DATA MINING (BDAN 420) Syllabus

Spring 2020

Instructor Information

Associate Professor	Email	Office Location & Hours
Dr. Lily Popova Zhuhadar	Lily.popova.zhuhadar@wku.edu	GH226, 11:30am – 2:00pm, M/W

General Information

Description

We will use Blackboard: https://wku.blackboard.com/ for the course homepage. Class notes, assignments, and announcements will be posted on Blackboard (announcements will be forwarded automatically from Blackboard to your WKU e-mail). Students should check their emails for updates each day.

Expectations and Goals

This course is designed to teach students how to use the latest data mining best practices to enable timely, actionable, evidence-based decision making throughout an organization! Student will learn how to use Data Mining techniques to uncover hidden patterns or trends within data, and it also enables students with expertise and knowledge on how to leverage these algorithms to improve all aspects of business performance. Without compromising either simplicity or clarity, this course provides enough technical depth to help students truly understand how data mining technologies work.

Coverage includes

- Processes, methods, techniques, tools, and metric.
- The role and management of data.
- Text and web mining.
- Sentiment Analysis and Big Data integration.

Throughout the semester, this course' conceptual coverage is complemented with application case studies (examples of both successes and failures), as well as simple, hands-on tutorials.

By the end of the semester, student should be able to

- Critically identifying which types of algorithms and methods are better in answering specific business questions.

- Creatively solving business cases and presenting solutions at the end of the semester.
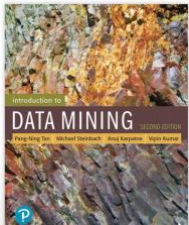
Course Materials

Required Materials

Course lectures, videos, notes, and assignments are listed on Blackboard.

Optional Materials

TEXTBOOK

Introduction to Data Mining, 2nd Edition

Pang-Ning Tan, Michael Steinbach,
Anuj Karpatne, Vipin Kumar

ISBN-13: 978-0-13-312890-1
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Course Schedule

Week	Topic	Reading	Exercises
Week 1	- Intro Data Mining Basics - Unit 1: **Introduction to Data Mining and CRISP-DM** - Learning Objectives - The Data Mining Process	Chapter-1	Chapter-1 Assignments
Week 2	- Unit 2: **Organizational Understanding & Data Understanding** - Learning Objectives - Purposes, Intents and Limitations of Data Mining - Database, Data Warehouse, Data Mart, Data Set - Types of Data	Chapter-2	Chapter-2 Assignments
Week 3	- Unit 3: **Data Preparation** - Learning Objectives - Data Scrubbing - Hands on Exercise - Preparing RapidMiner, Importing Data, and Handling Missing Data - Data Reduction - Handling Inconsistent Data - Attribute Reduction - Business Case Scenario Hands-one activities with RapidMiner	Chapter-3	Chapter-3 Assignments

Week	Topic	Reading	Exercises
Week 4	• Unit 4: **Data Mining Models and Methods (Correlation)** • Learning Objectives ○ Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment ○ Business Case Scenario Hands-one activities with RapidMiner	Chapter-4	Chapter-4 Assignments
Week 5	• Unit 5: **Association Rules** • Learning Objectives ○ Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment ○ Business Case Scenario Hands-one activities with RapidMiner	Chapter-5	Chapter-5 Assignments
Week 6	• Unit 6: **k-Means Clustering** • Learning Objectives ○ Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment ○ Business Case Scenario Hands-one activities with RapidMiner	Chapter-6	Chapter-6 Assignments
Week 7	• Unit 7: **Discriminant Analysis** • Learning Objectives ○ Organizational Understanding ○ Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment ○ Business Case Scenario Hands-one activities with RapidMiner	Chapter-7	Chapter-7 Assignments
Week 8	• Unit 8: **Linear Regression** • Learning Objectives ○ Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment ○ Business Case Scenario Hands-one activities with RapidMiner	Chapter-8	Chapter-8 Assignments

Week	Topic	Reading	Exercises
Week 9	• Unit 9: **Logistic Regression** • Learning Objectives o Organizational Understanding o Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment o Business Case Scenario Hands-one activities with RapidMiner	Chapter-9	Chapter-9 Assignments
Week 10	• Unit 10: **Decision Trees** • Learning Objectives o Organizational Understanding o Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment o Business Case Scenario Hands-one activities with RapidMiner	Chapter-10	Chapter-10 Assignments
Week 11	• Unit 11: **Neural Networks** • Learning Objectives o Organizational Understanding o Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment o Business Case Scenario Hands-one activities with RapidMiner	Chapter-11	Chapter-11 Assignments
Week 12	• Unit 12: **Text Mining** • Learning Objectives Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment o Business Case Scenario Hands-one activities with RapidMiner	Chapter-12	Chapter-12 Assignments
Week 13	• Unit 13: **Evaluation and Deployment (Cross-Validation)** • Learning Objectives o Data Understanding /Data Preparation/ Modeling/ Evaluation / Deployment o Business Case Scenario Hands-one activities with RapidMiner	Chapter-13	Chapter-13 Assignments

GRADED WORK

- **Mid-term Exam** (20%): Proctored Mid-term Exam will take place the week right after the Spring Break. You will have the opportunity to pick a specific day/time that suits your schedule.
- **Online Homework** (40%): Homework/Quizzes will be posted on Blackboard. Therefore, you will always need to access Blackboard, regularly throughout the semester (approximately once or twice weekly). It is your responsibility to access the assignment in adequate time to complete it *before* the due date/time.
- **Final Exam** (20%): A comprehensive final exam will be given. Final Exam take place during the second week of May 2020. You will have the opportunity to pick a specific day/time that suits your schedule.

Grades will be posted on Blackboard. Please consider the online gradebook as a courtesy to you, subject to errors given various upgrades and shifts in the software. I reserve the right to make gradebook corrections to keep it consistent with the syllabus so that your grade reflects true performance, not software or user error. If you see something that doesn't make sense, please alert me. Your online grade may not reflect dropped quizzes/activities.

Course Distribution of Points			
Activities Type	**# of tasks**	**Total Points**	**Scale**
Assignments	20	600 Points	• A: 900-1000
Midterm Exam	1	200 Points	• B: 800-899 • C: 700-799
Final Exam	1	200 Points	• D: 600-699 • F: 0-599
Total	**1000 Points**		

IMPORTANT DATES

- **Classes Begin:** Monday, January 27
- **Spring Break:** Monday-Friday, March 9-13
- **Mid-term Exam:** March 16-March 20
- **Final Exams:** May 11- May 14

Refer to https://www.wku.edu/registrar/academic_calendars/ for more details about the academic calendar.

COURSE PREREQUISITE

- Before attending this course, you should have a Personal Computer to install some software packages, in order to do your assignments, during the semester.
- **Note**: In case you don't have a personal computer, WKU TRC Center (located in MMTH) offers laptops to WKU student (free of charge). You can check out a laptop for two weeks long, afterward, on a bi-weekly basis, you can request a renewal. Besides, if you had any issues installing any software package used in this course, the TRC team can help you set up your computer. Here is a link to this recourse: https://apps.wku.edu/trc/index.php?fuseaction=auth.notLoggedin

REQUIRED SOFTWARE

- A significant amount of time that students spend completing their assignments will involve the use of data mining software (will be listed on Blackboard).
- Students will be able to learn the basic features of one or more of these through training videos that are posted in Blackboard, self-directed studies or by using available resources on Blackboard.

ADJUSTMENTS To ASSIGNMENTS, SCHEDULE, AND SYLLABUS

- The scope, timing, and due date/time of any assignments, or any other required work may be adjusted by the instructor as needed to maximize learning opportunities for students and/or better serve the goals of the course. The syllabus may likewise be modified at the discretion of the instructor.
- Any adjustments will be communicated to students in class and on Blackboard with as much advance notice as possible.

EXPEXTATIONS

Students are expected to:

- Read the scheduled assignments each week
- Complete the assigned homework, and quizzes posted on Blackboard, by the due date

Students are expected to complete each test, exam, homework, and all other assignments independently. The student's submissions must represent his or her individual work, and citations must be provided where content from other sources is referenced.

COURSE POLICIES

- The professor reserves the right to make changes to the syllabus or schedule as necessary; it is the student responsibility to be aware of these changes by periodically checking the syllabus on Blackboard Course Site.
- Grades will be posted promptly on Blackboard after each assignment or quiz has been completed.
- Exams (Mid-term Exam & Final Exam) are proctored through DELO Testing Center: https://www.wku.edu/testing. Information about how to register for these exams will be provided, in advance, before each exam.
- Problems with Blackboard should immediately be reported to the Information Technology Services at (270) 745-7000.
- Assignments are due and must be uploaded to the appropriate location by the announced due date. Your assignments must be uploaded to the correct place to receive a grade.

- A malfunction of your personal computer is not a reason for not completing a test or assignment on time.
- Don't email your assignment to me unless I instruct you to.
- It is the student's responsibility to check the site to make sure the assignment upload was successful. However, if you don't see it immediately you should wait at least a couple of hours to give the online system time to process the upload. If the upload was not successful, repeat the process. If you are still having problems, contact the appropriate tech support service for assistance.
- No "extra credit" activities will be provided so please do not ask.
- The course policies apply to all students. Students experience personal illnesses, a family crisis, work schedule problems, automobile trouble, and similar "life" situations every semester. These are not typically unusual circumstances and do not warrant exceptions to course policies. Good planning and proactive efforts on the part of the student can avoid many of the problems that arise from these situations.

E-MAIL ETIQUETTE

- Each student must have a WKU email address and Blackboard account for participation. Email and Blackboard are considered official communication tools for this course. Thus, announcements and reminders are posted/sent frequently and will be sent only to official WKU email addresses. If you use a different email address, please ensure that your WKU email is forwarded correctly. It is your responsibility to check WKU email and Blackboard regularly and to be aware of all reminders and announcements.
- E-mail will generally be the best way to contact me. During normal business hours, I usually respond to e-mail fairly quickly (unless I am in a meeting/class/etc.).
- Please keep in mind that I am not as quick to respond to e-mail in the evenings or during the weekends/holidays. Please consider e-mail as a method of *professional* correspondence. Thus, you should do your best to use correct grammar, punctuation, and capitalization.
- Also, when you contact me via e-mail, make sure that you include BDAN-420 as well as your last name in the subject line of the e-mail.

ACADEMIC DISHONESTY

- Students who commit any act of academic dishonesty will receive from the instructor a failing grade F in this course. This rule applies to any act that involves cheating and plagiarism.
- Cheating will not be tolerated. Note that cheating might involve but not limited to the following actions:

    "To represent written work taken from another source as one's own is plagiarism. Plagiarism is a serious offense. The academic work of a student must be his/her own. One must give any author credit for source material borrowed from him/her. To lift content directly from a source without giving credit is a flagrant act. To present a borrowed passage without reference to the source after having changed a few words is also plagiarism," for more details, refer to https://www.wku.edu/undergraduatecatalog,

- Also, browsing the Internet or accessing any type of personal materials or course materials saved on a hard-drive (Flash Drive, or P-drive) during the exams are considered cheating. Students who commit this act will receive from the instructor a failing grade F in this course.

ADA ACCOMMODATIONS

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, 1074. SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu. Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

TITLE IX/ DISCRIMINATION & HARASSMENT

Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy (#0.2070) and Discrimination and Harassment Policy (#0.2040). Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121. Please note that while you may report an incident of sex/gender-based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, contact WKU's Counseling and Testing Center at 270-745-3159.

WKU COUNSELING & TESTING CENTER

The university experience should be challenging, but not overwhelming. To this end, the WKU Counseling Center provides a variety of services to help strengthen students' capacity to tolerate distress, form healthy relationships, and seek healthy expressions of their ideals and values. If you would like to speak with someone, you may contact WKU's Counseling and Testing Center at 270-745-3159 or use their Here To Help service at https://www.wku.edu/heretohelp/heretohelpemail.php. If you need immediate help, please visit the Counseling Center in 409 Potter Hall or call the 24-hour emergency help line at 270-843-4357.

TUTORING

1. **STUDENT SUCCESS TUTORING CENTER**

   If you need to refresh your knowledge on topics (closely related to this course) pertaining to some courses you have taken previously, such as Excel Skills. All you need to do is to schedule an appointment for a free tutoring at the GFCB Student Success Tutoring by visiting this Website: https://www.wku.edu/business/tutoring.

2. **LEARNING CENTER**

   The Learning Center (DSU A330) provides **free** supplemental education programs for all currently enrolled WKU students. For more information, or to schedule a tutoring appointment, please call TLC at (270) 745- 6254 or log on to their website at www.wku.edu/tlc.