Cover Sheet: Request 11673

SPA 3XXX Scientific Thinking

Info

Process	Course|New|Ugrad/Pro
Status	Pending
Submitter	Vogtle,Candice Raquel cvogtle@ufl.edu
Created	5/4/2017 8:36:19 AM
Updated	5/9/2017 11:00:47 AM
Description of request	This course provides students with basic concepts of the scientific process (e.g., inductive and deductive reasoning, foundations of inductive statistics, research design) as well as offering practice in critical thinking and avoiding the cognitive illusions and misapplied heuristics that can lead to invalid conclusions.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	PHHP - Speech, Language, and Hearing Sciences 313306000	Altmann, Lori J		5/4/2017
Added Scientific Thinking Syllabus REVISED APPROVED.docx					5/4/2017
College	Approved	PHHP - College of Public Health and Health Professions	HANSON, STEPHANIE L.		5/9/2017
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			5/9/2017
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

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Form version: 1

Responses

Recommended PrefixSPA
Course Level 3
Number XXX
Category of Instruction Intermediate
Lab Code None
Course Title Scientific Thinking
Transcript Title Scientific Thinking
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing No

Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic?No
Repeatable Credit?No

Amount of Credit3

S/U Only?No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description This course provides students with basic concepts of the scientific process (e.g., inductive and deductive reasoning, foundations of inductive statistics, research design) as well as offering practice in critical thinking and avoiding the cognitive illusions and misapplied heuristics that can lead to invalid conclusions.
Prerequisites None
Co-requisites None
Rationale and Placement in Curriculum BHS students are required to take a specific number of approved, upper-division college electives. However, there are few of these offered in the health sciences, and there are vanishingly few available for distance-learning BHS students. This course is intended to fill that gap.
Course Objectives Students will be able to:

- Differentiate between the types of questions that can potentially be answered by science and those that can't
- Identify what kinds of information are provided by scientific studies and what constraints exist
- Analyze popular reports of scientific findings for common errors
- Understand the need for statistical analysis and the basic concepts involved
- Relate how scientists determine which questions are interesting

- Identify common violations of logic and interpretation errors

Course Textbook(s) and/or Other Assigned Reading Popular press articles as well as other sources (tutorial articles, web pages, etc.) will be posted on elearning. It will be the responsibility of the student to regularly check elearning to see when readings and assignments are available.

Weekly Schedule of Topics Week Lecture Date Topic(s)
1 1 TBD

Introduction
1 2 TBD

The Art of Science
2 3 TBD

Theories and Hypotheses
2 4 TBD

Theories and Laws
3 5 TBD

Empirical Variables
Written Assignment #1 Due
3 6 TBD Guest Lecture by TBD on their Career Path and Research Questions
Online Commentary #1
4 7 TBD

Review & Whorfian Hypothesis
4 TBD In-Class Exam
5 8 TBD

Grants & Academic Scientists
5 9 TBD Empirical Based Approach to Studying: Science of Memory
6 10 TBD Guest Lecture by TBD on their Career Path and Research Questions
Online Commentary #2
6 11 TBD

Measurement Theory
7 12 TBD

Descriptive Statistics
Written Assignment #2 Due
7 13 TBD

Research Design
8 14 TBD Review & Confounding Variables
8 TBD In-Class Exam
9 15 TBD Correlation
9 16 TBD

Research Ethics
10 17 TBD Guest Lecture by TBD on their Career Path and Research Questions
Online Commentary #3
10 18 TBD

Conceptual Illusions

11 19 TBD Dr. Lotto's Science Journey
Online Commentary #4
11 20 TBD The Relationship Between Music and Language
Written Assignment #3 Due
12 21 TBD Review and Guest Lecture
12 TBD In-Class Exam
13 22 TBD Memes & Fads
13 23 TBD Guest Lecture by TBD on their Career Path and Research Questions
Online Commentary #5
14 24 TBD Great Scientific Ideas
14 25 TBD Explaining Science to the Public
15 26 TBD What Science Can and Cannot Tell Us
Written Assignment #4 Due
15 27 TBD Guest Lecture by TBD on their Career Path and Research Questions
Online Commentary #6

TBD Final Paper Due

Links and Policieshttp://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx
http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx
https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/
http://gradschool.ufl.edu/students/introduction.html
www.multicultural.ufl.edu
http://www.counseling.ufl.edu.
http://www.umatter.ufl.edu/.
https://evaluations.ufl.edu
https://shcc.ufl.edu/
https://evaluations.ufl.edu/results/.
http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx
http://www.dso.ufl.edu
Grading Scheme Exams: There will be 3 exams that will test knowledge of presented information as well as synthesis and application of this information to novel situations. Exams will be multiple-choice and short-answer format.

Written Assignments: There will be several written assignments during the semester. These assignments will be responses to particular questions based on a provided scenario. The purpose of these assignments is to determine your ability to present a reasonable argument for a position and to interpret data correctly. These assignments will be short (2 pages – double spaced). As a result, you will need to be concise and "to the point" in your writing.

A Final Position Paper will be due Finals Week. This paper will be slightly longer (4 pages) and will reflect your views of science at the end of the semester. **All written assignments must be written in Times New Roman Font (size 12), be double-spaced, and have one-inch margins around all sides.

Online Discussions: Throughout the semester you will be asked to provide short commentaries on lectures, guest lectures and readings. It is the responsibility of the student to regularly check elearning to determine if such a discussion is assigned and when it is due. These commentaries should be based on insights that the student has regarding the particular topic and questions that the lecture/reading raised in the mind of the student. The Instructor and TA's will look over these commentaries and choose some questions and comments to repeat in class (anonymously). In addition, some commentaries may receive extra points if they are outstanding in terms of the depth of the commentary.

Extra Credit: There are three ways to earn extra credit. The maximum number of total extra credit points that can be earned is 5 (total across the three extra credit types).

These points will be added after the total of all exams (curved), written assignments, and discussion scores have been added together (i.e., these points are added to your final grade).

(1) In-Class Clicker Questions - Students can obtain 1 extra credit point for responding in 80% of the classes that include clicker questions (whether or not they responded correctly).

(2) Experiment Participation - Students can obtain 1 extra credit point per hour (or part of an hour) for participating in experiments. A list of appropriate experiments with contact information will be posted on elearning. Signed forms must be turned in by the due date of the final paper to receive extra credit. Other experiments on campus may be appropriate substitutions. These experiments must be approved by the Instructor. **If a student signs up to participate and misses an experiment two times (or is more than 5 minutes late two times) without contacting the experimenter at least an hour prior to his or her designated time, the student will no longer be able to participate in experiments for extra credit.

(3) Research Papers - A three-page paper summarizing and evaluating a research article on speech, hearing, music or acoustics is worth 1 extra credit point. The paper must follow the same formatting as listed above for the written assignments. The article(s) must be pre-approved by the Instructor.

Grading

Requirement and % of final grade
Exam #1 20%
Exam #2 20%
Exam #3 20%
Final Paper 10%
Written Assignments 20%
Online Commentaries Throughout Semester 10%
Extra Credit (Date Final Paper is Due) +5%

Instructor(s) Andrew Lotto

University of Florida
College of Public Health & Health Professions Syllabus
SPA3XXX: Scientific Thinking (3 credit hours)
Fall: 2017
Delivery Format: On-Campus
Class Day/Time: TBD/TBD
Class Room: TBD

Instructor Name: Andrew J. Lotto, Ph.D.
Office Number: HPNP 2144
Phone Number: 294-5716
Email Address: alotto@phhp.ufl.edu
Office Hours: TBD; or by appointment
Preferred Course Communications: Email

PURPOSE AND OUTCOME

Course Overview: This course is about scientific thinking and an appreciation of the achievements and constraints of science. Whereas the examples will often be from the field of Speech, Hearing and Language Sciences, the course is a general introduction to the methods, techniques and art of science. Some of the course will be devoted to learning basic methods and concepts in scientific research such as experimental design, manipulation of independent and dependent variables and statistical analysis. However, the majority of the course is devoted to a discussion of how to interpret scientific findings, how to determine if a question is scientifically answerable and how to use science to inform therapies and our everyday lives, based on newly published articles featured in the press. The course is designed to be extremely interactive both during class time and online outside of class. Opportunities for practicing scientific thinking and intuition will be offered throughout in order to strengthen these mental abilities. In addition, participants will be provided opportunities to interact with scientists to appreciate their drive and passion and what questions they feel need to be answered in their field.

ASHA Standards Covered (Audiology):
IV-a11. Principles, methods, and applications of psychometrics
IV-a18. Principles and practices of research, including experimental design, statistical methods, and application to clinical populations
ASHA Standards Covered (Speech Pathology):
IV-F The applicant must have demonstrated knowledge of processes used in research and of the integration of research principles into evidence-based clinical practice.

Course Objectives:
Students will be able to:

- Differentiate between the types of questions that can potentially be answered by science and those that can't
- Identify what kinds of information are provided by scientific studies and what constraints exist
- Analyze popular reports of scientific findings for common errors
- Understand the need for statistical analysis and the basic concepts involved
- Relate how scientists determine which questions are interesting
- Identify common violations of logic and interpretation errors

Course Structure:
Classes will generally be lecture/discussions of two types: 1) Descriptions of concepts and definitions in science and research; and 2) guest lectures by scientists at various stages in their careers. Both types of lectures are expected to be interactive with plenty of opportunity to ask questions and make comments. In addition, discussion will be continued on the UF elearning system. Students will be asked to comment on the lectures on elearning.

DESCRIPTION OF COURSE CONTENT

Course Schedule (Topics are subject to Change)

Week	Lecture	Date	Topic(s)
1	1	TBD	Introduction
1	2	TBD	The Art of Science
2	3	TBD	Theories and Hypotheses
2	4	TBD	Theories and Laws
3	5	TBD	Empirical Variables *Written Assignment #1 Due*
3	6	TBD	Guest Lecture by TBD on their Career Path and Research Questions *Online Commentary #1*
4	7	TBD	Review & Whorfian Hypothesis
4		TBD	**In-Class Exam**
5	8	TBD	Grants & Academic Scientists
5	9	TBD	Empirical Based Approach to Studying: Science of Memory
6	10	TBD	Guest Lecture by TBD on their Career Path and Research Questions *Online Commentary #2*
6	11	TBD	Measurement Theory
7	12	TBD	Descriptive Statistics *Written Assignment #2 Due*
7	13	TBD	Research Design
8	14	TBD	Review & Confounding Variables
8		TBD	**In-Class Exam**
9	15	TBD	Correlation
9	16	TBD	Research Ethics
10	17	TBD	Guest Lecture by TBD on their Career Path and Research Questions *Online Commentary #3*
10	18	TBD	Conceptual Illusions
11	19	TBD	Dr. Lotto's Science Journey *Online Commentary #4*
11	20	TBD	The Relationship Between Music and Language *Written Assignment #3 Due*
12	21	TBD	Review and Guest Lecture
12		TBD	**In-Class Exam**
13	22	TBD	Memes & Fads

13	23	TBD	Guest Lecture by TBD on their Career Path and Research Questions *Online Commentary #5*
14	24	TBD	Great Scientific Ideas
14	25	TBD	Explaining Science to the Public
15	26	TBD	What Science Can and Cannot Tell Us *Written Assignment #4 Due*
15	27	TBD	Guest Lecture by TBD on their Career Path and Research Questions *Online Commentary #6*
		TBD	**Final Paper Due**

Course Materials

Popular press articles as well as other sources (tutorial articles, web pages, etc.) will be posted on elearning. It will be the responsibility of the student to regularly check elearning to see when readings and assignments are available.

Required i>clicker: You are required to have your own i>clicker response system, which can be purchased in the bookstore. You should bring your clicker to each class. These will be used for in-class quizzes and review sessions before each exam. While the in-class quizzes are not graded, they can contribute to your extra credit points (explained below).

ACADEMIC REQUIREMENTS AND GRADING

Assignments

Exams: There will be 3 exams that will test knowledge of presented information as well as synthesis and application of this information to novel situations. Exams will be multiple-choice and short-answer format.

Written Assignments: There will be **four** written assignments during the semester. These assignments will be responses to particular questions based on a provided scenario. The purpose of these assignments is to determine your ability to present a reasonable argument for a position and to interpret data correctly. These assignments will be short (2 pages – double spaced). As a result, you will need to be concise and "to the point" in your writing.

A Final Position Paper will be due Finals Week. This paper will be slightly longer (4 pages) and will reflect your views of science at the end of the semester. **All written assignments must be written in Times New Roman Font (size 12), be double-spaced, and have one-inch margins around all sides.

Online Discussions: Throughout the semester you will be asked to provide **six** short commentaries on guest lectures. These commentaries should be based on insights that the student has regarding the particular topic and questions that the lecture raised in the mind of the student. The Instructor and TA's will look over these commentaries and choose some questions and comments to repeat in class (anonymously). Commentaries will not be graded but must be completed to get credit.

Extra Credit: There are three ways to earn extra credit. The maximum number of total extra credit points that can be earned is 5 (total across the three extra credit types). These points will be added after the total

of all exams (curved), written assignments, and discussion scores have been added together (i.e., these points are added to your final grade).

(1) In-Class Clicker Questions - Students can obtain 1 extra credit point for responding in 80% of the classes that include clicker questions (whether or not they responded correctly).

(2) Experiment Participation - Students can obtain 1 extra credit point per hour (or part of an hour) for participating in experiments. A list of appropriate experiments with contact information will be posted on elearning. Signed forms must be turned in by the due date of the final paper to receive extra credit. Other experiments on campus may be appropriate substitutions. These experiments must be approved by the Instructor. **If a student signs up to participate and misses an experiment two times (or is more than 5 minutes late two times) without contacting the experimenter at least an hour prior to his or her designated time, the student will no longer be able to participate in experiments for extra credit.

(3) Research Papers - A three-page paper summarizing and evaluating a research article on speech, hearing, music or acoustics is worth 1 extra credit point. The paper must follow the same formatting as listed above for the written assignments. The article(s) must be pre-approved by the Instructor.

Grading

Requirement	Due date	% of final grade
Exam #1	TBD	20%
Exam #2	TBD	20%
Exam #3	TBD	20%
Final Paper	TBD	10%
4 Written Assignments	TBD	20% (5% for each assignment)
6 Online Commentaries	Throughout Semester	10%
Extra Credit	TBD (Date Final Paper is Due)	+5%

Point system used

Example:

Points earned	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	Below 60
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	WF	I	NG	S-U
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0.0	0.0	0.0	0.0	0.0

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at:
http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Exam Policy
The three exams will be the main method for assessing the knowledge base described in the ASHA standards listed above. The exams will take place at the time of the class in the assigned classroom.

Policy Related to Make up Exams or Other Work
Make up exams must be discussed with the instructor prior to the time of the originally scheduled exam. Please discuss any issues with the exam/assignment schedule as soon as possible. Late homework will be docked 10% on the score for each late day.

Policy Related to Required Class Attendance
Whereas attendance will not be recorded, attendance is expected and failure to attend will affect opportunities for class participation credit and the ability to write sufficient online commentaries.

For information regarding the UF Attendance Policy see the Registrar website for additional details:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity. As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge:

"**We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity**."

You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

"On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For additional information regarding Academic Integrity, please see Student Conduct and Honor Code or the Graduate Student Website for additional details:
https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/
http://gradschool.ufl.edu/students/introduction.html

Please remember cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior.

Inclusive Learning Environment
Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: www.multicultural.ufl.edu

Online Faculty Course Evaluation Process
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

SUPPORT SERVICES

Accommodations for Students with Disabilities
If you require classroom accommodation because of a disability, you must register with the Dean of Students Office http://www.dso.ufl.edu within the first week of class. The Dean of Students Office will provide documentation of accommodations to you, which you must then give to me as the instructor of the course to receive accommodations. Please make sure you provide this letter to me by the end of the second week of the course. The College is committed to providing reasonable accommodations to assist students in their coursework.

Counseling and Student Health
Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: http://www.counseling.ufl.edu. On line and in person assistance is available.
- You Matter We Care website: http://www.umatter.ufl.edu/. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: https://shcc.ufl.edu/
- Crisis intervention is always available 24/7 from:
  Alachua County Crisis Center:
  (352) 264-6789
  http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.