R·I·T	**Rochester Institute of Technology** **Golisano College of Computing and Information Sciences** **Department of Information Technology**

ISTE-600: Analytical Thinking
Fall (2168) Course Syllabus

REMINDER: The information presented in this syllabus is subject to expansion, change, or modification during the semester

Instructor: Weishi Shi
Office: 74 - 1050
   ☎ 585-622-8385
✍ email address: ws7586@rit.edu
Course Web Page: MyCourses.rit.edu

Office Hours:
   M-W: 11AM – 12PM
   or by appointment

Course Text and Materials

Required:
"Introduction to Data Mining" by P. Tan, M. Steinbach & V. Kumar.
Pearson Addison Wesley (2006)
ISBN 0-321-32136-7
http://www-users.cs.umn.edu/~kumar/dmbook/index.php
RIT Library

Optional (available on books24x7):
"Data Mining: Practical Machine Learning Tools & Techniques" by I. Witten, E. Frank & M. Hall
Morgan Kaufmann (2011)

Open source Data Mining software & documentation (Weka):
   http://www.cs.waikato.ac.nz/ml/weka/index.html
   http://www.cs.waikato.ac.nz/ml/weka/documentation.html

Important RIT Deadlines
Last day of drop/add: June 6, 2017
Last day to withdraw from the course with a "W": July 21, 2017.
NOTE: IST department policy states that a student has one semester to **challenge** any **grade**. After that, grades cannot be challenged.

Course Description

There is mounting evidence of a need to improve the ability of individuals and groups to think thoughtfully and analytically in order to develop appropriate and useful solutions to complex problems. Sources of complexity include human cognitive limitations, uncertainty, system dynamics, and reasoning errors. This course will provide students with frameworks, techniques, methods, and tools to improve analytical and critical thinking and presentation skills. Students will work individually and in groups on assignments and case study analyses.

Course Goals and Objectives

The student will:

- Increase awareness of the challenges and difficulties related to thinking clearly about complex systems and situations.
- Improve skills to analyze data and to use information effectively for complex problem solving.

Prerequisites:

- One-year programming in a high level language
- One statistics course

Role of course in curriculum for:

This course is required for students majoring in information sciences and technologies.

Course required for graduation in:

MS / IST

Course Organization:

Written Exams

Anticipated test dates are shown on the attached schedule. Requests to take tests at a different time will not be honored except in exceptional circumstances, such as a documented medical excuse, a serious family emergency, or scheduled RIT-approved off-campus event, and must be arranged with the instructor *in advance* if the circumstance can be anticipated.

A comprehensive final exam will be given during the regularly scheduled time in finals week. Information on the examinations will be distributed during the semester. Again, requests to take this exam at a different time will not be honored except in the exceptional circumstances discussed above.

Students are responsible for all material covered in lectures. Examinations will heavily emphasize conceptual understanding of the material. All exams will be analyzed after they have been administered; the instructor will look for -- and eliminate -- invalid or poorly framed questions.

All examinations are closed book. You may prepare a *hand-written* two-sided 8 1/2 by 11 inch "crib sheet" (even if it is empty) and bring it to your examinations. This crib sheet must have your name in the upper left hand corner (even if it is otherwise empty).

Labs

Working with data exploration & data mining software requires skills that are best mastered through practice. Following each lecture topic there will generally be a lab designed to reinforce lecture concepts. These labs will be collected and reviewed by your instructor/teaching assistant. Some labs might be peer reviewed by your classmates.

You should complete the Lab during the class session. If you do not complete them in class, they are due <u>at the beginning of the next class session</u>. Not handing in a Lab for **any reason** will result in a grade of zero for that lab.

There are no make-ups for missed Labs and they can't be submitted late.

Project

For the project, you will work in teams of **three students** on a problem of your choosing that is interesting, significant, and relevant to apply the data mining algorithms and techniques you learned in the class to some real-word problems. You need to analyze the logic of your problem using the Elements and Standards of THINKING. You will have great latitude in what you choose to work on, so take advantage of this opportunity to make a big impact! Please see the project description document for details about the project.

All project milestones are due on their respective due date. No late project milestones will be accepted.

Class Attendance
Your actions in the classroom and the lab should reflect the standards of behavior set in the commercial environment: you should be respectful of your classmates, the professor, the teaching assistant (TA) and the course support personnel (the note takers and interpreters) and you should willingly participate when asked to do so.

myCourses
MyCourses will serve as the primary communication mechanism for this course. You should log in on mCourses and check for changes in labs or schedule on a regular basis. All course materials will be posted to the content section of myCourses.

If you are having problems with an assignment or an emergency that may make you late in submitting your work, **contact instructors before the due date**. Excuses made after the fact will not be honored.

Course Outline
See the **Course Schedule.**

Course Topics
See the **Course Schedule.**

Grading
The grading scale used along with the grading criteria is as follows:

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Component	Weight
Labs	20%
Midterm Exam	25%
Final Exam	30%
Project	25%

Range	Grade
>= 90.0%	A
>= 80.0% & < 90%	B
>= 70.0 % & < 80.0%	C
>= 60.0 % & < 70.0%	D
< 60.0%	F

Project	Weight
Checkpoint 1: Project proposal	10%
Checkpoint 2: • Data collection, description, and processing	10%
Checkpoint 3: Core algorithm	10%
Final demo and project presentation	50%
Peer evaluation	20%
Total	25

Course Schedule (Subject to change at any time)

Week	Lectures	Reading	Due	Lab
1	Course Introduction Analytical Thinking	http://www.criticalthinking.org		
2	Intro to Data Mining	Ch. 1		Lab#1
3	Data/ Exploring Data	Ch. 2/3	Project Checkpoint 1	
4	Classification I	Ch. 4		Lab#2
5	Classification II	Ch. 5	Project Checkpoint 2	Lab#3
6	Review & Midterm			
7	Association Rules	Ch. 6		Lab#4
8	Cluster Analysis	Ch. 8	Project Checkpoint 3	Lab#5
9	Anomaly Detection	Ch.10		
10	Project Work & Demo		Project Report	
11	Final Exam			

Cheating Policy: Please review the departmental policy on cheating as described at
http://www.it.rit.edu/dishonesty.php

Note that if you get accused of cheating, the evidence has already been checked by other faculty members to verify it will withstand an appeal.

Cell Phones/Pagers:
Shut them off, I don't want to hear them going off during class.

Late Policy:
If you are having problems with an assignment or an emergency that may make you late in submitting your work, **contact me before the due date**. Excuses made after the fact will not be honored.

Extra Credit:
My policy on extra credit is simple: I do not offer extra credit assignments for any reason. Please do not ask for one.

Notices of Accommodation:
If you have a "Notice of Accommodation", you must provide me with a copy within a week of starting this course. If you provide me with the notice later in the course, it will not be retroactive. (In other words, an NOA is not a license to retake an exam or practical that you have done poorly on.)

Policy C 6.0 Policy Prohibiting Discrimination and Harassment/Title IX Reporting:
RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies require faculty to share information about incidents of gender based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework.
If you have a concern related to gender-based discrimination and/or harassment and prefer to have a confidential discussion, assistance is available from one of RIT's confidential resources on campus (listed below).

1. The Center for Women & Gender: Campus Center Room 1760; 585-475-7464; CARES **(available 24 hours/7 days a week)** Call or text 585-295-3533.
2. RIT Student Health Center – August Health Center/1st floor; 585-475-2255.
3. RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.
4. The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585-475-2876.
5. The Center for Religious Life – Schmitt Interfaith Center/Rm1400; 585-475-2137.
6. NTID Counseling & Academic Advising Services – 2nd Floor Lynden B. Johnson; 585-475-6468 (v), 585-286-4070 (vp).

Final Exam Date:
The final exam date for this course is set of the Registrar's Office about the middle of the semester. Please do not make travel plans without checking the exam schedule, since I will not give an early exam to accommodate your plans.

Contact Information:
Any updates to assignments and any emails that I need to send to individual students will be done through MyCourses. **What this means is that you should check your email and the MyCourses conference for this course periodically.**

I generally have email running whenever I am logged in, so you should get a reply to any email you send me within a day.

Finally...
Any or all of the previous information is subject to change or modification during the semester.