

### Course Information

Time: Mondays and Wednesdays 4:15PM - 5:35PM

Place: SL G03 (Science Library, Ground Floor, Room 3)

Blackboard: the course uses the Blackboard Learning System, login at <https://blackboard.albany.edu>,

### instructor Information

Instructor: Dr. Petko Bogdanov

Office: LI-95I, in the library building underground branch

Office Hours: Monday 12:00p-1:00p, Wednesday 1:00p-2:00p or by appointment

Email: please use Blackboard mail system, usually you can rely on a 24-hour turnaround on your questions, as the account will be checked daily.

### Course Description

Content: This course will offer an introduction to the key terms, concepts and methods in data analysis, with an emphasis on developing critical analytical skills through hands-on exercises of actual data analysis tasks. In addition, you will learn and practice basic programming skills to use software tools in data analysis. Most importantly, this course aims to help you look at the data and their analysis from new points of view, and nurture a habit of finding relevant patterns in large data sets with appropriate analysis steps. This ability becomes particularly important when you are facing with large amounts of data from your future field and career, be it natural or social science, engineering or business.

We will use the following textbooks for the readings of this course, though other reading materials will be distributed on Black Board Learning Systems occasionally.

- Joel H. Levine and Thomas B. Roos, Introduction to Data Analysis: the Rules of Evidence, Volume 1-2  
The whole book can be read or downloaded from  
[www.dartmouth.edu/~mss/docs/Volumes\\_1-2.pdf](http://www.dartmouth.edu/~mss/docs/Volumes_1-2.pdf)

Goals: By the end of this course, you will be able to

- define and use key terms, concepts and methods in data analysis;
- critically read and interpret data analysis results in science, engineering, and media;
- utilize computation tools to perform basic data analysis on data sets from practical problems;
- write summaries on data analysis results.

Learning Approach: I believe (and research shows) that people learn best from concrete experience, interacting with texts and with other learners/readers, engaging in challenging hand-on tasks, being held accountable for their work, and receiving frequent feedback on their progress. As a result, I have designed this course to provide all of those dimensions using the **Team-Based Learning** (TBL) approach. More detailed description of the TBL process is given in Appendix A: Overview of Team-Based Learning.

Process: The course content is divided into several units of study, with each unit focused on a common thematic element of data analysis. You will do much of the processing and analysis tasks in teams into which you will be placed on the first day of class and will stay in for the entire semester. While in many courses, group work can be structured unfairly, such that some students end up doing all the work while everyone shares in the credit, two factors will prevent that from happening in the TBL approach.

- First, nearly all graded team work will be preceded by one or more preparatory assignments in the form of readings, for which each individual will be accountable, thus ensuring that individual team members are each prepared to contribute to the team effort.
- Second, each individual's contribution to team work will be assessed by his/her teammates during the semester, as well as the instructors. Your interactions and performance in your team will be crucial to your success in the course.

For each unit of study, we will go through a similar set of steps:

- You will read the assigned reading on your own and will take a short Readiness Assessment Test (RAT) on that section at the beginning of each unit of study. The RAT tests are based solely upon your readings, and not on lecture or any other in-class preparation beforehand. This is an **ABSOLUTELY CRUCIAL POINT**: you must complete the readings for each unit before the unit's start (dates given in the class schedule).

- You will take each RAT twice—once on your own and once as a team. (Both grades count—see Grading and Evaluation for details.)
- As the Unit progresses, you will engage in in-class and out-of-class activities, both on your own and as a member of your team, that are designed to help you gain facility with the learned texts.
- As you work through the reading and activity sequence, there may be occasional mini-lectures to help fill in gaps in your understanding.

### Grading and Evaluation

There will be an individual set of grades and a team set of grades. Your final course grade will be composed of the following elements:

|     |                       |
|-----|-----------------------|
| 80% | individual grades:    |
| 30% | homework              |
| 20% | individual RAT grades |
| 15% | assessment test 1     |
| 15% | assessment test 2     |
| 20% | team grades:          |
| 10% | team RAT grades       |
| 10% | team exercise grades  |

### Policies

Attendance: Your in-class performance is key to your success in this course. Attendance, itself, is not graded. Instead, graded in-class activities and assignments constitute an important part of the course grade. It is not possible to maintain a passing average without consistent attendance. Missing class means the student earns an automatic “0” for the individual and team activities or assignments missed. In addition, Missing an assignment or activities that happened at the beginning of class before you arrive or at the end of class after you leave early will also earn a “0” for the individual and team activities or assignments missed. If you know that it will be difficult for you to consistently get to class on time and stay for the entire period, you should take this course at a time that better fits your schedule.

**IMPORTANT POINT:** Absolutely no individual make-up opportunities will be available for missed in-class activities. Instead of asking to make up missed work, please see the course ‘safety valves’ described below.

Late Turn-ins: homework turned in before or on the specified due date and time, in class or submitted through Blackboard, depending on the circumstance, are eligible for 100% of the grade. If you choose to turn in after the due date and time passes, for the first 24 hour period after the due date and time, your assignment will be eligible for 67% of the full grade; for the second 24 hour period after the due date and time, your assignment will be eligible for 33% of the full grade; for the third 24 hour period or later after the due date and time, your assignment will be eligible for 0% of the full grade.

Safety valve: Since there will be occasions in your life when missing a class meeting is simply unavoidable, this course has a no-fault safety valve. When course grades are calculated at the end of the semester, **each student will be credited with the grade of the equivalent of one individual RAT test, one team RAT test, and graded one team exercise.** Roughly speaking, this is the equivalent of two days in the course. It provides a buffer for about one or two absences or severe tardies. However, this is not intended to provide enough points to make up for consistent absences. In case a student is not absent or tardy, these points are capped at 100% of the points normally achievable in each category.

Withdrawal without Penalty: The drop date for the Spring 2015 semester is April 7th for undergraduate students. That is the last date you can drop this course and receive a 'W'. This may happen when you have to miss so many assignments for unforeseeable life problems that it will ruin your grade. **IMPORTANT POINT:** It is your responsibility to take such an action by this date, and don't wait until it's too late to see us when you get in trouble.

Incomplete and Extra Credit Policy: As per the Undergraduate Bulletin, the grade of Incomplete (I) will be given "only when the student has nearly completed the course requirements but because of circumstances beyond the student's control the work is not completed." A student granted an incomplete will make an agreement specifying what material must be made up, and a date for its completion. The incomplete will be converted to a normal grade on the agreed upon completion date based upon whatever material is submitted by that time. **IMPORTANT POINT:** Incomplete will not be given to students who have not fulfilled their classwork obligations, and who, at the end of the semester, are

looking to avoid failing the course. There will be no extra credit work. All students will be expected to complete, and be graded on, the same set of assignments.

Students with Disabilities: Students who feel that they have disabilities that require special arrangements for them to take the course must register with the [Disability Resource Center](#). Students are eligible for special services to which both the Center and the professor agree. In general, it is the student's responsibility to contact the professors at least one week before the relevant assignment to make arrangements.

Non-Class Related Use of Technology: Any use of electronic devices (**cell phone, tablets, personal laptop computers, or lab desktop computers**) for non-class purposes (e.g., browsing the web, facebook, twittering, etc) while the class is in session are not allowed. If this is violated in a consistent manner after initial warning is issued by the instructor, the student involved will be **expelled from the classroom** and receive no grade for the day's activity.

Academic Integrity: The Undergraduate Bulletin states the university's policies on academic integrity, see [http://www.albany.edu/undergraduate\\_bulletin/regulations.html](http://www.albany.edu/undergraduate_bulletin/regulations.html). You will be held to these policies. You are expected to be familiar with them. Any incident of academic dishonesty in this course, no matter how "minor" will result in (a) No credit for the affected assignment, (b) a written report sent to the appropriate University authorities (e.g. the Dean of Undergraduate Studies) and a referral of the matter to the University Judicial System for disposition, (c) a final mark reduction by at least a full letter grade or in the severe case, an F grade of the course.

## Appendix A: Overview of Team Based Learning

This course will be using a Team-Based-Learning (TBL) format ([www.teambasedlearning.org](http://www.teambasedlearning.org)). This instructional method aims to help develop your learning skills and will be done in a way that will hold teams accountable for using course content to make decisions that will be reported publicly and subject to cross-team discussion/critique. You will be assigned to a team with approximately 5 members. Teams will be formed during the first week of the term. You will sit with your team during all subsequent classroom sessions.

**Phase 1 – Preparation:** You will complete **specified readings** for each module

**Phase 2 – Readiness Assurance Test:** At the first class meeting of each module, you will be given a **Readiness Assurance Test (RAT)**. The RAT test (10 multiple-choice questions) measures your comprehension of the assigned readings, and helps you learn the material needed to begin problem solving in phase 3. Once the test period is over, the instructor may give a short mini-lecture to clarify concepts that are not well understood as evidenced by the individual test scores. The purpose of phase 2 is to ensure that you and your teammates have sufficient foundational knowledge to begin learning how to apply and use the course concepts in phase 3. **RATs are closed book/note and based on the assigned readings.**

| IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT) |                                     |                                     |                                     |                                     |       |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------|
| Name <u>TEAM 1</u>                              |                                     |                                     | Test # <u>1</u>                     |                                     |       |
| Subject _____                                   |                                     |                                     | Total <u>31</u>                     |                                     |       |
| SCRATCH OFF COVERING TO EXPOSE ANSWER           |                                     |                                     |                                     |                                     |       |
|   | A                                   | B                                   | C                                   | D                                   | Score |
| 1.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4     |
| 2.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | 4     |
| 3.  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4     |
| 4.  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 2     |
| 5.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 4     |
| 6.  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | 4     |
| 7.  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |       |

- **Individual RAT (individual RAT)** – You individually complete a 10 question multiple-choice test based on the readings.
- **Group RAT (team RAT)** - Following the individual RAT, the same multiple-choice test is re-taken with your team. These tests use a “scratch and win” type answer cards known as an IF-AT. You negotiate with your teammates, and then scratch off the opaque coating hoping to reveal a star that indicates a correct answer. Your team is awarded 10 points if you uncover the correct answer on the first scratch, 6 points for second scratch, and 2 point for third scratch.
- **Appeals Process** - Once your team has completed the team test, your team has the opportunity to complete an appeal. The purpose of the appeal process is to allow your team to identify questions where you disagree with the question key or question wording or ambiguous information in the readings. Instructors will review the appeals outside of class time and report the outcome of your team appeal at the next class meeting. Only teams are allowed to appeal questions (no individual appeals).
- **Feedback and Mini-lecture** - Following the RATs and Appeal Process, the instructor may provide a short clarifying lecture on any difficult or troublesome concepts.

**Phase 3 - In-Class Activities:** You and your team use the foundational knowledge, acquired in the first two phases to make decisions that will be reported publicly and subject to cross-team discussion/critique. We will use a variety of methods to have you report your team’s decision at the end of each activity. The presentation of your team responses are critical to the team grade. You should expect each team member to present individually and for the entire team to present with smooth transitions.

## Appendix B: A guide of being a critical reader

-- adapted from "A Guide of Being A Critical Reader" by CSU Writing Center.

As a reader, you are not a passive participant, but an active constructor of meaning. Exhibiting an inquisitive, "critical" attitude towards what you read will make anything you read richer and more useful to you in your classes and your life. This guide is designed to help you to understand and engage this active reading process more effectively so that you can become a better critical reader.

Let's look at a widely accepted model of reading that is based on cognitive psychology and schema theory. In this model, the reader is an active participant who has an important interpretive function in the reading process. In other words, in the cognitive model you as a reader are more than a passive participant who receives information while an active text makes itself and its meanings known to you. Actually, the act of reading is a push and pull between reader and text. As a reader, you actively make, or construct, meaning; what you bring to the text is at least as important as the text itself.

Below are the major steps you will need to be a critical reader

### Previewing

Previewing a text means gathering as much information about the text as you can before you actually read it. You can ask yourself the following questions:

#### What is my Purpose for Reading?

If you are being asked to summarize a particular piece of writing, you will want to look for the thesis and main points. Are you being asked to respond to a piece? If so, you may want to be conscious of what you already know about the topic and how you arrived at that opinion.

#### What can the Title Tell Me About the Text?

Before you read, look at the title of the text. What clues does it give you about the piece of writing? It may reveal the author's stance, or make a claim the piece will try to support. Good writers usually try to make their titles do work to help readers make meaning of the text from the reader's first glance at it.

#### How is the Text Structured?

Sometimes the structure of a piece can give you important clues to its meaning. Be sure to read all section headings carefully. Also, reading the opening sentences of paragraphs should give you a good idea of the main ideas contained in the piece.

### Annotating

Annotating is an important skill to employ if you want to read critically. Successful critical readers read with a pencil in their hand, making notes in the text as they read. Instead of reading passively, they create an active relationship with what they are reading by "talking back" to the text in its margins. You may want to make the following annotations as you read:

- Mark the Thesis and Main Points of the Piece
- Mark Key Terms and Unfamiliar Words
- Underline Important Ideas and Memorable Images
- Write Your Questions and/or Comments in the Margins of the Piece
- Write any Personal Experience Related to the Piece
- Mark Confusing Parts of the Piece, or Sections that Warrant a Reread
- Underline the Sources, if any, the Author has Used

### Summarizing

Summarizing the text you've read is an valuable way to check your understanding of the text. When you summarize, you should be able to find and write down the thesis and main points of the text.

### Analyzing

Analyzing a text means breaking it down into its parts to find out how these parts relate to one another. Being aware of the functions of various parts of a piece of writing and their relationship to one another and the overall piece can help you better understand a text's meaning. To analyze a text, you can look at the following things:

### Analyzing Evidence

Consider the evidence the author presents. Is there enough evidence to support the point the author is trying to make? Does the evidence relate to the main point in a logical way? In other words, does the evidence work to prove the point, or does it contradict the point, or show itself to be irrelevant to the point the author is trying to make?

### Analyzing Assumptions

Consider any assumptions the author is making. Assumptions may be unstated in the piece of writing you are assessing, but the writer may be basing her or his thesis on them. What does the author have to believe is true before the rest of her or his essay makes sense?

Example: "[I]f a college recruiter argues that the school is superior to most others because its ratio of students to teachers is low, the unstated assumptions are (1) that students there will get more attention, and (2) that more attention results in a better education" (Crusius and Channell, *The Aims of Argument*, Mayfield Publishing Co., 1995).

### Analyzing Sources

If an author uses outside sources to back up what s/he is saying, analyzing those sources is an important critical reading activity. Not all sources are created equal. There are at least three criteria to keep in mind when you are evaluating a source:

Is the Source Relevant?

Is the Source Credible?

Is the Source Current?

### **Re-reading**

Re-reading is a crucial part of the critical reading process. Good readers will reread a piece several times, until they are satisfied they know it inside and out. It is recommended that you read a text three times to make as much meaning as you can.

#### The First Reading

The first time you read a text, skim it quickly for its main ideas. Pay attention to the introduction, the opening sentences of paragraphs, and section headings, if there are any. Previewing the text in this way gets you off to a good start when you have to read critically.

#### The Second Reading

The second reading should be a slow, meditative read, and you should have your pencil in your hand so you can annotate the text. Taking time to annotate your text during the second reading may be the most important strategy to master if you want to become a critical reader.

#### The Third Reading

The third reading should take into account any questions you asked yourself by annotating the margins. You should use this reading to look up any unfamiliar words, and to make sure you have understood any confusing or complicated sections of the text.

### **Plan your Time Well**

Know when the assignment due date is and be sure to allow enough time for all thinking, reading, researching, drafting and revising. Be aware of the class policy on due dates.