# Syllabus in fall 2018 for GH 101 Computing and Data ScienceGeneral Information

## Contact Your Instructor

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**Phone:** *812-237-2136*

**Office:** Root Hall, *A-140D*

## Lecture, Exam, Office Hours

 **Lecture:** *MWF 2-2:50pm in Holmstedt Hall 117*

**Exam:** *Monday Dec 10 3pm*. Also check the [Office of the Registrar’s exam schedule](https://www.indstate.edu/registrar/faculty-staff-resources/final-exam-schedule)

**Instructor Office Hours:** *10:30-noon TWR, and normally in roughly 9-4 with about half of any given day taken up with meetings*

**GA Tutoring**: See <http://cs.indstate.edu/info/labs.html>

**Website**: [*https://docs.google.com/document/d/1BbmHvR47jKPkmNzi8J6EYxis0zKYlmLx5GK\_2umti3E/edit?usp=sharing*](https://docs.google.com/document/d/1BbmHvR47jKPkmNzi8J6EYxis0zKYlmLx5GK_2umti3E/edit?usp=sharing)

## Prerequisites

Honors student.

## Recommended and/or Required Text

There is no required text for this course. Readings will be given from online freely available sources as needed.

The beginning of the course covers a wide range of basic terms and concepts in computing. Much of this is similar to some of the content that is part of the high school AP CS Principles course. There is great online content at a non-CS-major level. A few options are -

* [Beauty and Joy of Computing](https://bjc.edc.org/bjc-r/course/bjc4nyc.html) ([watch on edX](https://www.edx.org/course/beauty-joy-computing-apr-cs-principles-uc-berkeleyx-bjc-34x-0))
* [CS50’s CSP](https://ap.cs50.net/curriculum/)
* [Code.org’s CSP](https://code.org/educate/csp)

Wikipedia articles about the basic terms and concepts are also great. Try reading just the summary at the top of an article, and maybe the first section or few.

## Course Announcements

Announcements regarding the course will be made both during class and via email to your @sycamores.indstate.edu email address. You should regularly check this email account or have it forwarded to an account that you check regularly.

## Classroom conduct

You may not use cell phones, iPods/music players, etc. during class. You should be civil and respectful to both the instructor and your classmates, and you should arrive to class a few minutes before the scheduled lecture so you are ready for lecture to begin on time. You may use your computer during class if you are using it to follow along with the examples that are being discussed. You may not check email, facebook, work on other courses, etc. during class.

# Course Description

The official description of this course from the catalog is

“Freshman Honors: Contemporary Issues Seminar - Topics may vary semester to semester, and may be taught by faculty from several academic disciplines. Topics range from environmental issues, politics and the media, technology and the quality of life, the military in peacetime, to freedom and responsibility in a democracy. Students may enroll in more than one General Honors 101 topics course during a semester, and the course may be repeated for credit as long as the topics vary. General Honors 101 is open to first-year students eligible for admission to the University Honors Program.”

The description for this particular section of GH 101 is the following, which has also been posted to the Honors College Website.

In GH 101 Computing and Data Science, we survey the landscape of the latest tools and techniques for data science and data mining. The semester begins with a “computing bootcamp” to get everyone up to speed on key terms and concepts in computing. The semester culminates in each student participating in two projects, including presenting the projects to the class.

The first project involves choosing, studying, and analyzing a large dataset - from either those of interest to ISU faculty (e.g., large datasets for analysis in biology, aviation, or geography) or large datasets from tech companies (e.g., twitter, facebook, netflix, google). Students work alone or in groups along with the instructor. Each group produces a polished set of presentation slides, self-guided tutorial, and conclusions based on their analysis. This project involves putting into action the technical skills acquired in the computing bootcamp and extending those skills into the area of data science.

The second project involves projecting to the near and distant future and forecasting what changes in tech will take place and when. Students select particular areas of tech. Each group goes thorough research of available sources from both current predictions and how close or far off past predictions have been. Each group produces a polished set of presentation slides and a polished project report. The project involves use of the library, critically examining sources, and practicing good writing skills.

The computing bootcamp covers the most important terms and concepts in computing that are needed for a fuller understanding of data science and its place within computing. The bootcamp includes a high level view of topics such as - computer components, algorithms and efficiency, cloud computing, security, key software systems, data mining, big data, and artificial intelligence. The bootcamp also builds skills necessary in data science, including basic programming and use of a variety of operating environments (Windows, Linux, Mac, GUI and text-based).

# GH 101 Requirements

Note that the following are requirements of all GH 101 courses. The plan above was made with these requirements in mind.

**Development of information literacy**

Students are guided in experiences that require them to:

* Locate scholarly sources and data
* Interact with the personnel and physical spaces of the library, including establishment of a library contact person
* Critically evaluate the authority, accuracy and authenticity of sources

**Co-curriculum and engagement**

Students will:

* Realize the connection of curriculum to the university and community through co-curricular experiences tied to coursework

**Writing skills**

Students will be challenged to:

* Summarize complex text through the writing of narratives
* Summarize their own work through proper construction of abstracts
* Develop and articulate arguments from logic or evidence

**Oral presentation skills**

Students will develop and exercise their skills of oral presentation, specifically aspects of style and content.

**Synthesis**

Students will be challenged to:

* Recognize and analyze connections between multiple subjects (e.g., multiple texts, book vs. film)
* Recognize and analyze connections across disciplinary lines

# Course Outline

1. Computing bootcamp (4-5 weeks)
	1. Basic concepts and terms (aka greatest hits in computing) -
	amount of information (bit, byte, KB, MB, etc.), frequency/speed (gigahertz), computer components (CPU, memory, storage, I/O, GPU), networked systems (client, server, cloud, internet of things), key software (operating system, web server, mail server, thin client, virtual machine), security (encryption/decryption, digital signing, trusted authority, public key vs symmetric key encryption), data (database, data mining, data science, big data), artificial intelligence (machine learning, neural networks, etc.)
	2. Text-based interaction with your computer - on Windows (command terminal), on unix/linux/mac (shell). Commands for - dealing with files and directories (like File Explorer or Finder), running programs, checking state of the system (users logged in, CPU load, disk usage, etc.).
	3. My first program - basics of a programming language (syntax rules, semantics of what it means, follow the rules, debugging skills).
	4. Some popular programming languages and basic differences - C, C++, Java, Python, R, Visual Basic, C#, Swift, Objective C, Javascript, Php, Asp, Jsp
2. Data science and data mining (4-5 weeks)
	1. Terms - regression (logistic, linear, etc.), machine learning (neural networks, deep learning), least squares fitting, gradient descent, naive Bayes algorithm, decision tree, support vector machine, classification, supervised vs unsupervised learning, training vs test vs validation data sets
	2. Data science and data mining in R and Python - using classic datasets (e.g., handwriting) and newer datasets (twitter data, yelp, facebook, netflix, google NCAA)
	3. Project - pick a dataset, study it in depth, do some analysis, and present to the class. Note - requires writing and presentation skills...
3. The future of tech (4-5 weeks)
	1. Looking at current trends in technology and trying to predict the future.
	2. Looking back at previous predictions in the past and how good or bad they were.
	3. Project - pick an area of tech and look at past and future, decide where you think things will likely go. Note - requires use of the library, evaluating sources, etc.

# Expected Amount of Work

If you take this class seriously and get what you should out of it, some weeks you will likely be spending around **10 hours/week** or more on the class. The students who get A’s in their courses and have an easy time finding jobs do spend this much time on important courses. Not everyone would need to spend this much time and not all weeks will be the same, but you should plan on putting in whatever time it takes.

**Note - your classes should be more important than your part-time job.**

# Grading and Assignments

The students of this course have the following responsibilities: read assigned readings before lecture, attend lecture, complete homework assignments, take in-class quizzes, take exams, and complete projects.

Your grade in each of the following categories will be calculated. Your “total” grade will be the minimum of these.

1. **Exams** - we will have two exams, which will both be cumulative. The total exams grade will be max(exam2, .6\*exam2 + .4\*exam1).
2. **Projects** - The projects grade will be the simple average of the two project grades (each of the projects is ½ of the project grade).
3. **HW** - each HW is given a number of points, and the total HW grade comes from just adding up all of the HW’s (so HW’s worth more points are worth more in the total HW grade)
4. **Quiz** - same as with HW’s, but for in class quizzes.
5. **Attendance** - each lecture you should login to the machine. I have a script that runs to check who has logged in, and your total attendance will be the % of the time you were present and logged in within the first 5 minutes of the start of class.

**Note that if you miss more than 20% of the lectures, you will receive an F for the course**. This course has 45 lectures, so if you miss 9 lectures you fail. I will not give you a warning about this - if you are likely to miss more than a few lectures during the semester you should keep track for yourself how many you have missed.

## CS Course Policies

Note that this course follows all standard CS course policies. In particular check the CS course policies related to - cheating/plagiarism, attendance, missing exams. See <http://cs.indstate.edu/info/policies.html> for details.

## Late Homeworks

When an assignment is given, the assignment will state if late work will be accepted. For some assignments, a “full credit” date and “late credit” date will be given. By default, “late credit” is at most ½ of the points. If no “late credit” date is given for an assignment, then no late credit is given for the assignment.

Some key assignments will be labeled as “**checkpoint assignments**”. For these assignments, if you do not complete the assignment correctly by the due date, **you fail the course**. These assignments are labeled as “checkpoint assignments” to make it clear to you that you cannot pass the course if you do not complete them on time.

## Start Homeworks Early

We suggest attempting a homework assignment the day it is given, or the day after, so that if you have a problem you can ask early. If you continue to have problems in trying to complete the assignment, you will have time to ask again. Many of the homework assignments require thought and problem solving, which takes “time on the calendar” not just “time on the clock”. By that we mean that spending two hours on 3 consecutive days may be more productive than trying to spend 6 hours at once on the assignment.

## Grade Cutoffs

We try to design homework assignments and exams so that a standard cutoff for grades will be close to what you deserve. After the first exam a grade will be created in Blackboard called “Letter Grade” that is what your letter grade would be if the semester ended today. Initially, I will likely assign the following grades: 93-100 A, 90-93 A-, 87-90 B+, 83-87 B, 80-83 B-, 77-80 C+, 73-77 C, 70-73 C-, 67-70 D+, 63-67 D, 60-63 D-, 0-60 F

Our goal is that the different grades have the following rough meaning.

**A+/A**
You can do *all* the assignments *on your own*.

**B+/A-**You understand nearly everything, and should be all set to use this knowledge in other courses or in a job.

**B-/B**

Most things you understand very well and a few you might not (more towards the former for a B and more towards the latter for a C).

**C/C+**
Learned enough and have the minimum skills to move on in the subject.

**D+/C-**
You did put some effort in, and understand many things at a high level, but you haven’t mastered the details well enough to be able to use this knowledge in the future.

**D-**

Students will normally *not* get an F if - you attend 80% of the lectures, complete some of the assignments up through the end of the course, and get nearly half of the problems on the final exam correct.

**F**
Normally, students that get an F simply stopped doing the required work at some point.

# Blackboard

The course has a blackboard site. Click [here](http://blackboard.indstate.edu) to go to blackboard. You should see this course listed under your courses for the current term. The blackboard site is only used for giving you your grades (go to the course in blackboard, then click “My Tools”, and then “My Grades”). All course content, schedule, etc. is kept in this google doc (which you are currently viewing).

*For online courses - if any parts of blackboard are used for the course, mention it here if appropriate.*

# Academic Integrity

Follow the standard CS course policies in terms of what is and is not allowed on assignments: <http://cs.indstate.edu/info/policies.html>

Please ask the instructor if you have doubts about what is considered cheating in this course.

# Special Needs / Student Disabilities

*Standard language included in the syllabi for ISU courses.*

Indiana State University recognizes that students with disabilities may have special needs that must be met to give them equal access to college programs and facilities. If you need course adaptations or accommodations because of a disability, please contact us as soon as possible in a confidential setting either after class or in my office. All conversations regarding your disability will be kept in strict confidence. Indiana State University's Student Support Services (SSS) office coordinates services for students with disabilities: documentation of a disability needs to be on file in that office before any accommodations can be provided. Student Support Services is located on the lower level of Normal Hall in the [Center for Student Success](http://www.indstate.edu/services/student-success/cfss) and can be contacted at 812-237-2700, or you can visit the ISU website under A-Z, [Disability Student Services](https://www.indstate.edu/services/student-success/cfss/student-support-services/disability-student-services) and submit a Contact Form. Appointments to discuss accommodations with SSS staff members are encouraged.

Once a faculty member is notified by Student Support Services that a student is qualified to receive academic accommodations, a faculty member is obligated to provide or allow a reasonable classroom accommodation under ADA.

# **Disclosures Regarding Sexual Misconduct**

*Standard language included in the syllabi for ISU courses.*

Indiana State University fosters a campus free of sexual misconduct including sexual harassment, sexual violence, intimate partner violence, and stalking and/or any form of sex or gender discrimination. If you disclose a potential violation of the sexual misconduct policy I will need to notify the Title IX Coordinator. Students who have experienced sexual misconduct are encouraged to contact confidential resources listed below. To make a report or the Title IX Coordinator, visit the Equal Opportunity and Title IX website:<http://www.indstate.edu/equalopportunity-titleix/titleix>.

The ISU Student Counseling Center – HMSU 7th Floor | 812-237-3939 | [www.indstate.edu/cns](http://www.indstate.edu/cns)

The ISU Victim Advocate – Trista Gibbons, trista.gibbons@indstate.edu

HMSU 7th Floor | 812-237-3939 (office) | 812-230-3803 (cell)

Campus Ministries - United Campus Ministries | 812-232-0186

 <http://www2.indstate.edu/sao/campusinistries.htm>

[www.unitedcampusministries.org](http://www.unitedcampusministries.org/) | ucmminister2@gmail.com

321 N 7th St., Terre Haute, IN 47807

For more information on your rights and available resources<http://www.indstate.edu/equalopportunity-titleix/titleix>