasonable accommodation, upon request, for such observances. Each year, instructors are provided with the dates of major religious holidays for which students may request accommodation. Students must submit written requests for accommodation in writing by the end of the second week of the semester. Instructors are expected to give students the opportunity to do appropriate make-up work that is intrinsically no more difficult than the original exam or assignment.

**Disabilities:** Every attempt will be made to accommodate qualified students with disabilities (e.g. mental health, learning, chronic health, physical, hearing, vision neurological, etc.). You must have established your eligibility for support services through the appropriate office that services students with disabilities. Note that services are confidential, may take time to put into place and are not retroactive; captions and alternate media for print materials may take three or more weeks to get produced. Please contact Disability Services for Students at http://disabilityservices.indiana.edu, 812-855-7578, or in Wells Library Room W302. Walk-ins are welcome 8 AM to 5 PM, Monday through Friday. You can also locate a variety of campus resources for students and visitors that need assistance at: http://www.iu.edu/~ada/index.shtml