

IST 5535 – Machine Learning Algorithms and Applications Course Syllabus - Spring 2021

TuTh, 12:30 PM – 1:45 PM

Canvas home: <https://mst.instructure.com/courses/53476>

Department Mission:

“To serve the economic interests of industry and the evolving needs of society in a challenging, rapidly-changing, global environment, the Department of Business & Information Technology capitalizes on the strong technological emphasis of Missouri S&T to enable individuals to excel in a technology-centric business world. Recognizing this rapid evolution of the marketplace, we create and disseminate knowledge impacting the theory and practice of business.”

INSTRUCTOR

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Missouri University of Science & Technology

Office: Fulton Hall 106B

Office Hours: Thursday 1:50 pm – 3:50 pm or by appointment (suggest a date and time via email)

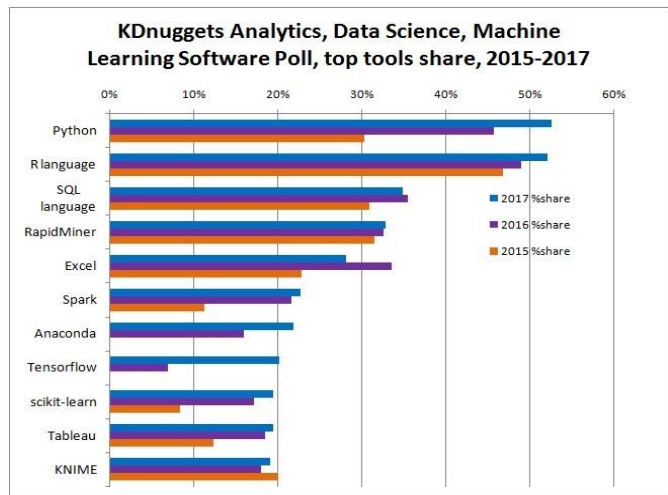
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COURSE DESCRIPTION

Introduces techniques of modern machine learning methods with applications in marketing, finance, and other business disciplines. Topics include regression, classification, resampling methods, model selection, regularization, decision trees, support vector machines, principal component analysis, and clustering. R programming is required.

Prerequisites: One of Stat 3111, Stat 3113, Stat 3115, Stat 3117 and either IS&T 1552 or Comp Sci 1510; or Graduate Standing with knowledge of calculus, statistics, and programming.

R is one of the most popular tools for analytics, data science, and machine learning.



Source: <http://www.kdnuggets.com/2017/05/poll-analytics-data-science-machine-learning-software-leaders.html>

LEARNING MANAGEMENT SYSTEM

Access Canvas (<http://canvas.mst.edu/>) for course materials, grades, course schedule, submission deadlines etc.

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LEARNING OBJECTIVES

Course Objectives	Program Learning Objectives			
	Communication (Oral & Written)	Critical Thinking	IT Impact Knowledge	Leadership
To obtain an overview of modern machine learning methods applied in various business applications			X	
To learn R programming language for data analysis and machine learning		X	X	
To develop a set of tools and skills to apply machine learning methods in various applications		X	X	
Become informed users of a set of machine learning methods and be able to apply various techniques and skills to solve real business problems	X	X	X	X

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GRADING

Course grading is composed of evaluations of the following components:

<i>Grading Component</i>	<i>Weight</i>
Homework	35%
Participation, Topic Presentation, In-Class Exercises, and Quizzes	15%
Group Project	10%
Exam 1	20%
Exam 2	20%
Total	100%

Note:

Homework accounts for a large part of grade. Around 10-12 homework assignments are expected.

The weighted percentage students have earned for all components will be rounded to the nearest hundredth. For example, 79.49% would be 79%, and 89.51% would be 90%.

Then the final letter grade will be assigned as follows:

<i>Grade</i>	<i>Percentage</i>
A	$\geq 90\%$
B	$< 90\%$
C	$< 80\%$
D	$< 70\%$
F	$< 60\%$

SOFTWARE AND DEVICES

1. R

R is a free software environment for statistical computing and graphics.

Obtain R from <https://www.r-project.org/>

2. RStudio

RStudio is a powerful integrated development environment (IDE) for R.

Get RStudio Desktop (open source edition) from
<https://www.rstudio.com/products/rstudio/download/>

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3. Zoom

Both the on-campus and distance sections are offered through online sessions. There are no in-person meetings. The following software and devices are required:

- Zoom: We use Zoom for online meetings and office hours. Please install Zoom in your personal computer. For the detail, refer to <https://it.mst.edu/services/zoom/>.
- Webcam: If your computer does not have an integrated webcam, you need to install an external webcam.
- Microphone: Please test microphone before you attend each class. Please use a microphone that works well.

READINGS

Reading materials provide a basis for understanding course content and participating in class discussion. Thus, assigned reading materials must be read prior the class. Some in-class quizzes based on reading materials will also be given prior lecturing. The instructor will provide reading materials (refer to the course website for the detail).

POLICIES

1. Attendance and Participation for On Campus Students

Participation and in-class activity points cannot be made up if the student is absent.

The instructor will check attendance during the semester. Four lowest participation points including missing classes (i.e., zero points) will be ignored in calculating your final grade at the end of the semester. Because students are given a leeway of four missing classes, doctor's notes and other excuses are not accepted for absences. Missing one more additional class will lower your final grade by 1%. For example, if you miss 6 classes in the semester for whatever reason, your final grade will be lowered by 2%.

Attendance is a prerequisite, not a substitute for class participation. Students should be fully prepared for each class. The instructor will ask students questions in the class. Your participation points obtained will reflect the quality of your answers and your motivation for class participation.

In-class activities such as assignments, exercises, and unannounced quizzes should be submitted before the class session ends if not specified otherwise. Late submissions will not be accepted.

If a student misses more than three classes during the semester without valid or documented reasons, an electronic alert will be issued. **After five absences, the student will be dropped from the course.**

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2. Attendance and Participation for Distance Students

For distance students, there are two options of course participation.

Option one (by default) is to live participate in each session, as the on-campus students do. The same attendance and participation policy for on-campus is applied (refer to policy #1 above). This option is encouraged for distance students.

Option two is for distance students to watch class videos at a flexible time.

- As a way of course participation, each distance student, if chooses to not live participate, needs to post at least three questions/answers/comments on course discussion board each week. Questions/answers/comments should be complicated enough and highly relevant to a week's learning content. Questions such as where to download RStudio is superficial and will not be counted. Students need to report online posting at the end of each week to earn course participation points.
- In-class exercises will also be ready online for distance students who choose to not live participate. Such in-class exercises need to be finished by a specified due time (usually two days after the class).
- Since option two is flexible, no leeway of missing discussion posts or in-class exercises will be given. Missing one week's posts or an in-class exercise will lower your final grade by 1%. For example, if you miss 6 weeks' posts and in-class exercise combined together in the semester for whatever reason, your final grade will be lowered by 6%.
- If a student misses more than three week's posting and in-class exercise combined together during the semester without valid or documented reasons, an electronic alert will be issued. **After five missing events, the student will be dropped from the course.**
- Even if a student chooses the option two, live participation is required on certain days (topic presentation, project presentation etc.).
- Please send the instructor your choice by Jan 20th if you choose option 2.

3. Readings

Reading materials will be assigned for corresponding sessions. Readings provide the basis for lecture and class discussions. Thus, corresponding materials **must** be read prior each class.

Check the course website for reading assignments.

4. Exams

There will be two exams. No make-up exam allowed unless you ask in advance (and the instructor agree) that a significant life-event prevents you from attending the exam. For distance students, exams may be provided on a different date.

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5. Assignment Submission Policy

Instruction for homework and project assignments will be posted on the course's website. Each assignment must be submitted by the due time. The assignment must be submitted through the course website unless the instructor requests another channel. Students who fail to submit an assignment before the deadline will be given additional 24 hours to submit the assignment to the instructor for legitimate reasons (e.g., documented illness). Late submissions will receive a penalty of 40% of the points assigned to that specific assignment. No credit will be given for assignments submitted more than 24 hours after their original due time. It is your responsibility to make sure that you properly submit the correct files.

Students with missed assignment submission will be dropped from the course.

6. Cell Phones

Cell phones must be turned off when in the distance classroom.

7. Title IX

Missouri University of Science and Technology is committed to the safety and well-being of all members of its community. US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Furthermore, in accordance with Title IX guidelines from the US Office of Civil Rights, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Title IX Coordinator, any notice of sexual harassment, abuse, and/or violence (including personal relational abuse, relational/domestic violence, and stalking) disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T's Title IX Coordinator is Neil Outar. Contact him directly (naoutar@mst.edu; (573) 341-6038; 605 W. 11th St.) to report Title IX violations. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit <http://titleix.mst.edu>.

8. Student Honor Code and Academic Integrity:

Please take a few minutes to stress the importance of academic integrity in class. Discuss why it should matter to the student, why it matters to you and your discipline, why it matters to Missouri S&T, and why it matters to future employers. Include a statement on your syllabus about the Honor Code developed and endorsed by the Missouri S&T Student Council: the Honor Code can be found at this link: <http://stuco.mst.edu/honor->

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[code/](#). Encourage students to read and reflect upon the Honor code and its emphasis on HONESTY and RESPECT.

Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism or sabotage (<http://registrar.mst.edu/academicregs/index.html>). Additional guidance for faculty, including the University's Academic Dishonesty Procedures, is available on-line at <http://ugs.mst.edu>. Other informational resources for students regarding ethics and integrity can be found online at <http://ugs.mst.edu/academicintegrity/studentresources-ai>.

9. S&Tconnect: <https://canvas.mst.edu/> (S&Tconnect icon on left toolbar)

S&Tconnect provides an enhanced system that allows students to request appointments with their instructors and advisors via the S&Tconnect calendar, which syncs with the faculty or staff member's Outlook Exchange calendar. S&Tconnect will also facilitate better communication overall to help build student academic success and increase student retention. S&Tconnect Early Alert has replaced the Academic Alert system used by Missouri S&T. If training is needed, please contact Rachel Morris at rachelm@mst.edu or 341-7600.

10. Classroom Egress Maps

Faculty should explain where the classroom emergency exits are located. Please include a statement in your course syllabus asking the students to familiarize themselves with the classroom egress maps posted on-line at: <http://designconstruction.mst.edu/floorplan/>.

11. Accessibility and Accommodations

It is the university's goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please contact Disability Support Services at (573) 341-6655, dss@mst.edu, or visit <http://dss.mst.edu/> for information, or go to mineraccess.mst.edu to initiate the accommodation process.

**Please be aware that any accessible tables and chairs in this room should remain available for students who find that standard classroom seating is not usable.*

12. LEAD Learning Assistance <http://lead.mst.edu>

The Learning Enhancement Across Disciplines Program (LEAD) sponsors free learning assistance in a wide range of courses for students who wish to increase their understanding, improve their skills, and validate their mastery of concepts and content in order to achieve their full potential. LEAD assistance starts no later than the third week of classes. Check out the online schedule at <http://lead.mst.edu/assist>, using zoom buttons to enlarge the

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view. Look to see what courses you are taking have collaborative LEAD learning centers (bottom half of schedule) and/or Individualized LEAD tutoring (top half of the schedule). For more information, contact the LEAD office at 341-7276 or email lead@mst.edu.

13. The Burns & McDonnell Student Success Center

The Student Success Center is a centralized location designed for students to visit and feel comfortable about utilizing the campus resources available. The Student Success Center was developed as a campus wide initiative to foster a sense of responsibility and self-directedness to all S&T students by providing peer mentors, caring staff, and approachable faculty and administrators who are student centered and supportive of student success. Visit the B&MSSC at 198 Toomey Hall; 573-341-7596; success@mst.edu; facebook: www.facebook.com/SandTssc; web: <http://studentsuccess.mst.edu/>

If you have any questions about the information listed above, please contact the Office of Undergraduate Studies at 573-341-7276.