

## syllabus for

# DNA

## FSEM 101

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Hours: **MON 10:30-11:30**

**TUE and WED 1-2pm**

or appointment

Meeting Times: **TR 11:00-12:20** (Science Center SC B234)

### Online material:

Udacity's Tales of the Genome (online, free):

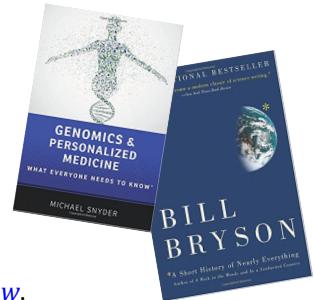
<https://www.udacity.com/course/tales-from-the-genome--bio110>

<https://www.23andMe.com>



<http://lexos.wheatoncollege.edu>

Tales from the Genome  
by 23andMe



### Books

Bryson, Bill (2003). *A Short History of Nearly Everything*. Broadway Books.

(we are reading a few chapters; pdf files are on reserve for us)

Synder, M. (2016). [\*Genomics and Personalized Medicine – What Everyone Needs to Know.\*](#)

Oxford University Press. (you need to buy this)

I also strongly recommend that you buy a 3-ring binder. I'll pass out lots of handouts.

**Summary:** An amazing blend of science and computing emerges when considering the molecule Deoxyribonucleic ('de-ox-ee-ri-bo-nu-cla-ic') Acid (DNA). DNA is the blueprint of life for all organisms on Earth and throughout evolutionary time. Fully sequenced genomes including the human genome and hundreds of microbial genomes have become the starting point for attempts to answer a wide range of biological and quantitative questions. This is your life in 3.2 billion letters, your genome as 3.2 Gigabytes, and your personalized medicine in a world of DNA from womb to tomb.

### 10 Learning Objectives for this course

- (0) You are at a cocktail party in the future and the topic of genomes comes up. You are able to **recall** significant phrases, terms, and techniques and your **understanding** of the main ideas and concepts **enables you to lead** the conversation for a while ... which causes your friends to raise their eyebrows.
- (1) You gain a comfort with DNA from multiple perspectives and abstractions including (a) from the **cell** level, (b) as a **digital** file of DNA sequence, and (c) as **data**.
- (2) You appreciate the importance of the **Human Microbiome Project**. (Love for the microbial world is encouraged, but optional).
- (3) You learn to **identify** and **classify** problems that are candidates for a computer to handle; this is the start of "computational thinking".
- (4) You **sharpen your technical software skills**, including working with data in spreadsheets, professionally formatting papers and slides, and you consider **computational problem solving** and the three types of algorithmic control.
- (5) You hone your **technical writing** skills.
- (6) You learn the syntax of **regular expressions** to search for **fuzzy patterns** in DNA or natural language.
- (7) You appreciate and can discuss the (soon to be) revolution in **personalized medicine**, including knowing your way around a **23andMe** report.
- (8) You feel empowered to **consider and evaluate** the ethical implications of society's transition to micro or personalized medicine.
- (9) You **enjoy yourself** within a community of scholars.

*In computing, if you are almost correct you are a liability.*  
Fred Kollett (1941-1997), MathCS, Wheaton College, Norton, MA

### Your Grade:

Things to do	Grading	Frequency
Professional participation	3%	always
Attend 3 events (one athletic, one in the arts, one your choice)	2%	TBD
In-class, hands-on “labs”	5%	weekly
Regex homework	5%	TBA
Oral presentations	10%	TBA
Three ‘skillsEarly’ modules	10%	TBA
Tales of the Genome material	15%	TBA
Writing Assignments (3)	30%	
- Timeline Entry	(10%)	
- Book Review	(10%)	
- Microbe genome report	(10%)	
Final project	20%	

#### onCourse (moodle):

All daily deadlines and readings will be **written on the board in class** and listed on our class online website in onCourse. I have *not* attempted to list a full 15-week schedule on this paper syllabus.

#### Late Submissions:

Due is due. Always turn in whatever you have on time. Something turned in on time is much better than not having it accepted because it is late. Late is not an option. (*Good, glad we can all agree with this*). Note that the moodle (onCourse) page associated with this course will have submission areas that are time triggered; if you are late, submissions will be blocked. Note: If an assignment is “due” on, say a Monday, I will actually allow you to submit your materials up to 4am of the following day. Thus, an assignment due on a Monday can safely be submitted up until Tuesday 4am. In short,



if you are willing and/or need to work late into the night that it is due, you are granted some grace time. Note: when I say *due that means it is (really) due*.

**TATA [AT] A [AT] [AG]**

#### Honor Code Revisited:

It goes without saying that all submitted work will be the student's own, in keeping with the Wheaton Honor Code, unless the assignment has assigned groups. For labs, you may get “help” from fellow classmates, but remember that all completed work must be your own. Be wise. If someone is asking you for too much help, be honest and remind them your work is just that, *your work*.

#### HELP

I have listed my office hours on the syllabus, but be bold, contact me: schedule a time to meet. Study, study, study and talk about the material with me as often as you can. *Please don't wait too long before you see me; a quick chat in my office can often clear things up. I'm here a lot...*

#### Accommodations for Disabilities

*Wheaton is committed to ensuring equitable access to programs and services and to prohibit discrimination in the recruitment, admission, and education of students with disabilities. Individuals with disabilities requiring accommodations or information on accessibility should contact Abigail Cohen, Assistant Dean for Accessibility and Assistive Technology at the Filene Center for Academic Advising and Career Services. ~ [cohen\\_abigail@wheatoncollege.edu](mailto:cohen_abigail@wheatoncollege.edu) or (508) 286-8215 ~*