NC STATE UNIVERSITY

Division of Academic and Student Affairs
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Council on Undergraduate Education 2016-2017

February 17, 2017
Talley Student Union 4140
1:30pm-3:00pm

Call to Order 1:30pm

- Welcome and Instructions, Chair Peggy Domingue
- Remarks from Associate Vice Provost, Dr. Barbara Kirby
- Approval of CUE January 20, 2017 Minutes

New Business

Consent Agenda		
Action	**Type**	**Notes**
ENG 371 Late Twentieth Century Fiction	HUM	Course being dropped
ENG 373 Late Twentieth Century Poetry	HUM	Course being dropped
ENG 398 Contemporary Literature I (1900 to 1940)	HUM	Course being dropped
ENG 471 American Literature, Since 1945	HUM	Course being dropped
IPGE 295 Big Data in a pocket: call it a smartphone	IP	Second offering

- Course and Curricular Business

Courses New to GEP				
Presenter	**Reviewers**	**GEP Category Under review**	**GEP Action**	**Notes**
Knowles	Nowel, Allen, Joines	HUM, GK	ENG 275 Literature and War	New Course
Reiskind	Keene, Lee, Schmidt	USD, IP	NTR 210 Introduction to Community Food Security	New Course
Gilmartin	Levine, Ashwell, Skrzecz	HUM, IP	PHI 347 Neuroscience and Philosophy	New Course
Gilmartin	Rabah, Reiskind, Ozturk	USD	SW 201 Introduction to Social Work	*New to USD

Courses for GEP Category - Review				
Presenter	**Reviewers**	**GEP Category Under Review**	**GEP Action**	**Notes**
Ashwell	Allen, Outing, Gilmartin	NS	ANS 105 Introduction to Companion Animal Science	*Major Changes: SLO and description; NS Review

**Changes to course approved by UCCC.*
SLO= Student Learning Outcomes

Notes:

- All linked course actions are viewable in CIM.
- To view actions, please click on the hyperlink. You may need to use your Unity ID to log in.
- If you experience issues logging in, please go to https://next-catalog.ncsu.edu/courseadmin/ and type the course prefix and number into the search bar.

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Council on Undergraduate Education 2016-2017

January 20, 2017
Talley Student Union 4140
Call to Order: 1:30 PM

Members Present: Chair Peggy Domingue, Chris Ashwell, Karen Keene, Sarah Ash, Alice Lee (Proxy), Ozturk Hatice, Frederick Parker, Erin Sills, David Gilmartin, Kim Outing, James Knowles, Ghada Rabah, Tania Allen, Ingrid Schmidt, Morgan Travis (Proxy), Adam Rogers (Proxy),
Members Absent:, Tim Petty, Adam Skrzecz, Jeff Joines, Cynthia Levine, Andy Nowel

Ex-Officio Members Present: Li Marcus, Lexi Hergeth, Dr. Barbara Kirby, Melissa Williford, Erin Dixon
Guests: Nathaniel Isaacson, Jason Miller

WELCOME AND INTRODUCTIONS

- *Remarks from Chair*— Chair Peggy Domingue welcomed the committee and guests.
- *Dr. Barbara Kirby, Associate Vice Provost*- Reminded the committee members of the faculty senate should have received a committee on committees survey. The committee on committees uses the survey results to populate university standing committees like UCCC and CUE.
- Approval of the Minutes from December 9th, 2016. – *Approved Unanimously*
    - Discussion: The minutes were presented and approved without further discussion. Motion to approve by member Sarah Ash.

NEW BUSINESS

Consent Agenda

- HESS 254 and HESS 260 (Courses being dropped from GEP list)- *Approved Unanimously*
  Member Chris Ashwell presented the Consent Agenda.

GEP Review

- ANS 110 Introduction to Equine Science: (NS) - *Approved Unanimously*
  Discussion: Presented by member David Gilmartin. Presenter noted that the same statement is used for the two categories and asked more senior members of the committee if this is acceptable. Member responded using the same statement is fine, more specific statements for each would be helpful, however the broad objective is acceptable to use for both categories.

- ANS/HS 215 Agricultural Genetics: (NS) -*Approved Unanimously*
  Discussion: Presented by member David Gilmartin. Presenter mentioned the cost of the textbook should be noted on the syllabus. The committee discussed that this is a UCCC issue and ask this to be a friendly suggestion. Members discussed open enrollment of the course and debated if a required course would need reserved seats. The members concluded that seat reservation is not a CUE issue and the members decided open enrollment is fine.

New to GEP

- ENG 255 Beyond Britain: Literature from Colonies of the British Empire: (HUM, GK) – *Approved Unanimously*
  Discussion: Presented by member James Knowles. Members discussed if the GK category needs to be contemporary. The committee determined historical references and literature are acceptable resources for the Global Knowledge category.

- ENG 342 Literature of Space and Place: (HUM, USD, IP) - *Approved Unanimously*
  Discussion: Presented by member James Knowles. Members pointed out a few typos. Member mentioned the sample questions seem to indicate that the student determines where they identify gender, race, and sexuality without being taught how to do so. Members pointed out examples in the syllabus that provided information on how the instructor will teach students how to identify this information and explained the burden will not fall on the students. Dr. Kirby noted

that a course with more than one GEP credit category requires the student to choose between non-corequisite GEP categories (ie: HUM or IP). The committee suggested indicating in the syllabus that students will need to choose which categories this course will fulfill to insure the students are aware of the process. Member suggested changing the statement "The course fulfills the GEP requirement…" to "This course fulfills a GEP requirement…OR" to clearly indicate the need for students to choose which categories the course will fulfill. Members agreed the statement should be updated.

- ENG 466 Transatlantic Literatures: (HUM, USD) - *Approved Unanimously*
  Discussion: Presented by member James Knowles. No further discussion.

- FLC 402 Advanced Chinese: Readings in Literature and Science: (HUM, GK) – *Approved, 2 abstentions*
  Discussion: Presented by member James Knowles. Member brought attention to the objectives emphasizing scientific research. Members debated making the suggestion to change the title "Advanced Chinese: Readings in Literature and Social Sciences" of "Advanced Chinese: Readings in Literature and Sciences". Li Marcus reminded members that title was approved by UCCC. Member asked if the word "science" is necessary in the title and guest Nathanial Isaacson indicated the word "science" is used to indicate the writing style in scientific and social-scientific literature. Members asked if students will be reading scientific readings in Chinese, guest responded yes, the students will read scientific, specifically socially scientific, reading and provided an example of a student who chose a reading about air pollution. Member suggested the professor choosing the readings as opposed to the students choosing the readings. Guest explained the student-selected literature is something he has implemented in response to participating in the NC Think program. Chair reminded the committee to focus on the GEP categories. Dr. Kirby explained that sometimes the title of the course can be confusing for CUE when determining which categories are under discussion, and that it's okay to ask for clarification when needed. Guest Nathanial Isaacson said he would be open to suggestions about changing the title in the future and reiterated the importance of allowing students to choose scientific readings. Members agreed because this is new course and title changes are approved through UCCC and the course is not seeking a Natural Science categorization to end the discussion about changing the title.

Meeting adjourned at 2:11 PM

Respectfully submitted by Lexi Hergeth

GEP Interdisciplinary Perspectives Special Topic Shell Offering (IPGE 295)

This form is to be used for submitting a Special Topics shell offering for the Interdisciplinary Perspectives GEP category to the Council on Undergraduate Education (CUE)

Course action proposals for a GEP shell offering must provide documentation to show how the course is designed to enable a student to achieve the particular GEP category objectives.

The ***GEP Interdisciplinary Perspectives objectives*** will provide instruction and guidance that help students to:

1. Distinguish between the distinct approaches of two or more disciplines.
2. Identify and apply authentic connections between two or more disciplines.
3. Explore and synthesize the approaches or views of the two or more disciplines.

IPGE 295		
Department(s)/Program	Plant Pathology	**New GEP Special Topics Offering** ☐
Special Topic Title: (30 character limit)	Big data in a pocket: call it a smartphone	**Review for 2nd Offering** ☐
Term to be Offered	Fall	
Instructor Name/Title	Asimina Mila/ Associate Professor	

SECTION 1: GEP CRITERIA

Instructions:

- At least one of the Instructor's student learning outcomes must be listed under each GEP category objective.
- Achievement of the outcomes must allow students to meet the GEP category objectives.
- Outcomes must illustrate what students will do in order to demonstrate they have achieved the outcome.
- At least one means of evaluation must be listed under each outcome and provide data to allow the instructor to judge how well students have achieved outcomes.
- Student learning outcomes that are relevant to the GEP category objectives must be applied to all course sections.
- For assistance with writing outcomes and list of active verbs using ***Bloom's Taxonomy*** [Click Here]

List the Instructor's student learning outcomes for the course that are relevant to GEP *Interdisciplinary Perspectives Objective 1*:

Obj. 1) Distinguish between the distinct approaches of two or more disciplines.

- Upon successful completion of this course, students will be able to describe the types of data available and the methods used to collect them in social sciences, such as sociology and anthropology, biological sciences such as public health and precision agriculture, and engineering such as machine system engineering. In particular, students will be able to contrast the differences between data from these disciplines.
- Upon successful completion of this course, students will be able to compare and contrast how the mathematical definition of a model is implemented in each of these disciplines and what role data play in model development.

Measure(s) for above Outcome:

Describe the assessments that will be used to determine if students have achieved the outcome. Including a relevant example assignment/question/prompt is encouraged for clarity.

1. Students will be asked to bring examples of data and models in class and explain how these examples fit with the definition of data or models in biological or social sciences.
2. Potential EXAM I questions:

a. Are always statistical methods necessary to build a model? Explain why or why not and give an example to justify your answer.
b. Experimentation is an important way to collect data in biological but not always in social sciences. Explain two reasons for this difference.

List the Instructor's student learning outcome(s) for the course that are relevant to GEP *Interdisciplinary Perspectives Objective 2*:

Obj. 2) Identify and apply authentic connections between two or more disciplines.

- Upon successful completion of this course, students will be able to evaluate how and whether data massively collected nowadays in social sciences, such as sociology, economics and biological sciences such as public health and precision agriculture are useful in addressing a question in that particular

discipline.

Upon successful completion of this course, students will be able to describe how, due to the complexity and the large-scale nature of data now being generated in the disciplines mentioned above, similar data analysis methods and technologies are used in all of these disciplines.

- Upon successful completion of this course, students will be able to describe how technology and the internet have changed the relationship between data and models in both biological sciences such as public health and precision agriculture and social sciences such as sociology, economics connecting them as disciplines more than ever.

Measure(s) for above Outcome:

Describe the assessments that will be used to determine if students have achieved the outcome. Including a relevant example assignment/question/prompt is encouraged for clarity.

A. Potential exam question:
1. Surveys have been used as a common method to collect data on consumers' attitude in social sciences. Name another method that could be used to collect similar data nowdays.
2. Farmers collect soil samples in the fall, send them for analysis to the department of agriculture of their state and they use the results of this analysis to apply fertilizers in their farms before they plant a crop. There is an automated GIS system loaded on the farmer's tractor that measures the amount of fertilizer applied. Can you think of a way that nowdays a farmer may use this information to make a cost-effective decision about the amount of fertilizer he/she applies?
B. Students will evaluate case studies presented in class and will be asked to assess the integration of data models and technology in both biological and sociological sciences.

List the Instructor's student learning outcome(s) for the course that are relevant to GEP *Interdisciplinary Perspectives Objective 3*:

Obj. 3) Explore and synthesize the approaches or views of the two or more disciplines.

- Upon successful completion of this course, students will be able to integrate knowledge from biological sciences such as crop science and social sciences such as sociology and anthropology to create visual models and synthesize information by visually inspecting data. Particular emphasis will be placed on perceptions and fallacies created by inappropriate visualizations.

Measure(s) for above Outcome:

Describe the assessments that will be used to determine if students have achieved the outcome. Including a relevant example assignment/question/prompt is encouraged for clarity.

1. Students will generate a visualization of data and will provide to the instructor a written critique of other students' visualization.
2. Group projects of data visualization, analysis and interpretation will be assigned the 3rd week of class. Students will be given the option of two different types of projects from biology and/or sociology: (i) informative data visualization, for example given a dataset to produce a set of dashboards that tell the story of the data given or (ii) translate a biological or social phenomenon into data, for example students will be given a short video demonstrating plant respiration and will be asked to represent this phenomenon with a numerical model. Groups will give a 15-minute in-class presentation of their projects. Projects will be posted online.

To assist CUE in evaluating this course for Interdisciplinary Perspectives, please provide answers to the following questions:

A. Which disciplines will be synthesized, connected, and/or considered in this course?
IPGE 295 synthesizes knowledge from Biology (sub-discipline precision agriculture, crop science), Public Health, Sociology, and Economics to understand how biology, social attitudes, and data, together will drive innovation and change the shape of science and society within the next 20 years.

B. How will the instructor present the material so that these disciplines are addressed in a way that allows the students "to integrate the multiple parts of view into a cohesive understanding"?

Material is presented in a context that enables students to understand types of data collected from Biology (sub-discipline precision agriculture and crop science), Public Health, Sociology, and Economics, their use to derive knowledge and innovation. This is a survey course and an in-depth knowledge of methods in data collection and statistical methods is not required. However some basic knowledge is necessary particularly with regards to types of data (quantitative and qualitative) and their relative value in each discipline to extract knowledge. Thus the few first lectures will be used to cover this topic. Colleagues from the departments of Sociology & Anthropology and Biological and Agricultural Engineering will give relevant disciplinary lectures.

Subsequently, the concept of a model will be introduced. Students will be asked to bring in class an example of a model and justify their selection. After the initial intuitive introduction of a model, the mathematical definition of a model will be introduced with examples of models (theoretical or research-subject) from each discipline. The relationship between data and models and the explanation of why quantitative and qualitative data have different relative value among the disciplines in study will become clear with selected readings.

The second part of the course will focus on data generation with mobile devices and uses of big data analytics. Several examples from applications such as Facebook and mobile apps will be conducted and discussed in class and readings on the role of mobile devices and social media will be provided. Videos and readings from the disciplines of genetics and sociology, economics (ie. Marketing) and public health will give discipline grounded understanding of data collection and the unique role technology potentially will play across disciplines in data collection and information extraction. Readings provided will lead students to re-examine the potential value of quantitative and qualitative data in Biology (sub-discipline precision agriculture), Public Health, Sociology, and Economics, as it compares with the traditional use of quantitative and qualitative data in each of these disciplines. Six lectures have been included: three on hands on practice and three on "case studies" from biology (precision agriculture, public health) and Sports analytics. Students are expected to use materials from those lectures to integrate the similarities and differences among disciplines as it relates to data types, methods of collection and approaches in model development.

Finally data visualization is an important nowadays method of extracting information from large datasets. In this course several lectures and 2 in-class practice sessions using Tableau will be conducted to integrate data, and investigate relationships (ie. models) from biology (crop science) and sociology/anthropology. Students will describe similarities in visualization methods used in both disciplines as it is related to extracting information, storytelling, testing hypothesis, and building conceptual models.

SECTION 2: REQUISITES AND SCHEDULING

General guidelines:

- GEP Courses should have at least 25% of seats non-restricted (i.e. available to all students).
- GEP Courses should have no more than ONE pre-requisite.
- GEP Special Topics are approved as a one-term offering.
- The course syllabus for all sections must include the GEP ***Interdisciplinary Perspectives*** category designation and GEP student learning outcomes.

Special Topics Term Scheduling:

- List below the course scheduling detail:
  - Meeting time and day(s): Tuesday and Thursday, 10:15 - 11:30 am
  - Seat count:
    40
  - Room assigned or room preference including needed classroom technology/seat type:
    Room with PowerPoint and audio capability. Also teaching labtops for students to practice in class.

- If this course is to be piggy-backed with a department special topic, list the piggy-backed course prefix/number below. (EX: BIO 295 with NSGK 295)

What percentage of the seats offered will be open to all students? __100____ %

a. If seats are restricted, describe the restriction being applied.

b. Is this restriction listed in the course catalog description for the course?

List all course pre-requisites, co-requisites, and restrictive statements *(ex: Jr standing; Chemistry majors only).* ***If none, state none.***

None

List any discipline specific background or skills that a student is expected to have prior to taking this course. If none, state none.
(ex: ability to analyze historical text; prepare a lesson plan)

None

SECTION 3: ADDITIONAL INFORMATION

Complete the following 3 questions or attach a syllabus that includes this information.

1. Title and author of any required text or publications.

No textbook; however sample readings are given in syllabus and will be posted in moodle

2. Major topics to be covered and required readings including laboratory and studio topics.

See attached syllabus

3. List any required field trips, out of class activities, and/or guest speakers.

See attached syllabus

SIGNATURE PAGE FOR IPGE 295

RECOMMENDED BY:

JANUARY 24, 2017

HEAD, DEPARTMENT/PROGRAM — DATE

For GEP Special Topics Submission Form, follow the standard workflow for approval of a special topic offering in your College which may or may not include review by the College CCC.

ENDORSED BY:

CHAIR, COLLEGE COURSES & CURRICULA COMMITTEE — DATE

COLLEGE DEAN — DATE

APPROVED BY:

CHAIR, COUNCIL ON UNDERGRADUATE EDUCATION — DATE

DEAN, DIVISION OF ACADEMIC AND STUDENT AFFAIRS (DASA) — DATE

APPROVED EFFECTIVE DATE _____

Section TBD

FALL 2017

3 Credit Hours

N/A

Data have been, are, and will be collected in every scientific discipline. Data provide a foundation to evaluate hypotheses and advance knowledge. For centuries scientists have collected data and built models separately with methods and principles defined in their disciplines. Modern technological advances have resulted in a data revolution. Data now come fast in all forms and in high volumes, presenting both new challenges and opportunities in many disciplines. In this course we will discuss how data is collected and visually summarized and how modern technology has allowed for the collection of big data, resulting in a revolution in the way we live, work, and think.

At the conclusion of this course, students will be able to:

1. Define the types of data generated in different disciplines and explain how data is collected.
2. Compare and contrast data collection in the past, present, and how data collection may change in the future.
3. Describe how developments in technology changed the role of data in innovation.
4. Evaluate how large amounts of data will change the way we will generate knowledge in the future.
5. Utilize visualization to summarize vast amounts of data.

Course Structure

The course will be delivered through lectures that will include PowerPoints, videos, readings, and class discussion.

N/A

Dr. Asimina Mila - *Instructor*
Email: almila@ncsu.edu

Phone: 919-513-1291
Fax: 919-515-9500
Office Location: Gardner Hall 2714
Office Hours: Tuesday and Thursday 1:00-2:00 PM or by appointment

Guest lectures
Dr. Grant Ellington, Biological and Agricultural Engineering
Dr. Anna Manzoni, Dept. of Sociology & Anthropology

Lecture

Days: TH
Time: 10:15 - 11:30am **Campus:** Main **Location:** TBA
This meeting is required.

None; however there will be sample readings assigned. Students are expected to access the

Expenses

None.

None.

None.

None.

None.

GEP Category

Interdisciplinary Perspectives

1. **Objective 1. Distinguish between the distinct approaches of two or more disciplines;**

GEP Learning Outcome(s) for 1.

- Upon successful completion of this course, students will be able to describe the types of data available and the methods used to collect them in social sciences, such as sociology and anthropology, biological sciences such as public health and precision agriculture, and engineering such as machine system engineering. In particular, students will be able to contrast the differences between data from these disciplines.

- Upon successful completion of this course, students will be able to compare and contrast how the mathematical definition of a model is implemented in each of these disciplines and what role data play in model development.

2. Objective 2. Identify and apply authentic connections between two or more disciplines;

GEP Learning Outcomes for 2.

- Upon successful completion of this course, students will be able to evaluate how and whether data massively collected nowadays in social sciences, such as sociology, economics and biological sciences such as public health and precision agriculture are useful in addressing a question in that particular discipline.
Upon successful completion of this course, students will be able to describe how, due to the complexity and the large-scale nature of data now being generated in the disciplines mentioned above, similar data analysis methods and technologies are used in all of these disciplines.
- Upon successful completion of this course, students will be able to describe how technology and the internet have changed the relationship between data and models in both biological sciences such as public health and precision agriculture and social sciences such as sociology, economics connecting them as disciplines more than ever.

3. Objective 3. Synthesize the approaches or views of two or more disciplines;

GEP Learning Outcomes for 3.

- Upon successful completion of this course, students will be able to integrate knowledge from biological sciences such as crop science and social sciences such as sociology and anthropology to create visual models and synthesize information by visually inspecting data. Particular emphasis will be placed on perceptions and fallacies created by inappropriate visualizations.

Which disciplines will be synthesized, connected, and/or considered in this

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Material is presented in a context that enables students to understand types of data collected from Biology (sub-discipline precision agriculture and crop science), Public Health, Sociology, and Economics, their use to derive knowledge and innovation. This is a survey course and an in-depth knowledge of methods in data collection and statistical methods is not required. However some basic knowledge is necessary particularly with regards to types of data (quantitative and qualitative) and their relative value in each discipline to extract knowledge. Thus the few first lectures will be used to cover this topic. Colleagues from the departments of Sociology & Anthropology and Biological and Agricultural Engineering will give relevant disciplinary lectures. Subsequently, the concept of a model will be introduced. Students will be asked to bring in class an example of a model and justify their selection. After the initial intuitive introduction of a model, the mathematical definition of a model will be introduced with examples of models (theoretical or research-subject) from each discipline. The relationship between data and models and the explanation of why quantitative and qualitative data have different relative value among the disciplines in study will become clear with selected readings.

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Finally data visualization is an important nowadays method of extracting information from large datasets. In this course several lectures and 2 in-class practice sessions using Tableau will be conducted to integrate data, and investigate relationships (ie. models) from biology (crop science) and sociology/anthropology. Students will describe similarities in visualization methods used in both disciplines as it is related to extracting information, storytelling, testing hypothesis, and building conceptual models.

This course does not fulfill a General Education Program co-requisite.

This course will not require students to provide their own transportation. Non-scheduled class time for field trips or out-of-class activities is NOT required for this class.

None.

Grading

Grade Components

Compone	Weight	Details
Project	30% of final grade.	Group projects of data visualization, analysis and interpretation will be assigned the 3rd week of class. Examples of projects: (i) informative data visualization, for example given a dataset students will be asked to produce a set of dashboards that tell the story of the data given or (ii) develop a physical (3-D) model. Groups will give a 20-minute in-class presentation of their projects. Projects will be posted online.
Exams	60% of final	There will be 3 scheduled exams, each worth 20% of the final grade for a total of 60%.
Class participation	10% of final	Students are expected to actively participate in class. See attached rubric. Attendance will be taken at the beginning of each lecture. If you know you will be absent let me
Total	100%	

This Course uses Standard NCSU Letter Grading Scale

$97 \leq$ A+ ≤ 10
$93 \leq$ A < 97
$90 \leq$ A- < 93
$87 \leq$ B+ < 90
$83 \leq$ B < 87
$80 \leq$ B- < 83
$77 \leq$ C+ < 80
$73 \leq$ C < 77
$70 \leq$ C- < 73
$67 \leq$ D+ < 70

$63 \leq D < 67$
$60 \leq D- < 63$
$0 \leq F < 60$

In order to receive a grade of S, students are required to take all exams and quizzes, complete all assignments, and earn a grade of C- or better. Conversion from letter grading to credit only (S/U) grading is subject to university deadlines. Refer to the Registration and Records calendar for deadlines related to grading. For more details

Requirements for Auditors (AU)

Information about and requirements for auditing a course can be found at http://policies.ncsu.edu/regulation/reg-02-

Policies on Incomplete Grades

If an extended deadline is not authorized by the instructor or department, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an

grades is located at http://policies.ncsu.edu/regulation/reg-02-20-3.

Late Assignments

No assignments after the due date will be accepted. Group projects are expected on the date assigned but a later date will be allowed if excusable reasons are presented.

Attendance Policy

For complete attendance and excused absence policies, please see http://policies.ncsu.edu/regulation/reg-02-20-03

Full participation in classes, project, and examinations is expected. Students may be asked to provide documentation for multiple consecutive class absences or frequent single class absences. Students are referred to http://policies.ncsu.edu/regulation/reg-02-20-03 for information on attendance

Absences Policy

Absences must be cleared with the instructor in advance, and in the case of an exam a scheduled make-up date must be confirmed prior to the date of the event. Unplanned absences must be discussed with the instructor as soon as is possible after the event, and a make-up plan agreed to. Students are referred

to http://policies.ncsu.edu/regulation/reg-02-20-03 for information on excused/unexcused absence policies.

Makeup Work Policy

Students missing an exam for an excused absence must schedule a make-up exam as soon as is possible, and within 1 week of the originally scheduled event unless excusable reasons are presented.

Missing an exam for an unexcused absence must be discussed with the instructor.

Additional Excuses Policy

Students are required to comply with the university policy on academic integrity found in the Code of
Student Conduct found at http://policies.ncsu.edu/policy/pol-11-35-01

See http://policies.ncsu.edu/policy/pol-11-35-01 for a detailed explanation of academic honesty.

Honor Pledge

Your signature on any test or assignment indicates "I have neither given nor received unauthorized aid on this test or assignment."

Students may be required to disclose personally identifiable information to other students in the course, via electronic tools like email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information outside the course.

Electronically-hosted Components: Readings and PowerPoints from lectures will be posted to Moodle. These components are required but students are not required to disclose personally identifiable information. Moodle will be used as an information

Accommodations for Disabilities

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office (http://www.ncsu.edu/dso), 919-515-7653. For more information on NC State's policy on working with
students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at http://policies.ncsu.edu/regulation/reg-02-20-01.

NC State University provides equality of opportunity in education and employment for all students and employees. Accordingly, NC State affirms its commitment to maintain a work environment for all employees and an academic environment for all students that is free from all forms of discrimination. Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of

state and federal law and/or NC State University policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and/or NC State University policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. NC State's policies and regulations covering

discrimination, harassment, and retaliation may be accessed at http://policies.ncsu.edu/policy/pol-04-25-05 or http://www.ncsu.edu/equal_op/. Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office for Equal Opportunity (OEO) at 919-515-3148.

NOTE: The course schedule is subject to change.

Lecture 1: Course introduction, policies, data definitions
Course expectations and policies
Data definitions

Lecture 2: Examples of Data, Video & Discussion

- *Each student should bring an example of data (it could be saved in smartphone, computer, a piece of paper or another application). Material will be used in class discussion.*

Lecture 3: Types of data in life sciences and methods of collection

Sample Reading

Petter Laake, Haakon Breien Benestad, and Bjørn Reino Olsen. 2007. Research methodology in the medical and biological sciences. Chapters 1 & 4

Lecture 4: Types of data in engineering and methods of collection (by G. Ellington, Dept of Biological and Agricultural Engineering)

Lecture 5: Types of data in social sciences and methods of collection (by Anna Manzoni, Dept. of Sociology & Anthropology)

Sample Reading will be determined by Dr. Manzoni

Lecture 6: Show me a model!

Students will be asked to bring an example of what they consider to be a model and explain why they think it

is a model.

Definition of a model; why are models useful; how to use models; Limitations

Sample Reading

Chapter 4: Models are the building blocks of science, **Jim Bull, University of Texas at Austin Bio301D (I have author's permission).**

Chapter 5: All models are false. But some are useful anyways. **Jim Bull, University of Texas at Austin Bio301D (I have author's permission).**

Models vs experimentation: http://www.datasciencecentral.com/profiles/blogs/models-vs-experiments

Lecture 7: Data and models

How models are derived from data and observations
Uncertainty. Random. Correlations. Random and correlations

Sample Reading: Correlations are hard to interpret

Lecture 8: And then technology came; Big Data definition

Mobile technology and its abundance

How technology is related to data collection

Big Data definition

https://www.brighttalk.com/webcast/11519/212273?utm_source=brighttalk-promoted&utm_medium=email&utm_term=Audience4907&utm_campaign=212273&utm_content=2016-08-6

Sample Reading
Mayer-Schonberger, V, Cukier, K & Niel. 2013. Big Data: A Revolution That Will Transform How We Live, Work, and Think. Pp 1-18.

Lecture 9: EXAM 1

Lecture 10: Does Facebook know who you are better than you do? Which jacket you want to buy? Can DNA tell when I will get sick? What questions your smartphone can or cannot answer.

Students will do in class Facebook based quizzes about two topics (such as "best city to live in" and "what

type is your best friend"). Results will be discussed in class. How the results are generated will be also discussed in combination with the readings.

Readings

New York Times

http://www.nytimes.com/2014/06/13/technology/facebook-to-let-users-alter-their-ad-profiles.html?_r=1

FORBES – TECH "How Big Data Is Transforming The Fight Against Cancer"

MIT Technology review

http://www.technologyreview.com/featuredstory/428150/what-facebook-knows/

Listening
Intelligent Social Media: Using the Social Web to Monitor, Measure and learn
https://www.brighttalk.com/webcast/43/168335?autoclick=true&utm_source=brighttalk-recommend&utm_campaign=network_weekly_email&utm_medium=email&utm_content=collab
BIG DATA: How biological data science can improve our health, foods & energy
https://www.youtube.com/watch?v=pLHUoxSNCf8

Lecture 11: 3-D printing DH Hill Library Makerspace

Lecture 12: Who needs models anymore? Data is the king!

Use short 2-3 mins videos to stimulate interest and understanding about how big data differ from traditional data collection and model development
Discuss after each video (a) types of data, (b) characteristics of data, (c) compare with data as known in general, (d) how prediction was done, and (e) compare with models as known in general.

Fashion: https://www.youtube.com/watch?v=z1uFIgfjYmc&index=4&list=PL7FnN5oi7Ez8ldFg0FYaHWnm_CTa2e0jT
Traffic:
https://www.youtube.com/watch?v=atflFGrOSJQ
Publishing:
https://www.youtube.com/watch?v=U1y7Lrh1dhE&index=11&list=PL7FnN5oi7Ez8ldFg0FYaHWnm_CTa2e0jT
Public safety:
https://www.youtube.com/watch?v=sj_ItgsvEUo&list=PL7FnN5oi7Ez8ldFg0FYaHWnm_CTa2e0jT&index=26
Cheesecake Factory:
https://www.youtube.com/watch?v=1PdD7SAl1AU&list=PL7FnN5oi7Ez8ldFg0FYaHWnm_CTa2e0jT&index=34

Reading

How leading organizations use big data and analytics to innovate. A. Marshall, S. Mueck, and R. Shockley. 2015. Strategy & Leadership, Volume 43, Issue 5, pp. 32-39.

Lecture 13: Ardiuno – introduction and data collection DH Hill Library Makerspace

Lecture 14: Ardiuno –data collection; models DH Hill Library Makerspace

Lecture 15: Case study 1

Big Data in Medical applications (speaker from Industrial Engineering)

Lecture 16: Case study 2

Big Data and Sports Analytics (Department of Math)

Lecture 17: Case study 3

Understanding the genetics of common diseases: Using Big Data approaches to see the whole
https://www.youtube.com/watch?v=Wc4C2ZOjQUk

Reading

Chan, I. and Ginsburg, G. 2011. Personalized Medicine: Progress and Promise. Annual Review of Genomics and Human Genetics. Vol 12: 217-244.

Lecture 18: Opportunities and Challenges with Big Data for Science and Society

First 20 mins class will discuss the major positive or negative elements using Big data that students gathered by listening the 3 cases. A written summary is expected at the beginning of class.

Listening
An economist debate: is Big Data a positive force for creativity?
https://www.youtube.com/watch?v=_z3wwWOxDbg

Reading
Boyd D., and Crawford K. 2012. Critical questions for big data. Information, Communication & Society.

Biology: The big challenges of Big Data. Nature, Volume 498, Issue 7453, p. 255

The limits of Big Data, C. Croft, 2014. SAIS Review of International Affairs, Volume 34, Issue 1, pp. 117-120

Lecture 19: EXAM 2

Lecture 20: How to put a million data in a picture (VISUALIZATION I)

Lecture will give the basic introduction on the purpose of visualization and methods of implementation

Reading

Chapter 2, i*n* Show me the numbers, S. Few, Analytics Press, CA.

Lecture 21: How to put a million data in a picture (VISUALIZATION II) – Alison Blaine, NCSU Libraries

Reading

The art of telling the story, in Cool Infographics : Effective Communication with Data Visualization and Design, pp. 27-29, ed. Krum R. John Wiley&Sons (2014).

Visual trends for 2016 https://www.brighttalk.com/webcast/10189/179395?autoclick=true&utm_medium=web&utm_source=brighttalk-portal&utm_campaign=vidora-feed&utm_content=organic

Lecture 22: Practice with Tableau (PART I) – Agricultural data

Students will practice visualization using Tableau Public an easy drag and play software. In this lecture instructor will demonstrate briefly the software and the dataset that will be used. Data will be a subset of USDA census data of 50,000 rows by 6 attributes (quantitative and qualitative). Students are expected to work in teams visualizing data in different ways for about 45 mins. During the last 30 mins of class time teams will explain how they visualized data, compared quantitative to qualitative attributes and what discuss the knowledge/information they gained.

Lecture 23: Practice with Tableau (PART II) – Crime rates in city of Los Angeles, 2012-2015

Students will practice visualization using Tableau Public an easy drag and play software. In this session an example from Open Government (www.data.gov) will be used. This is a dataset in the scale of 150 MB & 950,000 rows or larger by 13 attributes. Students are expected to work in teams visualizing data in different ways for about 50 mins. During the last 25 mins of class time teams will explain how they visualized data, difficulties they experienced with the exercise and the information they gained.

Lecture 24: Misuses of data Viz

Examples will be presented and discussed in class. Students will also be asked to criticize some of the visualizations created in sessions 19 and 20.

Sample
Reading
Top Ten Fears of New Data-Viz creators, in Data Visualization for Dummies, pp 213-218, eds. Yuk M. & Diamond S. John Wiley&Sons (2015).

Lecture 25: EXAM 3

Lecture 26: Students Presentations

Lecture 27: Students Presentations

Lecture 28: THANKSGIVING

Lecture 29: The future of data

This lecture may be also used for Students projects depending on enrollment volume. If a 3rd session for student projects is not of need then Lecture 29 will be used to discuss ideas of potential innovation with data in the future

Reading
http://www.techrepublic.com/article/5-powerful-data-trends-to-watch-in-2016/

Final session: review and wrap-up