

# Machine Learning in Education (Fall 2017)

## [Jump to Today](#)

Welcome to C260F, Machine Learning in Education.

Meeting Location: Tolman Hall 2515

Time: Tues/Thurs 12:30-2:00pm

Instructor: Prof. Zach Pardos [zp@berkeley.edu] [[homepage](#)  
([ischool.berkeley.edu/people/faculty/zacharypardos](https://ischool.berkeley.edu/people/faculty/zacharypardos))]

Office hours: **Thursdays** 2pm-3:30pm (after class) in Tolman 4641

GSI: Zihao Fan [zihao\_fan@berkeley.edu]

Office hours: 4:30pm-6:30pm Wednesdays in Tolman 4417 or Friday morning (on-demand)

### Topics covered in class

#### **Knowledge representation**

- Mastery Learning
- Item Response Theory
- Distributed Representations

#### **Platforms**

- Massive Open Online Courses
- Intelligent Tutoring Systems

### Modeling frameworks

#### **Knowledge Tracing**

- Bayesian Knowledge Tracing (HMM)
- Deep Knowledge Tracing (RNN)
- Performance Factors Analysis (Logistic)

#### **Representation Learning**

- Word2vec
- Autoencoders

Grading structure

Readings: 20%

Assessments: 15%



Homework projects: 20%















Final Project: 45%





This course's reading list (for a preview of what's to come) is [here](#).

The previous year's syllabus can be found [here](#).

# Course Summary:

Date	Details	
Thu Aug 24, 2017	 <b>Lecture: Introduction to Machine Learning in Education (part 1)</b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2140487&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2140487&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Tue Aug 29, 2017	 <b>Lecture: Introduction to Machine Learning in Education (part 2)</b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2140680&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2140680&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Thu Aug 31, 2017	 <b>Homework: Getting started with a dataset</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7825379">https://bcourses.berkeley.edu/courses/1465020/assignments/7825379</a>	due by 11:30am
	 <b>Lecture: Introduction to Knowledge Tracing</b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2141696&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2141696&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Tue Sep 5, 2017	 <b>Reading: Introduction to Knowledge Tracing</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7827669">https://bcourses.berkeley.edu/courses/1465020/assignments/7827669</a>	due by 12pm
	 <b>Lecture: Introduction to Bayesian Knowledge Tracing (part 2)</b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2143065&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2143065&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Tue Sep 12, 2017	 <b>Homework (group): Getting started with prediction (part 1)</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7827670">https://bcourses.berkeley.edu/courses/1465020/assignments/7827670</a>	due by 11:59am
Thu Sep 14, 2017	 <b>Reading: Deep Knowledge Tracing</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7827671">https://bcourses.berkeley.edu/courses/1465020/assignments/7827671</a>	due by 12pm
Tue Sep 19, 2017	 <b>Reading: Personalized Next-Step Recommendation in a MOOC</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7831156">https://bcourses.berkeley.edu/courses/1465020/assignments/7831156</a>	due by 12pm
Thu Sep 21, 2017	 <b>Reading: Representation learning with word2vec</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7832500">https://bcourses.berkeley.edu/courses/1465020/assignments/7832500</a>	due by 11:59am
	 <b>Lecture: Word2vec representation learning</b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2148058&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2148058&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Tue Sep 26, 2017	 <b>Lecture: DKT loss review + HW erratum</b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2149251&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2149251&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Wed Sep 27, 2017	 <b>Homework: RNN modeling of behavior and performance</b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7833094">https://bcourses.berkeley.edu/courses/1465020/assignments/7833094</a>	due by 11:59pm

Date	Details	
Fri Sep 29, 2017	 <b><u>Homework: Visualizing representations of problems and skills</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7833827">https://bcourses.berkeley.edu/courses/1465020/assignments/7833827</a>	due by 11:59pm
Tue Oct 3, 2017	 <b><u>Reading: Reducing the dimensionality of data</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7835466">https://bcourses.berkeley.edu/courses/1465020/assignments/7835466</a>	due by 11:59am
Tue Oct 3, 2017	 <b><u>Lecture: Autoencoders and final project discussion</u></b> <a href="https://bcourses.berkeley.edu/calendar?event_id=2150607&amp;include_contexts=course_1465020">https://bcourses.berkeley.edu/calendar?event_id=2150607&amp;include_contexts=course_1465020</a>	12:30pm to 2pm
Thu Oct 5, 2017	 <b><u>Homework: Schedule time with me to discuss final project idea</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7836450">https://bcourses.berkeley.edu/courses/1465020/assignments/7836450</a>	due by 12:29pm
Thu Oct 12, 2017	 <b><u>Project descriptions</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7838034">https://bcourses.berkeley.edu/courses/1465020/assignments/7838034</a>	due by 2pm
Tue Oct 17, 2017	 <b><u>Reading: Automatic Skill Model Improvement</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7838518">https://bcourses.berkeley.edu/courses/1465020/assignments/7838518</a>	due by 11:59am
Tue Oct 17, 2017	 <b><u>Complete behavioral research training</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7838511">https://bcourses.berkeley.edu/courses/1465020/assignments/7838511</a>	due by 12pm
Thu Oct 19, 2017	 <b><u>Reading/Homework: Choose and present a paper most related to your project within one of these conference (ITS/AIED)</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7838524">https://bcourses.berkeley.edu/courses/1465020/assignments/7838524</a>	due by 12pm
Tue Oct 24, 2017	 <b><u>Video: Recordings from local UC Berkeley Learning Analytics conference</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7841054">https://bcourses.berkeley.edu/courses/1465020/assignments/7841054</a>	due by 12pm
Tue Oct 31, 2017	 <b><u>In-class: Create milestone timeline (Slack)</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7843328">https://bcourses.berkeley.edu/courses/1465020/assignments/7843328</a>	due by 11:59pm
Thu Nov 2, 2017	 <b><u>Reading/Homework: Choose and present a paper most related to your project within one of these conference (EDM/LAK)</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7838525">https://bcourses.berkeley.edu/courses/1465020/assignments/7838525</a>	due by 12pm
Tue Nov 7, 2017	 <b><u>Homework: Write dataset section of your final project paper</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7843771">https://bcourses.berkeley.edu/courses/1465020/assignments/7843771</a>	due by 11:59pm
Thu Nov 9, 2017	 <b><u>Homework: Complete peer-review of two dataset description submissions</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7843772">https://bcourses.berkeley.edu/courses/1465020/assignments/7843772</a>	due by 11:59pm
Tue Nov 14, 2017	 <b><u>Reading/Homework: Choose and present a paper most related to your project within one of these conference (ICLS/L@S)</u></b> <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7838851">https://bcourses.berkeley.edu/courses/1465020/assignments/7838851</a>	due by 12pm

Date	Details	
Thu Nov 30, 2017	 <b><u>Tutorial: DKT code + dynamic batch generation (saves memory) + extra credit assignment</u></b> ( <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7847379">https://bcourses.berkeley.edu/courses/1465020/assignments/7847379</a> )	due by 2:15pm
Tue Dec 5, 2017	 <b><u>Final Project: Paper</u></b> ( <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7843322">https://bcourses.berkeley.edu/courses/1465020/assignments/7843322</a> )	due by 11:59am
	 <b><u>Final Project: Presentation (Day 1)</u></b> ( <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7848671">https://bcourses.berkeley.edu/courses/1465020/assignments/7848671</a> )	due by 12:30pm
Thu Dec 7, 2017	 <b><u>Final Project: Presentation (Day 2)</u></b> ( <a href="https://bcourses.berkeley.edu/courses/1465020/assignments/7843323">https://bcourses.berkeley.edu/courses/1465020/assignments/7843323</a> )	due by 12:30pm