General Education Assessment Workbook

Brooklyn College
The City University of New York

Scientific World 2019-2020

The Office of Educational Research and Assessment

Brooklyn College General Education Assessment Workbook
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Brooklyn College General Education Assessment Workbook

This workbook was created to facilitate General Education assessment at Brooklyn College. The workbook includes several tools – the Pathways list of Scientific World outcomes, a sample rubric for evaluating the three core outcomes of the Flexible Core, worksheets to assist faculty with evidence of validity, and the submitted Pathways applications for reference and recommendations on methodology for those participating in assessment. Additionally, the workbook has a timeline for Brooklyn College's General Education assessment through 2025. This workbook is for the Flexible Core competency, Scientific World, thus all the documents Scientific World-specific. We hope that you find the contents of this workbook useful.

The Office of Educational Research and Assessment

List of Commonly Used Terms

Assessment Tool: The form, test, rubric, etc. that is used to collect data for an outcome or set of outcomes.

Construct Validity: Construct Validity is the broadest form of validity; refers to the "concept or characteristic that an assessment is designed to measure" (AERA, APA & NCME, 2014).

Locally Developed Exam (LDE): An exam created locally, usually at an institution.

OSLO: In reference to the Pathways assessment efforts, an OSLO is an Optional SLO to be selected by the department chair for assessment. In the case of the 2019-2020 General Education assessment effort, Scientific World must assess required outcomes 1 through 3, as well as one additional OSLO from outcomes 4 through 8. CUNY Pathways policy states that a course in the Flexible Common Core must meet at least three of the OSLOs along with the three required SLOs.

Outcomes: The student results of programs including behaviors, knowledge, skills, and level of functioning. They are usually measured as a test or other assessment method, such as a performance appraisal.

Performance Appraisal: The assessment of student performance on an assignment such as a paper, project, or presentation. Performance appraisals may be assessed/evaluated via an assessment tool such as a rubric.

Rubric: A rubric is a tool used in assessing student artifacts, e.g., oral exams, research papers, and capstone projects. Assessment rubrics are useful because they list clear expectations of student performance and provide a way to rate student work.

SLO: Student Learning Outcomes (SLOs) are behavioral statements that specify what students will learn or can do as a result of a learning program, process, or curriculum.

Test Blueprint: A document aligning test items on a locally developed exam to the learning outcomes that the test is assessing.

Validity: The degree to which evidence and theory support the interpretations of test scores or assessment results for proposed uses. There are many types of validity and sources of evidence.

Brooklyn College
General Education
Assessment Overview: Scientific World

How was Your Course Selected?

Brooklyn College believes that a strong assessment program will result in improved student learning outcomes.

The Faculty Council General Education Committee selected the Scientific World Pathways competency - to which your course belongs - for assessment this semester. Your department chair in conjunction with the assessment coordinator selected your course section for assessment. Your participation is very important to obtain meaningful, representative results.

More information on courses within Brooklyn College's eight competencies, the College Option, and General Education/Pathways is available at https://www.brooklyn.cuny.edu/web/academics/general/pathways.php.

You can find the Pathways SLOs for the various competencies at: https://www.cuny.edu/wp-content/uploads/sites/4/page-assets/about/administration/offices/undergraduate-studies/pathways/gened/flex-commoncore/Additional_Information_About_the_Flexible_Common_Core_rev.pdf.

For Flexible Core courses such as those in Scientific World, everyone must assess the three common SLOs for Flexible Core competencies. In addition, your department chair and department assessment coordinator have selected an additional SLO from the Flexible Core competency's list of outcomes to be assessed. For additional information on CUNY Pathways competencies and their associated SLOs, please visit https://www.cuny.edu/about/administration/offices/undergraduate-studies/pathways/gened/.

All eight outcomes for Scientific World are listed on page 8 of this workbook.

A detailed timeline for the Pathways assessment process by semester is outlined in the table on the next page.

A Detailed Timeline of General Education Assessment[1]

Action	Responsible Parties	Timeline for Fall semester assessment	Timeline for Spring semester assessment
Selection of General Education Requirement and/or Thematic Area of Flexible Core	Committee on General Education, Coordinator of General Education	Early February	Early October
Notification of departments	Meetings between department chairs, Coordinator of General Education, and Assessment team to discuss departments' involvement in the assessment of general education courses during the next semester	February-March	October-November
Selection of OSLO for assessment	Department chair and/or department assessment coordinator(s), based on department assessment practices[2]	April-May	November-December
Selection of sections for assessment	Department chair and department assessment coordinator(s)	April-May	November-December
Informing of relevant instructors	Department chair and department assessment coordinator(s)	May, or upon hiring	December, or upon hiring
Consulting Meeting(s)	Interested departments, Assessment team, and/or General Education Coordinator	Early September	Early February
Selection of assignment(s) for assessment: Locally Developed Exam (LDE) or Performance Appraisal	Department chair, department assessment coordinator(s)[3], and relevant instructors	September	February
Test Blueprint for LDE or Rubric Selection/Design for a Performance Appraisal	Department chair, department assessment coordinator(s)[3], and relevant instructors	September	February
Assignment Finalization	Department chair, department assessment coordinator(s)[3], and relevant instructors	Early October	Early March
Submission of completed Validity Worksheets	Relevant instructors	Early October	Early March
Data Collection	Department assessment coordinator(s), relevant instructors	October through December[4]	March through May/June[4]
Submission of Data	Department assessment coordinator(s), relevant instructors	December[4]	May/June[4]
Analysis of results and submission to Gen Ed Coordinator	Department chair and/or department assessment coordinator(s)	Due the first week in March	Due the first week in October

[1]Timeline developed by the Brooklyn College General Education Coordinator

[2] As assessment of the General Education curriculum proceeds, the Committee on General Education and Coordinator of General Education will provide feedback to department chairs regarding program-level assessment of the general education program.

[3] The Office of Educational Research and Assessment and The Coordinator of General Education are available to facilitate, if desired by the department.

[4] The assessment timing of courses depends on the course and department. The assignment(s) used for assessment may be administered at any time during the semester, but preferably after the consulting meetings (if applicable) and before faculty go off contract.

The Brooklyn College General Education/Pathways Assessment Cycle Planned Through Spring 2025[1]

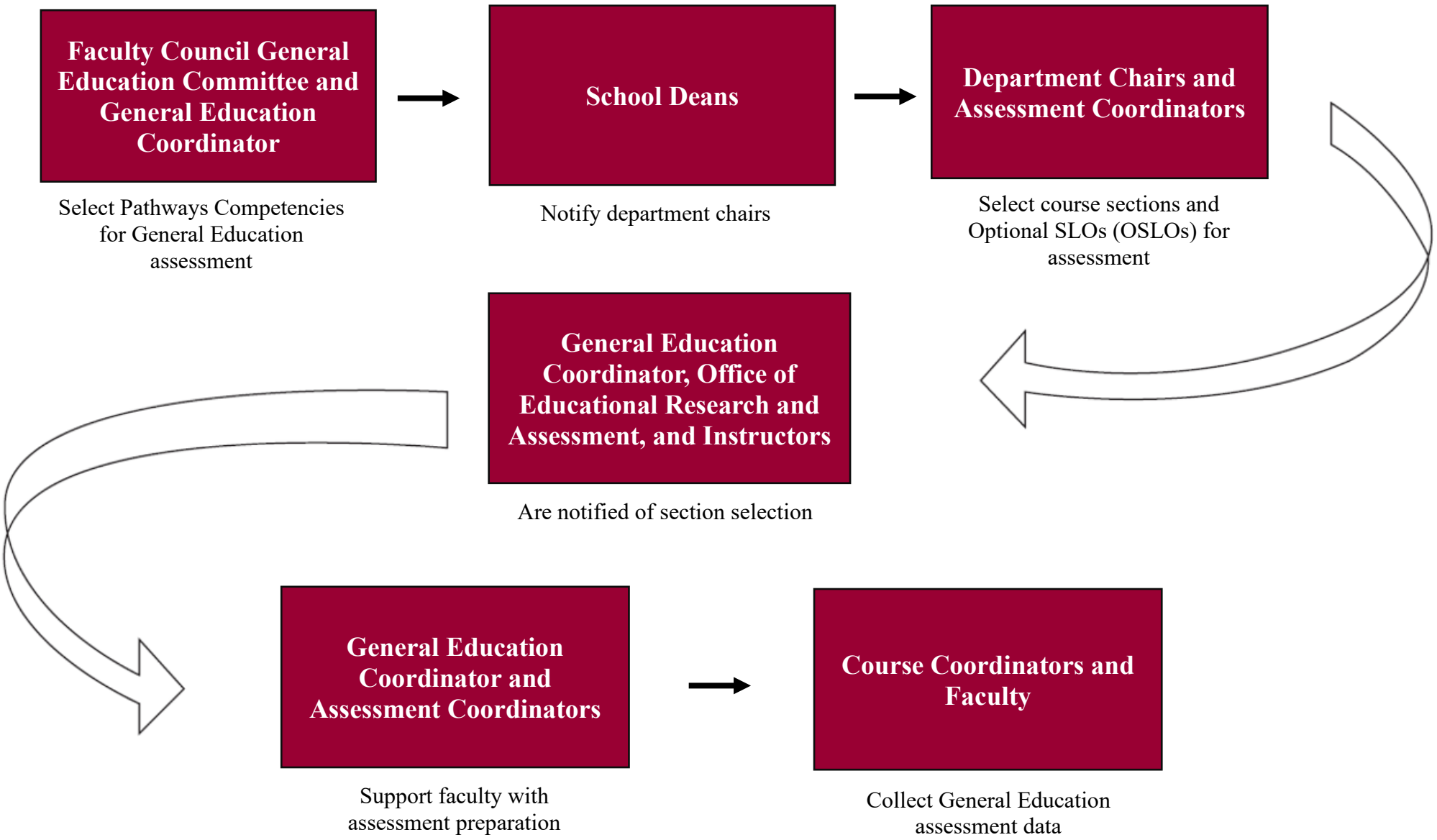
Pathways Competency	General Education/ Pathways Competency	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023	Fall 2023	Spring 2024	Fall 2024	Spring 2025
English Composition	Required Core	II		CA	DC	AEI	II			CA	DC	AEI
Mathematical and Quantitative Reasoning	Required Core	II		CA	DC	AEI	II			CA	DC	AEI
World Cultures and Global Issues	Flexible Core			CA	DC	AEI	II			CA	DC	AEI
Creative Expression	Flexible Core	CA	DC	AEI	II			CA	DC	AEI	II	
Inter-Cultural Competency	College Option	CA	DC	AEI	II			CA	DC	AEI	II	
Life and Physical Sciences	Required Core	CA	DC	AEI	II			CA	DC	AEI	II	
Scientific World	Flexible Core	CA	DC*	AEI	II			CA	DC	AEI	II	
Individual and Society	Flexible Core					CA	DC	AEI	II			CA
U.S. Experience in Its Diversity	Flexible Core					CA	DC	AEI	II			CA

Code for Abbreviations
DC = Semester of Data Collection
AEI = Analysis of data, evaluation of report, and drafting of improvement plan
II = Implementation of improvement plan
CA = Communication Regarding Next Data Collection

Notes:1. Cycle developed by the Brooklyn College General Education Coordinator

2. If a course scheduled for assessment is not offered during the fall semester, data should be collected the following spring semester

Launching the General Education Assessment Cycle



Scientific World Outcomes

Student Learning Outcome (SLO)	Required or Optional for Assessment*
1. Gather, interpret, and assess information from a variety of sources and points of view.	Required
2. Evaluate evidence and arguments critically or analytically.	Required
3. Produce well-reasoned written or oral arguments using evidence to support conclusions.	Required
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Optional
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Optional
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Optional
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Optional
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Optional

**All required SLOs and at least one Optional SLO (OSLO) must be assessed in each approved Pathways course*

Steps in Gen Ed Assessment for Participating Faculty & Course Coordinators

Step 1: Confirm the Pathways Competency being assessed this semester

- Contact your department chair and/or assessment coordinator to confirm your section's participation in this semester's Pathways administration. A full list of selected Pathways sections is available on the Brooklyn College Assessment webpage.
  This list shows all selected sections by Pathways competency by semester.
- A list of all Flexible Pathways SLOs, by competency, can be found at https://www.cuny.edu/wp-content/uploads/sites/4/page-assets/about/administration/offices/undergraduate-studies/pathways/gened/flex-commoncore/Additional_Information_About_the_Flexible_Common_Core_rev.pdf.

Step 2: Get to know your assessment coordinator.

- A list of assessment coordinators by department is available on page 13.

Step 3: Consult with your department chair and assessment coordinator regarding the OSLO for your course.

Step 4: Assessment Coordinators and Course Coordinators attend General Education/ Pathways Orientations.

- Orientations are held during the second week of the semester.
- Orientations are led by the General Education Coordinator
- Orientations cover the assessment process, the development, adaptation, or selection of assessment tools and assignments, and assessment due dates and deliverables.

Step 5: Consult with your Assessment Coordinator and Course Coordinator (if applicable) regarding:

- Development, adaptation, or reaffirmation of an assignment or test items that will be used to assess your students for the assigned Pathways competency.
  - Assignment development coordination depends on departmental assessment structure, so assignments may be department-wide or section-specific.
  - You are welcome to use the Assignment Worksheet in this workbook to review your assignment to ensure that it is assessing the appropriate General Education Outcomes.
- Development, adaptation, or reaffirmation of a rubric for a performance appraisal or a test blueprint for a locally developed exam to be used for assessing your students for the assigned Pathways competency.
  - Rubric development coordination depends on departmental assessment structure, so rubrics may be department-wide or section-specific.

- You are welcome to use the Sample Scientific World Rubric for guidance in developing a rubric for the assessment of the appropriate General Education Outcomes.
- You are welcome to use the Example Test Blueprint for guidance in developing exam questions and a test blueprint for the assessment of the appropriate General Education Outcomes.

Step 6: Submit or review the rubric and assignment that will be used to assess your students for the assigned Pathways competency along with a completed Validity Sheet (if applicable).

- This rubric and assignment may be department-wide or section specific. This depends on departmental assessment structures and is determined by your department chair (see Step 5).
- A completed Validity sheet can be submitted to your assessment coordinator, the General Education Coordinator, and the Office of Educational Research and Assessment at IE@brooklyn.cuny.edu.
  - Faculty may use the provided Validity form from this workbook to complete their Validity exercise if they find the exercise helpful.
- If you are assessing your students using a locally developed exam (LDE), please submit along with your test blueprint.

Step 7: Score Student Work

Step 8: Submit your data to your assessment coordinator before grades are due.

Still have questions?

If you still have any questions, please email the Office of Educational Research and Assessment at IE@brooklyn.cuny.edu, or contact your General Education Coordinator, Professor Caroline E. Arnold, at CArnold@brooklyn.cuny.edu. We are always available to assist you with your

2019-2020 General Education Calendar of Important Dates

October 2019:

The General Education Committee and General Education Coordinator select the General Education Requirement Selection and/or Thematic Area of the Flexible Core for spring 2020.

November 2019:

- Department chairs are notified of participation in the spring 2020 Pathways administration.
- Department chairs and/or assessment coordinators (depending on the departmental assessment structure) select their OSLO for assessment for the spring 2020 Pathways administration.

December 20th, 2019:

- Deadline for selection of sections for assessment by department chairs and/or assessment coordinators. Selections are sent to the General Education Committee & General Education Coordinator. The General Education Coordinator sends the consolidated list of selections to the Office of Educational Research and Assessment.
- Faculty are notified of the course sections' participation in the spring 2020 Pathways administration by department chairs and/or assessment coordinators.

Week of February 3rd, 2020:

- Pathways/General Education Assessment Orientation Meetings
    - Department/program assessment coordinators and course coordinators attend orientation meetings to familiarize themselves with the assessment process, due dates, and deliverables.
    - The meetings are led by the General Education Coordinator and the Office of Educational Research and Assessment.
    - The meetings provide guidance to faculty on assignment and rubric selection/modification for Pathways assessment.

March 6th, 2020:

- Assignments are finalized for Pathways assessment by faculty and submitted to the department chair and/or assessment coordinator.
- Rubrics or locally developed exams with a test blueprint are finalized by faculty and submitted to the department chair and/or assessment coordinator.

March 13th, 2020:

- Assessment coordinators can submit completed Validity worksheets to the General Education Coordinator and the Office of Educational Research and Assessment if they wish.

(continued on the next page →)

May 28th, 2020:
Faculty must submit all their assessment data to their assessment coordinator.

October 2nd, 2020:
Spring 2020 Pathways results analysis is submitted to the General Education Assessment Coordinator by the department chairs and/or assessment coordinators.

Assessment Coordinators for Scientific World Courses

Department	School	Name	Role
Anthropology and Archeology	School of Natural and Behavioral Sciences	Kelly Britt	Assessment Coordinator
Chemistry	School of Natural and Behavioral Sciences	Laura Juszczak	Assessment Coordinator
Computer Science (GR)	School of Natural and Behavioral Sciences	Jim Cox	Assessment Coordinator
Computer Science (UG)	School of Natural and Behavioral Sciences	Michael Mandel & Katherine Chuang	Assessment Coordinators
Earth & Environmental Sciences	School of Natural and Behavioral Sciences	Kennet E. Flores	Assessment Coordinator
Health and Nutrition	School of Natural and Behavioral Sciences	Susan Jakuboski	Assessment Coordinator
Physics	School of Natural and Behavioral Sciences	Micha Tomkievicz	Assessment Coordinator

General Education Assessment Worksheets and Examples

General Education Assessment Checklist for Participating Faculty

Send all documents to Professor Caroline Arnold at CArnold@brooklyn.cuny.edu. Dates reflect deadline extensions recommended by Professor Arnold at the start of the Spring 2020 semester.

February 10th, 2020

☐ Confirm section participation via your department chair.

☐ Confirm the OSLO chosen by your department chair and/or assessment coordinator.

☐ **Assessment coordinators:** Send list of participating sections and OSLOs to the General Education Coordinator.

February 18th, 2020

☐ Identify the assignment(s) being used for each course/section and complete the "Assignment Worksheet" and "Validity Worksheet" (if applicable).

March 6th, 2020

☐ Submit your assignment and completed "Validity Worksheet" (if applicable) or exam/quiz with completed test blueprint form to your assessment coordinator.

March 13th, 2020

☐ **Assessment coordinators:** Send submitted Validity Worksheets and assignments or exams with test blueprint forms to the General Education Coordinator.

May 28th, 2020

☐ Submit assessment data to assessment coordinators and department chair

October 2nd, 2020

☐ **Assessment coordinators:** submit analyzed assessment data to the General Education Coordinator.

Which Scientific World SLOs Will You Assess?

Please check the box next to the Scientific World outcomes that you will assess, as directed by CUNY requirements (for required SLOs) and your department chair and/or assessment coordinator (for OSLOs)

Student Learning Outcome (SLO)	Please check the box for each SLO you will assess
1. Gather, interpret, and assess information from a variety of sources and points of view.	☑
2. Evaluate evidence and arguments critically or analytically.	☑
3. Produce well-reasoned written or oral arguments using evidence to support conclusions.	☑
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	☐
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	☐
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	☐
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	☐
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	☐

SAMPLE SCIENTIFIC WORLD RUBRIC

Adapted from AAC&U LEAP Rubrics affirmed by MSCHE for General Education assessment

Scientific World Pathways Outcomes (Required SLOs for Assessment)	Highest			Lowest
1. Gather, interpret, and assess information from a variety of sources and points of view.	[1]Synthesizes in-depth information from relevant sources representing various points of view/approaches.	Presents in-depth information from relevant sources representing various points of view/approaches.	Presents information from relevant sources representing limited points of view/approaches.	Presents information from irrelevant sources representing limited points of view/approaches.
2. Evaluate evidence and arguments critically or analytically.	[1]Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/or is unrelated to focus.
	[2]Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows and emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
3. Produce well-reasoned written or oral arguments using evidence to support conclusions.	[1]States a conclusion that is a logical extrapolation from the inquiry findings.	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.	States an ambiguous, illogical, or unsupportable conclusion from inquiry findings.
	[2]Communicates, organizes and synthesizes information from sources to fully achieve a specific purpose, with clarity and depth.	Communicates, organizes and synthesizes information from sources. Intended purpose is achieved.	Communicates and organizes information from sources. The information is not yet synthesized, so the intended purpose is not fully achieved.	Communicates information from sources. The information is fragmented and/or used inappropriately (misquoted, taken out of context, or incorrectly paraphrased, etc.), so the intended purpose is not achieved.
	[3]Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.

1. This row's mastery level descriptors come from the Inquiry and Analysis AAC&U LEAP Rubric
2. This row's mastery level descriptors come from the Information Literacy AAC&U LEAP Rubric
3. This row's mastery level descriptors come from the Critical Thinking AAC&U LEAP Rubric

An Example of a Test Blueprint

For courses where there is no common exam or instructors wish to use quizzes and individually-developed test items for assessment, a *Test Blueprint Items Form* is provided in Appendix A.

Student Learning Outcomes	Course Learning/ Objective Outcomes	Bloom's Taxonomy Classification	Number of Test Items	Point Value	(%) weight of test
Demonstrate mastery of the theoretical and practical knowledge of electrical and electronic circuits and systems	Define and identify the basic components of a microprocessor such as: CPU, ROM, RAM, CLOCK, Word-size, Communication Busses, lead outputs, Power requirements, etc.	Knowledge Comprehension	1 1	2 4	4 8
	Write, run, single step and flow chart a source code program	Knowledge Comprehension Analysis	1 1 1	2 4 10	4 8 17
Identify, formulate, and present solutions to practical technical problems in a variety of specialty areas related to electrical engineering technology programs	Follow the logic and flow of information in a program	Knowledge Comprehension Analysis	1 1 1	2 4 10	4 8 17
	Use the microprocessor to solve an array of typical practical problems (timing, control, and output)	Knowledge Comprehension Evaluation	1 1 1	2 4 10	4 8 18
		Total	**11**	**54**	**100**

Adapted courtesy of NYCCT CUNY. For Bloom's Taxonomy, please see Appendix B.

Assignment Worksheet for Scientific World

Name: _____ Department: _____

1. **Please describe the assignment you plan to use with the General Education assessment.**

_____

_____

_____

_____

2. **Please review the assignment and verify the assignment addresses the performance criteria by checking the box on the right. Please note that outcomes 1 through 3 are required, and that an additional student learning outcome (from outcomes 4 through 8) has been selected for assessment by your department chair.**

1. Gather, interpret, and assess information from a variety of sources and points of view. ☐
2. Evaluate evidence and arguments critically or analytically. ☐
3. Produce well-reasoned written or oral arguments using evidence to support conclusions. ☐
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies. ☐
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions. ☐
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory. ☐
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities. ☐

(*continued on the next page* →)

8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role. ☐

Validity Worksheet for Sample Scientific World

Course/Section/Assignment Sample:_____

Instructions: Please read over the submitted assignment carefully and familiarize yourself with the Scientific World outcomes. Please document how the assignment and instructions will cover each of the following outcomes. You are welcome to used the Sample Scientific World Rubric for reference.

1. Gather, interpret, and assess information from a variety of sources and points of view.

_____

_____

_____

_____

2. Evaluate evidence and arguments critically or analytically.

_____

_____

_____

_____

3. Produce well-reasoned written or oral arguments using evidence to support conclusions.

_____

_____

_____

_____

4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.

_____

_____

_____

_____

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5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.

6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.

7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.

8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.

Course Pathways Application
Outcome Descriptions

These descriptions are provided here for reference and as suggestions or ideas for identifying or developing the assessment for Scientific World. Appendix B contains full Pathways applications and submitted sample syllabi

ANTH 1205 (Cross-listed with CHEM 1037)

Flexible Outcomes	Pathways Application Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will learn and or apply methodologies in biological sciences, statistics, and chemical analysis, all within the framework of the scientific method. For example, they will learn and apply biological (e.g., morphometric) and statistical (e.g., regression analysis) methodologies for assessing stature and sex based on skeletal elements such as crania and femora. Students will be tested on this material on the bone quiz, all three exams, and based on the analyses and results that they will present in their group projects.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will statistically analyze quantitative data (e.g., morphometric data such as the length of long bones) to understand and interpret human skeletal variation and to evaluate pre- and post-mortem modification (student projects).
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Forensic science refers to any application of science used in a legal context. Forensic scientists analyze physical evidence that may include material collected at the crime scene or biological samples obtained from either the victim, the alleged perpetrator, or in some instances both. This course will offer an introductory level assessment of the various ways this evidence is obtained, preserved, analyzed, and used in a court of law. This course is designed to provide students with a basic understanding of the techniques used by forensic scientists and will equip them with the skills necessary to critically evaluate how both practitioners and lawmakers apply them to criminal and civil law. Further, this course will familiarize students with the unique ethical considerations that accompany working in such fields. Students will demonstrate that they are proficient in these areas by producing an in-class presentation based on primary literature, and by passing the bone quiz and the three exams.

ANTH 2205

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	The students will be introduced to biological, statistical and chemical methodologies,.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will apply quantitative data in understanding and interpreting the human skeleton including how to evaluate pre and post mortem modification.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	The students will be introduced to the chain of evidence methodologies and how scientific data can be generated and used in a court of law.

CHEM 1011

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will study the mechanism of action of different drugs and their role in human health. Lectures and readings activities will describe fundamental concepts in drug development, the biochemistry behind the action of selected pharmaceuticals and the statistics supporting their efficacy. This will include discussion of the nature of a range of illnesses and the mechanisms of drug action that address them. Methods by which mechanisms of action are elucidated will be briefly discussed. Biochemical and concepts will be applied to the interpretation of clinical studies supporting drug approval.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will be required to read primary scientific literature and a range of books and overviews of topics related to biochemistry, healthcare and medicine. Students will be asked evaluate the studies' validity based on the statistical data presented. Furthermore, students will be asked to analyze the evidence supporting policy modification suggestions of their own in three papers throughout the term.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Students will review case studies related to drug development and marketing and their influence on population health, including the procedures used by the US FDA to ensure safety and efficacy (see syllabus for detailed content and delivery schedule). Discussion will include both technical and ethical issues.

CHEM 1012

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will identify the most important concepts in chemistry as crucial for the arts and studies of archaeological artifacts. They will apply this knowledge in understanding of chemistry basics behind materials used in the arts, art preservation, art authentication, and archaeological artifacts analysis. Students' responses will be in the in-class problem sets, project reports, and exams.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will analyze several cases of art restoration and art forgery. They will demonstrate (in their in-class problem sets and particularly in the project reports) how chemical methods and techniques, based on modern technologies, aid art experts in solving the problems of object of arts deterioration and in cases of art authentication. Specifically, students will pair appropriate chemical methods, techniques and instruments with specific cases of preservation of objects of the arts and archaeology, and with specific cases of art authentication.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Based on the scientific theory of the relationship between the composition of a chemical compound and its color, students will examine chemical composition of several inorganic pigments and explain their colors (in-class problem sets).
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Students will learn about novel techniques and technologies in chemistry that can be used in radioactive dating of archaeological artifacts, in restoration of art objects, and authentication of art objects. They will describe these techniques and technologies in their reports.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Students will gain knowledge of basic principles of chemistry as well as chemistry methods and techniques, as it applies to the arts and archaeology. Based on this knowledge they will understand the scientific principles underlying matters of public concern, such as environmental challenges, economic and legal issues related to art deterioration due to air and water pollution, art preservation, art authentication, and archaeological artifacts preservation and analysis. Students will write about these issues in their project reports.

CHEM 1037 (Cross-listed with ANTH 1205)

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Lectures, readings, and guided in-class activities will identify fundamental concepts in Forensic Science. These concepts (principles of physical science) will be applied to the interpretation of criminal evidence. These goals will be achieved through classroom demonstrations and investigations, including but not limited to the following activities: Fingerprints: a class room demonstration/activity. Student participants will make both flat and rolled prints. The activity will also include the dusting and lifting of prints and the transfer of such prints to individual print cards. Impressions: This demonstration/activity will make use of various types of footwear and bicycle tires. Using long sheets of Butcher paper and ink, instructor/student participants will demonstrate how important impressions are to a criminal investigation. Accuracy of Witness testimony. This activity will involve showing the class a series of slightly altered photographs. The second doctored image will vary only slightly from the first but in a manner that would be crucial to the outcome of the case. Students will write down what items they believe have been changed; when the responses are reviewed, they will understand how numerous people can witness the same crime but in a different way.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	The study of forensic science inherently demonstrates the connection between a question of interest in a criminal proceeding and the means by which scientific study can address it. Since this class will be run in a regular lecture room, no experimental work (even in a demonstration form) is permitted due to safety concerns. Students will watch and analyze short videos from variety of scientific disciplines; these videos will come from the sources that include the Environmental Protection Agency, the American Chemical Society, the US Food and Drug Administration, NASA, and others. Presented videos will not involve criminal cases but they will highlight techniques, technologies and procedures employed by scientific investigators across all disciplines. Examples will include GC-MS detectors used in airports for explosive testing, pH in-field detectors used for preliminary drug testing, etc. Students' in class discussion will be focused on possible applications of the presented techniques in the science of forensics.

6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	The course will show both the means by which physical science can address questions of legal interest, and how the limits of scientific certainty can create legal and ethical challenges for those participating in the process. The knowledge of the Scientific Method will help students to understand the science behind many of the critical issues that face our society today, including but not limited to: air and water pollution, global warming and climate change, use of DNA analysis in the Innocence project, airport security procedures, and the use of polygraphs in courtrooms. Students will discuss two/three of the above topics during the class, with a focus on basic science behind them. One of four in-class quizzes will ask for a list of scientific methods and principles that are crucial for better understanding of these critical issues.

CISC 1003

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Use methods of computer science in programming and debugging robotic programs and the integration of the physical and logical. Use methods of physics and mathematics in understanding the operation of robots and how they can be controlled. Using psychological fundamentals in understanding methods of integrating sensory data with action in in feedback loops. Logical analysis of programs and reasoning about methods of correctly deploying robot capabilities.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Use programming and logical reasoning and mathematical analysis in analyzing the problem of enlisting the robot in practical task and producing solutions in such diverse areas as controlling robots (Project 1; weeks 2-3), the Arts (Project 2, weeks 4-5); search and rescue (Projects 3 and 5; weeks 6-7, 11-14) and housekeeping (Project 4; weeks 8-10).
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Create programs that assert the theory that the programs can solve specific problems and then assess the empirical evidence demonstrated by robot operation. Validate the theory that robotics is a feasible and valuable field of study and endeavor.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Discussions of ethics of the use of robots and their effect on human activity and the ethics involved in working in teams. Security area of search-and-rescue.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Discussion of effect of robotics on both productivity and employment. Use of robotics in measuring environmental health, human health and in performing tasks in environments toxic to humans, including exploration of the solar system and the universe.

EESC 1050

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will learn to evaluate the various impacts that society has on ocean processes including the effects of a warming climate, increasing ocean acidification, sustainable fishing practices, energy from the sea and transportation.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Students will learn the pros and cons of various uses of the oceans including oil exploration, fishing, aquaculture, medicines from the sea and how science informs management concerning the health of the oceans.

HNSC 1100

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will understand and apply basic concepts of epidemiology (e.g., morbidity and mortality rates, life expectancy) in describing the major causes of death and disability in the US (e.g., cardiovascular disease, cancer). Students will identify and explain how selected diseases and conditions (e.g., cardiovascular disease, cancer, accidents, mental illness, sexually transmitted infections, drug use and abuse) develop and may be prevented.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Students will understand the biological basis of cancer processes (e.g., stages of tumor development, role of DNA, impact of carcinogens/anti-carcinogens) and articulate how emerging cancer research impacts medical and public health policy regarding such issues as gene mutation screening, group-specific risk assessment and intervention, and environmental regulation. Students will evaluate different methods of contraception and illustrate knowledge of controversies surrounding the methods.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Students will describe the role of scientific knowledge in the creation of policies about topics such as the availability of firearms, the legalization of cannabis, abortion policy, etc.

HNSC 1200

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will calculate their energy, protein, vitamin and mineral requirements and using nutritional analysis software, and will compare their intake to their recommended requirements.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Based on gender, age and body composition, students will calculate their nutritional intake, evaluate their diets and plan a program to reach their recommendations based on the Dietary Reference intakes. Using the Nutrition Facts panel on a food label, students will be asked to calculate amounts of macro and micro nutrients, compare them to daily values and valuate nutritional content claims.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Throughout the semester, class discussion will focus on the role of the food industry transforming our food supply and the impact on the health of our nation, including rising rates of obesity and diabetes. We discuss the science underlying these changes and steps individuals can take to mitigate these effects. Students are required to post responses on Blackboard.

PHYS 1005 (Formerly PHYS 1331)

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will learn and apply Newton's laws, the law of gravitation, concepts of work and energy.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will practice their analytical problem solving skills. Also, in lab students will learn how to precisely use simple measurement equipment such as rulers and timers.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will learn about the processes through which physical ideas and theories were developed. Much of this process involves the careful comparison of theory to experiment.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Some groups will choose to study such topics as nuclear weapons or energy in an environmental context.

PHYS 1040

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Midterm and final exams on the history of 19th and 20th Century discoveries which led to our understanding of the atomic nucleus, and our ability to tap into the energy contained in it. See sample exam question 1 in Appendix C.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Exams and homework assignments illustrating how experimental techniques were developed to probe the atom and how statistical methods were used to estimate macroscopic effects of nuclear reactions. See sample exam question 2 in Appendix C.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Exams, in-class discussion, and term paper assignments related to an extensive historical analysis of Hiroshima, the factors related to the decision to drop the bomb, and the ethical arguments pro and con that decision. See, for example, sample assignment 3 in Appendix B.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	

PHYS 1070

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	The course on Cosmology includes the history of the constantly changing views of the universe. The views include past cultural as well as scientific views. The Earth as the center of the universe is continually challenged going from Earth centered, to the Sun centered, to our galaxy (Milky Way), to the observable universe and even includes multiple universes.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	About half of the students are without necessary background in basic sciences that include mathematics, Chemistry, Physics and some biology. Students are getting the necessary background in the sciences to understand the cosmology. Necessary areas in Mathematics include some Algebra, Scientific notations and logarithmic presentations.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will learn how the scientific method and its reliance on observation and refutability was applied to gain a consistent understanding of the structure of the universe and the processes that take place there. They will learn to understand that human intuition has limits that need to be overcome through observations.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	The last part of the course focused on Astrobiology and the effort to look for life on other planets. Students will discuss what it will take to save the human race following destruction of livable conditions on Earth.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	As part of the Astrobiology introduction the course makes connection with relevant matter of policies in an attempt to provide alternative habitat for the possibility that humans will make this planet uninhabitable.

PHYS 1080

Flexible Outcomes	Pathways Application Submission Outcome Descriptions
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	First half of the course is structured so students with no background in science can understand climate change from first principles. Students will demonstrate their mastery through the weekly iRAT and tRAT quizzes.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	About half of the students are without necessary background in basic sciences that include mathematics, Chemistry, Physics and some biology. Students are getting the necessary background in the sciences to understand the cosmology. Necessary areas in Mathematics include some Algebra, Scientific notations and logarithmic presentations.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Students will learn how to replace present fossil fuel economies with sustainable energy alternatives. Students will learn the technical issues and the economic consequences of such transition.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	During the second half of the semester students will analyze policies related to an important contemporary issues, such as the Presidential election or the 2015 COP21 Paris meeting, on future sustainability of the physical environment. Relevant contemporary policy issues are anchored in the most recent national or international reports that students learn to evaluate critically.

Appendix A

Test Blueprint Items Form for Scientific World Instructors

Course, Section, & Instructor Name	Scientific World Outcome	Which exam/quiz will be used to assess the outcome?	Which items on the exam/quiz will be used to assess the outcome? (Please list all that apply)
	1. Gather, interpret, and assess information from a variety of sources and points of view.		
	2. Evaluate evidence and arguments critically or analytically.		
	3. Produce well-reasoned written or oral arguments using evidence to support conclusions.		
	4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.		
	5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.		
	6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.		
	7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.		
	8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.		

Appendix B

Bloom's Taxonomy

Level	Definition	Sample verbs					Sample behaviors
Knowledge	Student recalls or recognizes information, ideas, and principles in the approximate form in which they were learned.	arrange define describe duplicate	identify label list match	memorize name order outline	recognize relate recall repeat	reproduce select state	The student will define the 6 levels of Bloom's taxonomy of the cognitive domain
Comprehension	Student translates, comprehends, or interprets information based on prior learning.	classify convert describe defend discuss distinguish	estimate explain express extend generalize give	example(s) identify indicate infer illustrate locate	predict paraphrase recognize rewrite review select	summarize translate	The student will explain the purpose of Bloom's taxonomy of the cognitive domain.
Application	Student selects, transfers, and uses data and principles to complete a problem or task with a minimum of direction.	apply change choose compute construct	demonstrate discover dramatize employ illustrate	interpret manipulate modify operate practice	predict prepare produce relate schedule	show sketch solve use write	The student will write an instructional objective for each level of Bloom's taxonomy.
Analysis	Student distinguishes, classifies, and relates the assumptions, hypotheses, evidence, or structure of a statement or question.	apply analyze categorize change choose compute	compare contrast discover demonstrate dramatize employ	illustrate interpret manipulate modify operate practice	predict prepare produce relate separate schedule	show sketch solve use write	The student will compare and contrast the cognitive and affective domains.
Synthesis	Student originates, integrates, and combines ideas into a product, plan or proposal that is new to him or her.	arrange assemble categorize collect combine comply	compose construct create design develop devise	explain formulate generate hypothesize invent plan	prepare rearrange reconstruct relate reorganize revise	rewrite set up summarize synthesize tell write	The student will design a classification scheme for writing educational objectives that combines the cognitive, affective, and psychomotor domains.
Evaluation	Student appraises, assesses, or critiques on a basis of specific standards and criteria.	appraise argue assess attach choose compare	conclude contrast critique defend describe discriminate	estimate evaluate explain interpret judge justify	predict recommend rate relate select summarize	support value	The student will judge the effectiveness of writing objectives using Bloom's taxonomy.

Adapted from Bloom's Taxonomy Action Verbs. *Retrieved March 1, 2018, from* http://www.fresnostate.edu/academics/oie/documents/assesments/Blooms%20Level.pdf

Appendix C

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits/3contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM10844600122001 **Version No.** 94.001 **Created by** Honigwachs, Lea

Created on 2018-02-21T12:16:14 **Last Updated on** 2018-02-21T12:23:01 **Status Updated on** 2018-03-09T14:57:47

Current Status Approved **Course Selected:** **Subject** ANTH. (ANTH - Anthropology & Arch) **Catalog Nbr** 1205

Course Revision & College

Form Submission Initial Submission **College** Brooklyn College

Course Data

Course ID 110062 **Subject** ANTH. (ANTH - Anthropology & Arch) **Catalog Nbr** 1205

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Studies in Forensic Science

Course Description 3 hours; 3 credits Introduction to forensic science, including modern techniques of forensic analysis. Collection and preservation of physical evidence at crime scenes. Authentic criminal cases. Anthropology 1205 and Chemistry 1037 are the same course. (Not open to students who have completed Core Curriculum 3307.) Satisfies Pathways Flexible Core Scientific World.

Department Anthropology and Archaeology

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

ANTH_1205_Syllabus_2018.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**
Math & Quantitative Reasoning	**US Experience in its Diversity**

Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Student group projects and resulting in-class presentations involve the examination of anatomical data and the reading of primary literature to help assess age, sex, stature and geographic descent of individuals. These activities will ultimately teach students how to identify multiple individuals as well as their causes of death.
*** 2. Evaluate evidence and arguments critically or analytically.**	This course will teach students how to assess hypotheses based on evidence collected through data analysis and through reading primary literature. Students will be required to present their findings to the class in a format admissible in a court of law.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	This course includes one bone quiz, written exams, and an in-class primary literature presentation, in which students develop written and oral arguments supported by quantitative and qualitative data.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will learn and or apply methodologies in biological sciences, statistics, and chemical analysis, all within the framework of the scientific method. For example, they will learn and apply biological (e.g., morphometric) and statistical (e.g., regression analysis) methodologies for assessing stature and sex based on skeletal elements such as crania and femora. Students will be tested on this material on the bone quiz, all three exams, and based on the analyses and results that they will present in their group projects.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will statistically analyze quantitative data (e.g., morphometric data such as the length of long bones) to understand and interpret human skeletal variation and to evaluate pre- and post-mortem modification (student projects).
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	

8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Forensic science refers to any application of science used in a legal context. Forensic scientists analyze physical evidence that may include material collected at the crime scene or biological samples obtained from either the victim, the alleged perpetrator, or in some instances both. This course will offer an introductory level assessment of the various ways this evidence is obtained, preserved, analyzed, and used in a court of law. This course is designed to provide students with a basic understanding of the techniques used by forensic scientists and will equip them with the skills necessary to critically evaluate how both practitioners and lawmakers apply them to criminal and civil law. Further, this course will familiarize students with the unique ethical considerations that accompany working in such fields. Students will demonstrate that they are proficient in these areas by producing an in-class presentation based on primary literature, and by passing the bone quiz and the three exams.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

ANTH 1205 – Studies in Forensic Sciences

Department of anthropology
CUNY-Brooklyn
Room: JAMES 2207
Fall 2017 – ANTH 1205 – section 2A & 3
Monday and Wednesday: section 2A (2.15pm-3.30pm) / section 3 (3.45pm-5pm)

Instructor information

Dr. Stephan Naji, Stephen.Naji-Hussain@brooklyn.cuny.edu;
Department of Anthropology and Archeology JAMES 3307
Office Hours: Wednesday 11am-1.00pm or by appointment: JAMES 3301-C

Course Goals

This course is an introduction to Forensic Sciences in Anthropology. Students will survey the scientific basis of forensic investigations, human bone anatomy (osteology) and all the techniques use to help identifying human skeletal remains in various forensic contexts. This course will offer an introductory level assessment of the various ways this evidence is obtained, preserved and analyzed. It will also offer a theoretical background for these collection methods and their associated analytical techniques.

Student Learning Outcomes

Upon successful completion of this course the student will be able to:
1. Identify and apply the key terminology, methods and perspectives used in forensic sciences, especially in anthropology
2. Understand basics in human osteology including the fundamentals of aging, sexing and individuating human skeletal remains
3. Apply Forensic anthropology methods to identify skeletal human remains in forensic contexts. Students will learn how to estimate stature, weight, and to the extent possible, geographic decent. Students will also learn how to recognize and evaluate pre- and postmortem modification including evidence of disease and activity. These methods will be used by students to assess to several case studies.

Upon completion of this course, students will be able to do the following.
- Discuss, evaluate, and apply core concepts associated with the various forensic sciences.
- Communicate effectively about topics in forensic science in written and oral form.
- Understand commonly used techniques and methodological approaches utilized by forensic practitioners.
- Contemplate important ethical considerations that arise when working with human remains.

Blackboard

It will be necessary to get access to Blackboard for communicating as well as for taking online tests.

All students should carefully and thoroughly read the section entitled "Academic Regulations and Procedures" in the Brooklyn College Undergraduate Bulletin or Graduate Bulletin for a complete listing of academic regulations of the College.

Required text book

- **Byers, Steven N. 2017. Introduction to Forensic Anthropology**, 4th or 5th edition. Routledge, New-York. (There is a Mass market paperback available, as well as a Rent option on Amazon)

http://brooklyn.textbookx.com/institutional/index.php?action=browse#books/1525312/

Course Requirement

Required weekly reading (BEFORE coming to class) assignments are listed in the schedule section of the syllabus. You will be tested through 3 cumulative exams, 1 bone quiz and 1 group oral presentation, as well as attendance.

Assignments	Points	% of Final Grade
Attendance	30	10%
Bone quiz	30	10%
First Exam	60	20%
Mid-term	60	20%
Final exam	60	20%
Presentation	60	20%
Total	300	100%

Attendance Policy: Attendance will be taken during each class on a signup sheet displayed during the first 20mn of class. You will be allowed one unjustified absence. For any other absence, you will need a valid justification (medical note for ex.).

Extra Credit options

Movie-series, books, article review: select a medium that discusses any of the topics covered in class or one of the various articles available (ask me in advance) and in a one-page essay summarize and discuss how it relates to the class and your opinion. Examples of texts describing actual forensic anthropological cases worked by their authors:

- Ubelaker, D. H., Scammell, H. (1992). Bones: A Forensic Detective's Casebook. New York: M. Evans and Company.
- Rhine, S. (1998). Bone Voyage. Albuquerque, NM: University of New Mexico Press.
- Maples, W. R., Browning, M. (1994). Dead Men Do Tell Tales. The Strange and Fascinating Cases of a Forensic Anthropologist. New York: Doubleday.
- Manhein, M. H. (1999). The Bone Lady: Life as a Forensic Anthropologist. New York: Penguin Publishing Group.

Academic Integrity

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at www.brooklyn.cuny.edu/bc/policies. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member must report the violation.

Classroom Behavior

In any anthropology course, the key elements to effective learning are based on the freedom to express ideas without feeling threatened of being ridiculed. Additionally, many topics covered may arise questions that might challenge other people's (or your own) beliefs. The following guidelines will ensure that the class provides a comfortable and respectful environment for all.

- **Cell phones must be turned off** or on silent mode at all times, anyone using text messages during class will be asked to leave
- **There is no recording** (photo, video or audio) of any lectures as some sensitive material may be presented
- During lecture, do not interrupt by talking to others
- There is no such a thing as a "dumb questions"
- If you need to leave the class, please do so quietly, without disturbing other students
- Please arrive early to class

Requesting Accommodations at CUNY – Disability services

In order to receive disability-related academic accommodations, students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at (718) 951-5538. If you have already registered with the Center for Student Disability Services, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

Nonattendance because of religious beliefs

The New York State Education Law provides that no student shall be expelled or refused admission to an institution of higher education because he or she is unable to attend classes or participate in examinations or study or work requirements on any particular day or days because of religious beliefs. Students will be excused from any examination or study or work requirements. Faculty must make good-faith efforts to provide students absent from class because of religious beliefs equivalent opportunities to make up the work missed; no additional fees may be charged for this consideration.

Important dates to remember

Thursday, August 31	Last day to add a course
Tuesday, September 5	Last day to file for elective course Pass/Fail
Thursday, September 14	Last day to drop a course without a grade

Friday, September 15	Last day to file for Fall Semester graduation (December 31 or February 1)
Tuesday, September 19	Conversion Day; Classes follow a Thursday Schedule
Thursday, November 9	Last day to resolve Spring 2017 and Summer 2017 incomplete grade (INC)
Friday, November 10	Last day to withdraw from course with a W (non-penalty) grade
Tuesday, November 21	Conversion Day; Classes follow a Friday Schedule

Class and reading Schedule

Month	Week	Day	Date	Topic	Readings; Text: chapter
August	1	M	28	Introduction: what is Forensic Science?	
		W	30	Death Investigation	
September	2	M	4	NO CLASS: LABOR DAY	
		W	6	Forensic Anthropology objectives and history	Byers Chap 1
	3	M	11	Bone biology and the human skeleton	Byers Chap 2
		W	13	Human osteology	Byers Chap 2
	4	M	18	Bone Quiz	
		W	20	NO CLASS: ROSH HASHANA	
	5	M	25	Scientific framework of Forensic Sciences: establishing medicolegal significance	Byers Chap 3
		W	27	Discovery and recovery: from crime scene investigation to forensic archaeology	Byers Chap 4
October	6	M	2	NO CLASS or guest speaker	
		W	4	Exam 1	
	7	M	9	NO CLASSES: Columbus Day	
		W	11	Forensic Archaeology	Additional readings 1
	8	M	16	Forensic Taphonomy and Post Mortem Interval	Byers Chap 5
		W	18	Burial taphonomy: can bone move in the ground?	Additional readings 2
	9	M	23	The Forensic lab	Byers Chap 6
		W	25	Estimating Ancestry	Byers chap 7
	10	M	30	Exam 2 - mid-term	
November		W	1	Estimating Sex	Byers chap 8
	11	M	6	Estimating Age at Death	Byers chap 9
		W	8	Estimating Stature	Byers chap 10
	12	M	13	Cause and Manner of death: Trauma 1: introduction and projectile trauma	Byers chap 11-12
		W	15	Cause and Manner of death: Trauma 2: Blunt and sharp trauma	Byers chap 13-14
	13	M	20	Antemortem skeletal modifications	Byers chap 15
		W	22	Postmortem skeletal modifications	Byers chap 16
	14	M	27	Positive identification - antemortem records	Byers chap 17-18
		W	29	Forensic odontology	Additional readings 3
December	15	M	4	Expert Testimony and Public Outreach in Forensic Anthropology	Byers chap 19
		W	6	Student group Presentation 1	
	16	M	11	Student group Presentation 2	
		W	13	FINAL EXAM	

ONLINE Quiz and Test-taking Best Practices

Follow these steps and tips to help ensure a successful testing experience.

Before You Start:

1. Make sure that you have a **reliable Internet connection**.
    - A **wired connection** better than a wireless connection.
    - If you are using a dial-up connection, make sure you won't be interrupted by a dropped connection from incoming or outgoing phone calls, etc.
2. Run the Browser Check to make sure your software is up to date.
    - Windows users download the latest version of Java.
    - Mac users download the latest version of Java by running the Software Update from the Apple menu.
    - Make sure you have all the appropriate plug-ins (Flash player, Quicktime, etc.).
3. **Use a Supported Browser**.
    - View the list of currently supported browsers.
    - Enable your browser's status bar to see the timer.
    - Start with a fresh Blackboard session. Close all open browsers and reopen one just for taking the test.
    - Turn off all pop-up blockers.
    - Clearing the browser cache on your computer before starting a test to mitigate potential problems.
4. **Close all open windows and applications** before starting the test.
    - **Avoid** starting any **software updates** at any point while taking a test.
5. The Blackboard server has a **90 minute inactivity timeout** (which may be shorter than the time an instructor allows to complete the test).
    - Clear your schedule for the allotted time for taking the quiz or test.
    - Typing is not counted as "activity." Saving an answer within the 90 minute inactivity timeout period will reactivate another 90 minutes on the server (but does not extend the allotted time specified by the instructor).
    - **Save your answers after you complete each question.**
6. If you are taking a test in an **Online Testing Center** facility be sure to check out the information at the Online Testing Center website.

Starting the Test:

- Once you click **BEGIN**, the test has started, so you better be ready to take it!
- **Make sure you read the instructions carefully** as there are a few different options your instructor might have chosen.
    - **Force Completion:** you MUST complete the test once you've started. NOTE: if this option is selected, an even minor interruption in your internet connection will cause the test to submit and close. Therefore, **do NOT use a wireless connection if Force Completion is specified.**
    - **Multiple Attempts**: you may be permitted to take the test more than once.
    - **Timed Test:** you must complete the test with in the time period (10 minutes, 1 hours, etc.)

- **Password Protected:** your instructor has provided a password that must be entered before the test can be started. This may mean that you need to visit a testing computer lab where a proctor will enter this for you.
- **All at Once/One at a Time:** determines how many questions you will see.
- **Backtracking Prohibited:** specifies whether or not you will be able to go back to previously answered questions.

Taking the Test:

- **Do NOT start answering questions until the entire page has loaded**. Watch the status bar for your browser to verify the entire page has loaded.
- **Use the left and right arrows on the test page** to move to the next question.
  - **NEVER use the forward/backward/refresh buttons on your browser**. You may get locked out of the test.
  - **NEVER use the mouse scroll wheel** to advance to the next question because it may accidentally change your answer to the question you just completed.
- Be patient while waiting for pages to load once you click to progress to the next question, to save, or to submit. **Do NOT double click.**
- **SAVE your answers after each question**. This is considered activity and will refresh your 90 minute server inactivity timeout.
- If you are typing an answer in a text box, be aware that **neither Blackboard nor your browser saves text as you type it**. One option is to click the **Save** button next to the question frequently so the text you have typed so far will not be lost.
- If you compose essay answers in another program to copy and paste into Blackboard, **use a simple text editor** such as Notepad (Windows) or TextEdit (Mac), then **do any desired formatting with Blackboard's text editing tools.**
- **Do NOT navigate to another page** while taking a test. This **includes other pages within Blackboard.**
- Contact your instructor immediately if you run into difficulty or get locked out of the test.

Submitting the Test:

- **Click SAVE and SUBMIT once you have completed the test. Do NOT close the browser window or navigate to another site until you see the confirmation page.**
- Do NOT ignore warning messages; take a screenshot of the message and contact your instructor.
- Check the feedback from your instructor.
- Print the submission receipt screen for your records.

Final Reminders:

- If you can't confirm that the test was successfully submitted, contact your instructor.

If you do not save as you go and it is not submitted successfully, all your work

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits/3contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM1084460027001 **Version No.** 27.001 **Created by** Honigwachs, Lea

Created on 2016-10-31T16:23:09 **Last Updated on** 2016-10-31T16:29:36 **Status Updated on** 2016-12-14T21:46:40

Current Status Approved **Course Selected:** **Subject** ANTH. (ANTH - Anthropology & Arch) **Catalog Nbr** 2205

Course Revision & College

Form Submission Initial Submission **College** Brooklyn College

Course Data

Course ID 110210 **Subject** ANTH. (ANTH - Anthropology & Arch) **Catalog Nbr** 2205

Catalog Status Approved **Contact Hours** 0 **No. of Credits** 3

CourseTitle Forensic Anthropology

Course Description The techniques of forensic identification as applied to medicolegal problems. Methods, procedures, and illustrative case studies pertinent to the reconstruction of biological profiles, and cause and manner of death. Hands-on work in the computer lab is required.

Department Anthropology and Archaeology

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

ANTH_2205_Syllabus.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**
Math & Quantitative Reasoning	**US Experience in its Diversity**

Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Human cases studies will be examined through variable data including, age, sex, stature and geographic ancestry to infer explanations on information on the individual but also cause of death.
*** 2. Evaluate evidence and arguments critically or analytically.**	The course will examine evidence collected through the data analysis and students will present their findings in a format admissible in a court of law.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	The course includes Lab reports and exams where the students need to develop arguments supported through quantitative data
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	The students will be introduced to biological, statistical and chemical methodologies,.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will apply quantitative data in understanding and interpreting the human skeleton including how to evaluate pre and post mortem modification.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	The students will be introduced to the chain of evidence methodologies and how scientific data can be generated and used in a court of law.
A. If there is a change to the course title, what is the new course title?	

B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

ANTH 2205 Forensic Anthropology Syllabus 11:00 AM – 12:15 PM TR

2207 James Hall
Department of Anthropology and Archaeology, Brooklyn College
Instructor: Christina M. Ryder Phone: (215) 622 - 5199 Office Hours: Tuesday 12:30 PM – 1:30 PM Email: cmr618@nyu.edu

Overview

This course provides an intensive introduction to the methods and techniques used to interpret the human skeleton. We will focus our techniques and applications in the direction of forensic anthropology. You will learn: 1) fundamentals of aging, sexing and individuating human skeletal remains, 2) how to estimate stature, weight, and to the extent possible, geographic ancestry, 3) how to recognize and evaluate pre- and postmortem modification including evidence of disease and activity. At the end of the course we will apply the aforementioned methods to several case studies.

Requirements: Enrollment in this course is limited to students of junior standing. Please contact the instructor immediately with any conflict.

Graded Work: Course grades are based on written quizzes, lab reports, a primary literature presentation, and a written final exam. Attendance and participation are also vital for success in this course. The final grade will be based on a curve. There will not be opportunity to resubmit graded work.

Point Distribution (Subject to modification)

Quizzes (3 Total) 27 Lab Reports (4 Total) 24 Presentation 12 Final Exam 25 Attendance/Participation 12 **Total 100**

Quizzes: Each quiz will be on topics covered in the previous lab report. If you will be late on a quiz day please contact the instructor as soon as possible to avoid missing the quiz. There will be a total of 3 quizzes and each quiz will be worth 9 points.

Lab Reports: Students will have a hands on opportunity to apply the methods discussed in lecture. Students will complete the labs during class, and turn in the completed report by the end of class. The labs will each be worth 6 points, and there will be a total of 4 labs.

Group Presentation: Students will select a topic in Forensic Science to review in primary literature to present to the class in the final week of class. You may choose a topic from a list provided by the instructor, or based on your own interests. If you decide to select your own
article, the instructor will need to approve the topic. Each group will consist of 5-6 people and each presentation will last 30 minutes.

Assigned Text:

White, T. D., Black, M. T., & Folkens, P. A. (2011). *Human osteology*. Academic press.

Class and Lab Rules

You may work together at stations in lab. Help and consult with your fellow students when the instructor is unavailable, but all lab reports must be written individually.

When handling skeletal materials:

Always treat human remains with the respect they deserve

Always hold remains with two hands over a table

Always place skulls on a skull ring for security. Never put a skull down on the table on its teeth.

No food or drink of any kind is allowed in the Osteology Lab EVER.

When working with human remains, the bones, paper and a writing utensil may be on the table. Never have books or book bags on a table at the same time as bones.

Never remove skeletal material or lab tools from the lab.

Other Class Policies:

Attendance is a vital part of class. Students who attend regularly, pay attention and take notes generally do well.
See me regarding **documentable**, extraordinary personal circumstances affecting your academic performance.
Please come to class in a timely manner.
Please turn all cell phone ringers off and do not send text messages during class.

Academic Integrity: The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at www.brooklyn.cuny.edu/bc/policies. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member MUST report the violation.

Disability Services: In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at (718) 951-5538. If you have already registered with the Center for Student Disability Services, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

Nonattendance Because of Religious Beliefs: The New York State Education Law provides that no student shall be expelled or refused admission to an institution of higher education because he or she in unable to attend classes or participate in examinations or study or work requirements on any particular day or days because of religious beliefs. Students who are unable to attend classes on a particular day or days because of religious beliefs will be excused from any examination or study or work requirements. Faculty must make good-faith efforts to provide students absent from class because of religious beliefs equivalent opportunities to make up the work missed; no additional fees may be charged for this consideration.

CLASSROOM BEHAVIOR

Disruptive classroom behavior negatively affects the classroom environment as well as the educational experience for students enrolled in the course. Any serious or continued disruption of class will result in a report to the Office of Judicial Affairs. Public Safety will be summoned immediately if a serious disruption prevents the continued teaching of the class and you may be subject to disciplinary action. For disruptive behavior that does not prevent the continued teaching of the class, you will receive a warning after one such disruption. If the disruptive behavior is repeated in the same or subsequent classes, you may be asked to leave the classroom for the remainder of class and you may be subject to disciplinary action.

Monday, August 31
Wednesday, September 14 Thursday, September 15 Thursday, October 6 Friday, October 14 Thursday, November 10 Wednesday, November 23

Important Dates to Remember

Last day to add a course
Last day to file for elective course Pass/Fail
Last day to drop a course without a grade
Last day to apply for Spring 2016 Graduation
Conversion Day: Classes follow a Monday Schedule
Conversion Day: Classes follow a Tuesday Schedule
Last day to withdraw from a course with a W (non-penalty) grade Last day to resolve Fall 2015 and Winter 2016 incomplete grade (INC)

Tentative Schedule
Lecture Topic
Readings Due
Introduction

Anatomical Terminology
Bone Biology and Variation
White: Ch 3
The Skull
White: Ch 4
The Teeth
White: Ch 5
Post-Cranial Skeleton
Lab 1: Osteology (Meet in 0207 Ingersoll Hall)
Practice Quiz
Subadult Aging
White: Ch 18 (Section 3)
Adult Aging
White: Ch 18
Quiz 1
No Class
Conversion Day: Monday Schedule
No Class
Sexing
White: Ch 18 (Section 4)
Lab 2: Age and Sex (Meet in 0207 Ingersoll Hall)
Ancestry and Stature
White: Ch 18 (Section 5 and 6)
Quiz 2
Presentation Groups: Groups Assigned and Topics Chosen
Trauma
White: Ch 19 (Section 2)
Lab 3: Ancestry, Stature, Trauma
Pathology
White: Ch 19
Taphonomy and Forensic Archaeology
White: Ch 19 (Section 7)
Lab 4: Pathology, Taphonomy, and Forensic Archaeology
Forensic Case Studies
Presentation Day 1
Quiz 3
No Class
Presentation Day 2
Presentation Day 3
Final Review

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits/3contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM10844600117003 **Version No.** 11.003 **Created by** Honigwachs, Lea

Created on 2018-02-20T14:12:48 **Last Updated on** 2018-02-20T14:19:41 **Status Updated on** 2018-03-09T15:17:52

Current Status Approved **Course Selected:** **Subject** CHEM. (CHEM. - Chemistry) **Catalog Nbr** 1011

Course Revision & College

Form Submission Revised Submission **College** Brooklyn College

Please describe revisions that have been made to this course The submission has been revised to better reflect how the course will meet the Pathways learning goals.

Course Data

Course ID 133675 **Subject** CHEM. (CHEM. - Chemistry) **Catalog Nbr** 1011

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Pharmaceutical Research, Development and Approval

Course Description 3 hours; 3 credits This course will study the procedure by which medications are developed, tested, and approved for sale. Through selected case studies, we will explore the biochemical basis for drug action and analyze the role of the Food and Drug Administration and the federal government in assuring drug safety. We will also discuss the ethical issues surrounding the pharmaceutical industry, drug development and marketing. There will be two midterm papers and one final paper for this class. Class participation and short quizzes will also factor into the final grade. Prerequisite: Junior Standing

Department Chemistry

Pre-Requisites/Co-Requisites JUNIOR STANDING REQUIRED TO TAKE THIS COURSE

Course Syllabus [Attachment Filename(s)]

CHEM_1011_Syllabus_(2018).docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED		FLEXIBLE
English Composition		World Cultures & Global Issues
Math & Quantitative Reasoning		US Experience in its Diversity
Life and Physical Sciences		Creative Expression
		Individual and Society
	☑	Scientific World

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will be required to read primary scientific literature and a range of books and overviews of topics related to healthcare and medicine. Furthermore, students will be asked to gather relevant background data supporting policy modification suggestions of their own in three papers throughout the term.
*** 2. Evaluate evidence and arguments critically or analytically.**	Students will review case studies related to drug development, including the procedures used by the US FDA to ensure safety and efficacy. Students will be asked to critically assess evidence of drug action. Students will be shown to pay attention to conflicts of interest for entities carrying out pre-clinical and clinical studies, critically assess control and treatment populations, and individual and statistical success of treatments. Discussion will include both technical and ethical issues. Moreover, students propose policy modification suggestions of their own in three papers throughout the term.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Two short midterm papers and one longer final paper will be assigned. Grading rubric for these papers will assess achievement of the learning objectives.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will study the mechanism of action of different drugs and their role in human health. Lectures and readings activities will describe fundamental concepts in drug development, the biochemistry behind the action of selected pharmaceuticals and the statistics supporting their efficacy. This will include discussion of the nature of a range of illnesses and the mechanisms of drug action that address them. Methods by which mechanisms of action are elucidated will be briefly discussed. Biochemical and concepts will be applied to the interpretation of clinical studies supporting drug approval.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	

6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will be required to read primary scientific literature and a range of books and overviews of topics related to biochemistry, healthcare and medicine. Students will be asked evaluate the studies' validity based on the statistical data presented. Furthermore, students will be asked to analyze the evidence supporting policy modification suggestions of their own in three papers throughout the term.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Students will review case studies related to drug development and marketing and their influence on population health, including the procedures used by the US FDA to ensure safety and efficacy (see syllabus for detailed content and delivery schedule). Discussion will include both technical and ethical issues.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

PHARMACEUTICAL RESEARCH, DEVELOPMENT AND APPROVAL
CHEM 1011 SECTION #XXXX

Faculty Contact Information

Prof. Mariana P. Torrente
Class Time: Lecture MW 11:00am-12:15pm
Classroom: ---------
Office: Ingersoll Hall 3151
Office hours: MTW 10:00-10:45am or by appointment
Email: mariana.torrente@brooklyn.cuny.edu , **note CHEM1011** in subject line.

Course Description

This course will study the procedure by which medications are developed, tested, and approved for sale. Through selected case studies, we will explore the biochemical basis for drug action and analyze the role of the Food and Drug Administration and the federal government in assuring drug safety. We will also discuss the ethical issues surrounding the pharmaceutical industry, drug development and marketing. This course will involve 50-75 pages of reading per week, two short papers during the semester and one final paper, in addition to class participation and short unannounced quizzes

Required Course Materials

1. ***Deadly Medicines and Organised Crime: How Big Pharma Has Corrupted Healthcare*** by Peter Gøtzsche
2. **Overdosed America: The Broken Promise of American Medicine** by John Abramson
3. **Drugs for Life: How Pharmaceutical Companies Define Our Health** by Joseph Dumit
4. **Powerful Medicines: The Benefits, Risks, and Costs of Prescription Drugs** by Jerry Avorn
5. **Blockbuster Drugs: The Rise and Decline of the Pharmaceutical Industry** by Jie Jack Lee
6. Lecture slides; primary scientific literature papers and news articles will be posted in Blackboard prior to class sessions.

General Education Objectives

- **Gather, interpret, and assess information from a variety of sources and points of view.**
  You will be required to read primary scientific literature and a range of books and overviews of topics related to healthcare and medicine. Furthermore, you will be gathering relevant background data in support of policy modifications suggestions of your own in three papers throughout the term.

- **Evaluate evidence and arguments critically or analytically.**
  *We will review case studies related to drug development, including the procedures used by the US FDA to ensure safety and efficacy. You will be asked to critically assess evidence of drug action. You must pay attention to conflicts of interest for entities carrying out pre-clinical and clinical studies, critically assess control and treatment populations, and individual and statistical success of treatments. We will discuss both technical and ethical issues.***.**

- **Produce well-reasoned written or oral arguments using evidence to support conclusions.**
  Two short midterm papers and one longer final paper will be assigned. Grading rubric for these papers will assess achievement of the learning objectives.

- **Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world.**
  We will study the mechanism of action of different drugs and their role in human health. Lectures and readings activities will describe fundamental concepts in drug development, the biochemistry behind the action of selected pharmaceuticals and the statistics supporting their efficacy. We will discuss the nature of a range of illnesses and the mechanisms of drug action that address them. Methods by which mechanisms of action are elucidated will be briefly discussed. Biochemical and concepts will be applied to the interpretation of clinical studies supporting drug approval.

- **Articulate and evaluate the empirical evidence supporting a scientific or formal theory.**
  You will be required to a range of materials covering topics related to biochemistry, healthcare and medicine. You will evaluate the studies' validity based on the statistical data presented.

- **Understand the scientific principles underlying matters of policy or public concern in which science plays a role.**
  We will review case studies related to drug development and marketing and their influence on population health, including the procedures used by the US FDA to ensure safety and efficacy (see syllabus for detailed content and delivery schedule). In-class discussion will include both technical and ethical issues.

Course Learning Objectives

- Understand the scientific evidence behind drug approval, and how it is evaluated by federal agencies to ensure drug safety and efficacy.
- Understand the relationship between science and policy.
- Understand how physical science is used to justify policy decisions impacting public health.
- Suggest policy revisions in light of changes in science.
- Understand the legal and ethical issues that are involved in pharmaceutical drug development and regulation.

Course Requirements

- **Attendance**
  - ⇒ You are expected to **attend all class meetings** of this course. A grade of "0" will be assigned to all missed quizzes and papers.
  - ⇒ If you must miss class, you are responsible for all material covered during your absence. Make arrangements to get any missed lecture notes and/or handouts from a classmate.

- **Participation**

You are EXPECTED to participate in class. Participation and short unannounced quizzes will heavily factor into the final grade for the course.

- **Papers**

There will be 2 midterm papers (5 pages + references) and one final paper (15 pages + references) for this class.

- You are free to pick a topic of your choosing involving science and/or drug policy/regulation and expanding on the topics covered in class.
- *You must submit a brief outline and obtain topic approval prior to the submission of all papers.*

Example topics (not to be chosen):

"Pharmacogenomics: Possible Uses and Abuses of the Orphan Drug Act"
"Biogenerics' Regulation: Beyond the Hatch-Waxman Act?"

- A rubric for paper grading is shown below:

Category	Possible Points
Appropriateness of Topic	**5**
Introduction	**10**
Background • Gather and lay out all necessary background information supporting your proposals, ideas and/or recommendations • Present supporting statistical evidence from literature	**15**
Address Conflicts of Interest: Commercial vs. Scientific Concerns/ Ethical Concerns	**15**
Case Studies/ Examples	**10**
Proposals, Ideas and Recommendations • Evaluate evidence for a problem • Link scientific/ethical principles to matters of drug policy • Propose/recommend improvements/changes to current state of affairs	**20**
Conclusions	**10**
References • Cite All Sources • Appropriate Format • Appropriate References	**15**
Grammar, etc.	**10**
Total	**100**

Grading

Your final grade will be calculated as follows:

2 midterm papers (15% each)	30%
Final Paper	40%
Participation/Quizzes	30%

Grading Policies

- Papers must be submitted during the class period on the paper deadline. All missed papers will receive a grade of zero.

- If you are unable to submit a paper **due to a documented extenuating circumstance**, you will be given the opportunity to turn in your paper late.
  - ⇒ If you are unable to submit a paper, you must contact the instructor prior to the paper deadline.
  - ⇒ In the event of unpredictable extenuating circumstances, other arrangements may be made after discussion with the instructor and possibly the Dean as warranted.

At the instructor's discretion, a grade of "0" will be assigned to any quizzes and/or papers where academic dishonesty is displayed.

Important Information

- **Academic dishonesty is prohibited in the City University of New York.**

Cheating, plagiarism, internet plagiarism and obtaining unfair advantages are violations of policies of academic integrity and are punishable by penalties, failing grades, suspension and expulsion. For more information about CUNY policy on academic integrity see

http://www.brooklyn.cuny.edu/bc/policies/pdt7CUNY%20PolicyAcademicIntegrity.pdf

- **Student Withdrawals**
  - ⇒ **If you decide to withdraw from this course, it is your responsibility to do so by the Deadline for Student Withdrawals (DATE).**

- **Library Services**

All required reference books are on reserve at the Library. Librarians can help you access them.

- **Students with Disabilities**

In order to receive disability-related academic accommodations students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at 718-951-5538. If you have already registered with the Center for Student Disability Services please provide your professor with the course accommodation form and discuss your specific accommodation with her.

- **No part of lecture can be recorded without the instructor's written permission.** A student requiring this particular accommodation must follow the procedures for students with disabilities detailed above.

Course Assessment

Assessment of the knowledge of the course material:
Unannounced one-question in-class quizzes, two midterm papers, and one final paper will assess students' understanding of terminology and concepts associated with pharmaceutical drug approval.

Assessment of the communication skills:
Students are expected to participate heavily in class discussion, drawing from the assigned readings and their own experiences and critical analysis.
Students will write three papers throughout the term.

Tentative Schedule*

Fall 2017	Class Session	Topic	Reading Assignment

Dates	1-2	Drug Approval Process Case Study: Thalidomide
	3	The FDA
	4	Blockbuster Drugs Case Study: Lipitor
		Outline for Paper 1 due
	5	"Me too" Drugs Case study: Prilosec
	6-7	Orphan Drugs Case studies: Tobramycin, Crestor
	8	Off-label Use Case Study: Propulsid
	9-10	Pediatric Use
		MIDTERM PAPER 1 due
	11-12	Generic Drugs, Hatch Waxman-Act
	13-15	Drug Pricing, Insurance Case Study: Epi pen, Darapin
		Outline for paper 2 due
	16-17	Over the Counter Drugs, Vitamins, Herbal Supplements
	18	Drug Advertising to Healthcare providers, Black Box Warnings
	19	Drug Recalls Case Study: Vioxx
	20-22	Direct to Consumer Advertising Case Studies: Humira, Viagra, Belsombra
		MIDTERM PAPER 2 due
	23-24	Biologics Case Studies: Herceptin, Pulmozyme
		Outline for final paper due
	25	Biogenerics/ Biosimilars Case Study: Epo
	25-27	Personalized Medicine Case studies: Herceptin, Gleevec
	27-28	The future of pharmaceutical development
		FINAL PAPER DUE

- **Please note: all dates are *tentative* and the instructor reserves the right to modify the schedule as needed during the course of the semester.**

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits/3contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM10844600113001 **Version No.** 91.001 **Created by** Honigwachs, Lea

Created on 2017-08-23T14:28:52 **Last Updated on** 2017-08-23T14:43:11 **Status Updated on** 2017-09-22T14:09:13

Current Status Approved **Course Selected:** **Subject** CHEM. (CHEM. - Chemistry) **Catalog Nbr** 1012

Course Revision & College

Form Submission Initial Submission **College** Brooklyn College

Course Data

Course ID 136194 **Subject** CHEM. (CHEM. - Chemistry) **Catalog Nbr** 1012

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Chemistry in the Arts and Archaeology

Course Description 3 hours; 3 credits General background in basic concepts of chemical structure and activity, with an emphasis on examples from the visual arts and archaeology. Topics include the nature of color; color mixing; chemical properties, synthesis and use of dyes, pigments, paints, metals, ceramics, glasses and glazes; chemical analysis of archaeological artifacts; the chemistry of art preservation and authentication of art objects; and the chemical hazards in the arts. Prerequisite: None

Department Chemistry

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

SYLLABUS_CHEM_1012.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will search chemistry literature (for example, journals of the American Chemical Society available on-line via CUNY libraries, such as Journal of Chemical Education and Analytical Chemistry) and other on-line sources, for chemical methods and techniques in art preservation, art authentication, and archaeological artifacts studies. They will analyze these methods and techniques based on their knowledge of chemistry gained at the beginning of this course. Students will assess the usefulness of these chemical methods and techniques for specific art and archaeology cases. Students' responses will be evaluated and graded in the in-class problem sets, project reports, and exams.
*** 2. Evaluate evidence and arguments critically or analytically.**	Students will investigate several cases of art forgery and authentication of archaeological artifacts. They will look at these cases from a point of view of the evidence provided by chemical methods and techniques, and analyze the outcome of each case. One of the study projects "Chemical Art Detective" will be devoted entirely to the application of the knowledge of the basics chemistry and its methods/techniques to solving art forgery cases.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Students will write four reports on assigned independent projects. These reports will be graded. Based on these report students will prepare one PowerPoint presentation (on one topic) that will be presented in the class. These oral presentations will be evaluated and graded.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will identify the most important concepts in chemistry as crucial for the arts and studies of archaeological artifacts. They will apply this knowledge in understanding of chemistry basics behind materials used in the arts, art preservation, art authentication, and archaeological artifacts analysis. Students' responses will be in the in-class problem sets, project reports, and exams.

5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Students will analyze several cases of art restoration and art forgery. They will demonstrate (in their in-class problem sets and particularly in the project reports) how chemical methods and techniques, based on modern technologies, aid art experts in solving the problems of object of arts deterioration and in cases of art authentication. Specifically, students will pair appropriate chemical methods, techniques and instruments with specific cases of preservation of objects of the arts and archaeology, and with specific cases of art authentication.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Based on the scientific theory of the relationship between the composition of a chemical compound and its color, students will examine chemical composition of several inorganic pigments and explain their colors (in-class problem sets).
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Students will learn about novel techniques and technologies in chemistry that can be used in radioactive dating of archaeological artifacts, in restoration of art objects, and authentication of art objects. They will describe these techniques and technologies in their reports.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Students will gain knowledge of basic principles of chemistry as well as chemistry methods and techniques, as it applies to the arts and archaeology. Based on this knowledge they will understand the scientific principles underlying matters of public concern, such as environmental challenges, economic and legal issues related to art deterioration due to air and water pollution, art preservation, art authentication, and archaeological artifacts preservation and analysis. Students will write about these issues in their project reports.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

CHEM 1012 CHEMISTRY IN THE ARTS AND ARCHAEOLOGY

Lecture: 3 hours per week Credits: 3

TEXTBOOK

"*Chemistry and Artists' Colors*", Mary V. Orna and Madeline P. Goldstein, 3rd edition, 2013.

ADDITIONAL MATERIALS

"*Traces of the Past: Unraveling the Secrets of Archaeology through Chemistry*", by J. B. Lambert, Basic Books; 1998.

"*Doing Chemistry at the Art/Archaeology Interface*", Mary Virginia Orna, Journal of Chemical Education, Volume 74, Number 4, April 1997, 373-376.

Selected scientific articles available on-line from CUNY libraries

COURSE DESCRIPTION

General background in basic concepts of chemical structure and activity, with an emphasis on examples from the visual arts and archaeology. Topics include the nature of color; color mixing; chemical properties, synthesis and use of dyes, pigments, paints, metals, ceramics, glasses and glazes; chemical analysis of archaeological artifacts; the chemistry of art preservation and authentication of art objects; and the chemical hazards in the arts.

GENERAL EDUCATION OBJECTIVES

- Use analytical reasoning skills and apply logic to understand the scientific study of materials used in the construction of works of art, and methods used in investigations of archaeological artifacts and works of art.
- Integrate knowledge to qualitatively and quantitatively understand the connection between chemistry and the arts and archaeology.
- Become knowledgeable in how to properly and safely handle potentially hazardous chemicals that artists use in their daily operation.
- Identify the problems related to the arts and archaeology, such as art and artifacts deterioration and forgery, and use scientific methods learned in the course to find solutions to these everyday life problems.
- Communicate clearly through speaking, writing, and reading.

OUTCOMES ANTICIPATED FOR COURSE

At the end of the course, students understand the basic facts, principles, theories and methods of chemistry. They are able to balance chemical equations, understand the principle of conservation of mass, interpret graphs in the lay literature, understand the problems associated with materials and methods used in the arts and archaeology, and discuss the chemical principles knowledgeably. Students understand key events in the history of science and recognize that science is an evolving body of knowledge. Students recognize the social and cultural implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

METHOD OF ASSESSMENT

Assessment of students' knowledge of the course material: Specific questions designed to address the course material will be included in in-class problem sets, class exams and the final exam. The outcome of these specific questions will report on students' understanding of terminology and concepts associated with chemical compounds, chemical methods and techniques in the field of the arts and archaeology.

Assessment of students' communication skills: During the semester, students will complete four reports and one oral presentation.

METHOD OF EVALUATION

In-class problem sets will be assigned, discussed and logged in. Two midterm exams will be given, after 3 weeks, and after 9 weeks. A comprehensive final exam will be given. Four group projects (groups of 2-3 students) will be assigned, and students will prepare four written reports. Based on one of these reports, a PowerPoint presentation will be prepared. These presentations will available on Blackboard to all students;

they will be presented by students during last three classes. Both the written reports and oral presentations will be graded.

The FINAL GRADE will be determined as follows:

Class participation (in-class problem sets):	15%
Two midterm exams:	25%
Written reports (4 projects):	20%
Oral presentation:	15%
Final exam	25%

ACADEMIC INTEGRITY

Academic dishonesty is prohibited in the City University of New York. Cheating, plagiarism, internet plagiarism and obtaining unfair advantages are violations of policies of academic integrity and are punishable by penalties, failing grades, suspension and expulsion. For more information about CUNY policy on academic integrity see http://web.cuny.edu/academics/info-central/policies/academic-integrity.pdf

STUDENT DISABILITY SERVICES

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COURSE OUTLINE

Chapters from: "*Chemistry and Artists' Colors*", Mary V. Orna and Madeline P. Goldstein, 3rd edition, 2013.

Week	Readings	Topics	Hrs
1	Ch. 1-3	1. Introduction to Light and Color Electromagnetic Radiation and Electromagnetic Spectrum Measurement and Metrics, Exponential Notation Wave/Particle Theory of Electromagnetic Radiation	3
	Ch. 4-6	2 Visible Light Wavelength, Frequency and Color Properties of Light: Refraction, Reflection, Bending *Project 1: How Rainbows work?*	
2	Ch. 7-8	3. Energy and Composition of Matter Energy States Atoms and Elements Sub-atomic Particles and Isotopes Electrons in Atoms and Atomic Orbitals	3
3	Ch. 9	4. Interaction of Light with Matter Transmittance and Absorption of Light Why objects Appear Colored Color Wheel Beer/Lambert Law	3
	Ch. 11-12	5. Colored Objects Subtractive vs. Additive Color Mixing, Color Wheel Pure/Impure Colors	
4		*Exam 1*	1.5
4, 5	Ch. 13	6. Chemistry Alphabet and Vocabulary Chemical Symbols, Names of Chemical Elements Chemical Formulas, Names of Chemical Compounds	3

		Chemical Equations Illustrate Chemical Reactions 7. The Periodic Table and Periodic Properties	
	Ch. 14	*Project 2: "Elements Are Everywhere" Crossword Puzzle*	1.5
6, 7	Ch. 15 Ch. 16 Suppl. Articles	8. Electrons in Atoms Electron Configurations 9. Chemical Compounds Chemical Bonding: Ionic vs. Covalent Molecules and Chemical Compounds Colored Chemical Compounds Types of Chemical Reactions 10. Oxidation Reduction Reactions Metal Etching Corrosion Metals in the History of Art and Technology	6
8	Ch. 17 Ch. 18	11. Dyes Dye Adhesion, Natural Dyes, Fiber-Reactive Dyes 12. Pigments Artists' Pigments and Commercial Pigments *Project 3: Inorganic and Organic Pigments*	1.5 1.5
9	Ch. 19	13. Paints Oil Paints Acrylic Paints Tempera Paints Water Colors Gouache Paints	1.5
9		*Exam 2*	1.5
10, 11	Ch. 23 Suppl. Articles	15. Artists' Safety Chemical Hazards in the Arts 16. Deterioration of Materials and Art Conservation Environmental Effects: Acid rain, Photolysis, Erosion, Humidity changes, Paper problems Art Preservation and Restoration	1.5 3
11, 12	Suppl. Articles	17. Authentication of Art Objects Famous Forgeries Detected using Chemistry *Project 4: Chemical Art Detective*	3
12, 13	Suppl. Articles	18. Chemical Analysis of Archaeological Artifacts 14C Isotope Dating Identification of Materials X-ray diffraction and fluorescence	3
13, 14		Projects Presentations	4.5
		Final Exam	

Course Submission Form

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Form ID CCOREFORM1084460091002 **Version No.** 63.002 **Created by** Honigwachs, Lea

Created on 2017-08-07T13:57:52 **Last Updated on** 2017-08-07T14:05:48 **Status Updated on** 2017-09-22T14:47:55

Current Status Approved **Course Selected:** **Subject** CHEM. (CHEM. - Chemistry) **Catalog Nbr** 1037

Course Revision & College

Form Submission Revised Submission **College** Brooklyn College

Please describe revisions that have been made to this course The submission has been revised to better reflect how the course will meet the Pathways learning goals.

Course Data

Course ID 110062 **Subject** CHEM. (CHEM. - Chemistry) **Catalog Nbr** 1037

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Studies in Forensic Science

Course Description Introduction to forensic science, including modern techniques of forensic analysis. Collection and preservation of physical evidence at crime scenes. Authentic criminal cases. (Not open to students who have completed Core Curriculum 3307). Prerequisite: None

Department Chemistry

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

SYLLABUS_CHEM_1037.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Course will make extensive use of authentic legal case studies. Students will search for documents related to the assigned cases on-line, for example the FDA website has forensic case studies as well as a portal for students, academia and industry. Students will evaluate these documents together with the provided primary documents, as well as background information on scientific and legal principles. Students will discuss these documents in class, and using an evaluation sheet, they will asses if these documents added to their understanding of the assigned cases.
*** 2. Evaluate evidence and arguments critically or analytically.**	Criminal cases naturally lend themselves to a discussion of the merits of evidence. These ideas will be discussed extensively in the classroom. Students will be given criminal cases to review. Without knowledge of the final verdict they will prepare themselves for class room arguments based solely on the physical evidence mentioned in each case. Students will not know in advance if they are to take the position of the government or for defense. They will be graded on their interpretation of the evidence and their scientific knowledge.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Students will write critical reviews of a series of videos describing legal cases, comparing the conclusions of the videographers against the evidence provided in the case. Students will give oral presentations on their interpretation of selected criminal cases based on the evidence and their scientific knowledge.

4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Lectures, readings, and guided in-class activities will identify fundamental concepts in Forensic Science. These concepts (principles of physical science) will be applied to the interpretation of criminal evidence. These goals will be achieved through classroom demonstrations and investigations, including but not limited to the following activities: Fingerprints: a class room demonstration/activity. Student participants will make both flat and rolled prints. The activity will also include the dusting and lifting of prints and the transfer of such prints to individual print cards. Impressions: This demonstration/activity will make use of various types of footwear and bicycle tires. Using long sheets of Butcher paper and ink, instructor/student participants will demonstrate how important impressions are to a criminal investigation. Accuracy of Witness testimony. This activity will involve showing the class a series of slightly altered photographs. The second doctored image will vary only slightly from the first but in a manner that would be crucial to the outcome of the case. Students will write down what items they believe have been changed; when the responses are reviewed, they will understand how numerous people can witness the same crime but in a different way.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	The study of forensic science inherently demonstrates the connection between a question of interest in a criminal proceeding and the means by which scientific study can address it. Since this class will be run in a regular lecture room, no experimental work (even in a demonstration form) is permitted due to safety concerns. Students will watch and analyze short videos from variety of scientific disciplines; these videos will come from the sources that include the Environmental Protection Agency, the American Chemical Society, the US Food and Drug Administration, NASA, and others. Presented videos will not involve criminal cases but they will highlight techniques, technologies and procedures employed by scientific investigators across all disciplines. Examples will include GC-MS detectors used in airports for explosive testing, pH in-field detectors used for preliminary drug testing, etc. Students' in class discussion will be focused on possible applications of the presented techniques in the science of forensics.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	

7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	The course will show both the means by which physical science can address questions of legal interest, and how the limits of scientific certainty can create legal and ethical challenges for those participating in the process. The knowledge of the Scientific Method will help students to understand the science behind many of the critical issues that face our society today, including but not limited to: air and water pollution, global warming and climate change, use of DNA analysis in the Innocence project, airport security procedures, and the use of polygraphs in courtrooms. Students will discuss two/three of the above topics during the class, with a focus on basic science behind them. One of four in-class quizzes will ask for a list of scientific methods and principles that are crucial for better understanding of these critical issues.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

CHEM 1037 INTRODUCTION TO FORENSIC SCIENCE

Lecture: 3 hours per week Credits: 3

TEXTBOOK

Criminalistics: An Introduction to Forensic Science by Richard Saferstein, 11th edition; Pearson Publications, 2014.

ADDITIONAL MATERIALS

Videos: "Cold Case JFK," PBS Nova, 2014; "Iceman Murder Mystery," PBS Nova, 2012; "Manhunt: Boston Bombers," PBS Nova, 2013.
Selected scientific and legal documents: to be provided by instructor

COURSE DESCRIPTION

Introduction to forensic science, including modern techniques of forensic analysis. Topics will include both legal and scientific issues related to the collection, preservation and analysis of physical evidence associated with legal proceedings. Social and ethical questions that arise from these issues will also be considered. The course will make extensive use of authentic criminal case studies

GENERAL EDUCATION OBJECTIVES

- Employ quantitative and scientific reasoning in various fields of interest and in everyday life.
- Employ basic concepts and methods of the natural and physical sciences to make informed judgments and decisions.
- Communicate clearly through speaking, writing, and reading.

LEARNING OBJECTIVES

- Understand the nature of both legal and scientific evidence, and how each are evaluated.
- Understand the relationship between science and the law.
- Understand how physical science is used to answer specific questions of importance to legal proceedings (e.g. how DNA evidence is used to identify an individual).
- Understand the legal and ethical principles that guide the collection, analysis and dissemination of evidence.

ACADEMIC INTEGRITY

Academic dishonesty is prohibited in the City University of New York. Cheating, plagiarism, internet plagiarism and obtaining unfair advantages are violations of policies of academic integrity and are punishable by penalties, failing grades, suspension and expulsion. For more information about CUNY policy on academic integrity see http://web.cuny.edu/academics/info-central/policies/academic-integrity.pdf

STUDENT DISABILITY SERVICES

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COURSE ASSESSMENT

Assessment of the knowledge of the course material:

Minimum of four 20-25 minutes in-class quizzes, one midterm exam, and a cumulative final exam will be given to assess students' understanding of terminology and concepts associated with forensic science.
Assessment of the communication skills:
Students will write reviews of the three documentaries.
Students will give oral presentations on their interpretation of selected criminal cases based on the evidence and their scientific knowledge.

FINAL GRADE DETERMINATION

In-class quizzes:	20%
Midterm exam:	20%
Written reviews of the three documentaries:	20%
Class participation (oral presentations, in-class discussion):	15%
Final exam	25%

CHEM 1037: INTRODUCTION TO FORENSIC SCIENCE
COURSE OUTLINE

Week	Topics	Hours
1	1. History and Development of Forensic Science: a. Scientific Method b. Organization of a Crime Lab c. Services of the Crime Lab d. The importance of Sherlock Holmes to the field of Forensic Science	3
2	2. History and Development of Forensic Science: a. Scientific Method b. Organization of a Crime Lab c. Services of the Crime Lab d. The importance of Sherlock Holmes to the field of Forensic Science	3
3	3. The Crime Scene: a. Processing the Crime Scene b. Legal Issues at the Crime Scene c. The role of the first officer on the scene d. The role of the lead detective and how his team of experts is chosen e. The types of Physical Evidence f. How physical Evidence is collected and processed at the crime scene	3
4, 5	4. Basic Introduction to Chemistry a. The Nature of Matter and of Energy: b. Atoms, Elements, Molecules, Compounds c. The subatomic world d. Understanding the Periodic Table of Elements e. How and why elements bond; Ionic and Covalent f. What is energy and how it reacts with matter g. The electro-magnetic spectrum h. Wavelengths and Frequencies i. The tools of the Forensic Chemist	6
6	5. Forensic Serology: a. The Nature of Blood b. Forensic Characteristics of Bloodstains c. Blood types and the Principles of Heredity	3
7	6. DNA: a. What is the chemistry of a nucleus, a chromosome, a gene, a nucleotide?	3

	b. Mitosis and Meiosis: how they provide each human with a specific genetic finger print c. How DNA is replicated in the lab d. Gel Electrophoresis e. The CODIS database	
8, 9	Midterm Exam 7. Drugs and Alcohol: a. What is a Drug? b. The four major groups of drugs c. Federal penalties d. Collection of drugs at a crime scene e. Chemical analysis of drugs in the Lab; Spectroscopy and presumptive color exams f. How Alcohol disrupts human metabolism g. The Field Sobriety Exam h. The cost of drugs to our society; crime and violence, productivity in the work place, overcrowding in the prison system, why drugs should be decriminalized or not	1.5 4.5
10	8. Hair, Fibers, Glass and Paint a. The Morphology of Hair b. The Identification of Hair c. Types of Fibers; natural and man-made Polymers d. The chemical analysis of paint in the Lab e. Known vs. Unknown Glass and the methods used to identify them in the Lab	3
11, 12	9. Firearms, Bullets and Ballistics a. The History of Explosives and their chemical make up b. The development of fire arms c. The differences between Manual and Automatic weapons d. The Rifled Barrel and how that creates individual impressions on a bullet e. How weapons and bullets are examined in the Lab f. Gun Shot Reside and bullet swipe	6
13, 14	10. Fingerprints a. The history of Fingerprints b. How Friction Ridges arise c. How prints are collected and preserved d. How Chemistry helps make invisible prints visible e. How prints are examined and used to identify individuals Review for final exam	4.5 1.5

Course Submission Form

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Form ID CCOREFORM10844600133001 **Version No.** 102.001 **Created by** Honigwachs, Lea

Created on 2018-11-14T15:59:05 **Last Updated on** 2018-11-14T16:02:54 **Status Updated on** 2018-12-22T18:54:55

Current Status Approved **Course Selected:** **Subject** CISC. (CISC - Comp & Info Science) **Catalog Nbr** 1003

Course Revision & College

Form Submission Initial Submission **College** Brooklyn College

Course Data

Course ID 110346 **Subject** CISC. (CISC - Comp & Info Science) **Catalog Nbr** 1003

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Exploring Robotics

Course Description 3 hours; 3 credits Introduction to programming through the use of project-based educational robotics activities. Small group work on a series of multi-week creative projects involving use of robots to address meaningful and socially important issues, such as urban search and rescue or elder care. Introduction to the fundamentals of robotics (including aspects of mechanical design) and elementary programming within a graphical environment. (Not open to students who have completed Core Curriculum 3303.) 2017-2018 and 2018-2019: Satisfies Pathways College Option requirement. Prerequisite: Junior standing

Department Computer & Information Science

Pre-Requisites/Co-Requisites JUNIOR STANDING REQUIRED TO TAKE THIS COURSE

Course Syllabus [Attachment Filename(s)]

SYLLABUS_CISC_1003_.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Several books are assigned, Robots are programmed using both open-loop and closed-loop processes in the projects of the syllabus. Both methods are assessed and compared. The programs integrate and assess information coming from a variety of robot sensors. Information is assessed from logical analysis in building programs and experiential results from the implementations and applications.
*** 2. Evaluate evidence and arguments critically or analytically.**	Analysis is done as to whether programs operate according to specification. Performance evidence and program logic are evaluated critically and analytically to determine necessary program changes. Results from the original and updated programs are compared and evaluated.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	See Goal 4 in the attached Syllabus that outlines methods for gathering results and presenting reports with evidence and argument regarding conclusions that can be drawn from project activities. These reports and arguments are assessed as part of the grading for each project. Also, see Project 5 (Weeks 11-14) where oral communication and argumentation and consensus-building within a team of students is an essential project component.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Use methods of computer science in programming and debugging robotic programs and the integration of the physical and logical. Use methods of physics and mathematics in understanding the operation of robots and how they can be controlled. Using psychological fundamentals in understanding methods of integrating sensory data with action in in feedback loops. Logical analysis of programs and reasoning about methods of correctly deploying robot capabilities.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Use programming and logical reasoning and mathematical analysis in analyzing the problem of enlisting the robot in practical task and producing solutions in such diverse areas as controlling robots (Project 1; weeks 2-3), the Arts (Project 2, weeks 4-5); search and rescue (Projects 3 and 5; weeks 6-7, 11-14) and housekeeping (Project 4; weeks 8-10).

6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Create programs that assert the theory that the programs can solve specific problems and then assess the empirical evidence demonstrated by robot operation. Validate the theory that robotics is a feasible and valuable field of study and endeavor.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Discussions of ethics of the use of robots and their effect on human activity and the ethics involved in working in teams. Security area of search-and-rescue.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Discussion of effect of robotics on both productivity and employment. Use of robotics in measuring environmental health, human health and in performing tasks in environments toxic to humans, including exploration of the solar system and the universe.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

Chair (Approver) Comments

Comments
I want to take this course! Mindstorms are great robots & fun to play with! I like the idea of getting the students to follow a process of trial & error to figure out exactly how they get their robot to carry out some task & then checking to see how much their code/workflow deviates from expectation.

Course Submission Form

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Form ID CCOREFORM1084460072001 **Version No.** 72.001 **Created by** Honigwachs, Lea

Created on 2016-11-17T09:55:54 **Last Updated on** 2016-11-17T10:01:39 **Status Updated on** 2016-12-14T16:26:33

Current Status Approved **Course Selected:** **Subject** EESC. (EESC - Earth & Environ Sci) **Catalog Nbr** 1050

Course Revision & College

Form Submission Initial Submission **College** Brooklyn College

Course Data

Course ID 110358 **Subject** EESC. (EESC - Earth & Environ Sci) **Catalog Nbr** 1050

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Society and the Ocean

Course Description How oceanography has matured into a truly interdisciplinary science; ocean phenomena in terms of the interconnections between geology, chemistry, biology, and physics; how ocean phenomena are critical to society in terms of climate, transportation, food resources, and earth habitability; the analysis of oceanographic data sets; one required field trip. (Not open to students who have completed Core Curriculum 3311). Satisfies Pathways College Option requirement. Prerequisite: None Prerequisite: None

Department Earth & Environmental Science

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

EESC_1050_Syllabus.doc

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning			**US Experience in its Diversity**
Life and Physical Sciences			**Creative Expression**
			Individual and Society
		☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will be assigned a class project for which they will gather data from a variety of literature on-line sources and marine data bases. They will be required to make an oral presentation to the class for subsequent class discussion.
*** 2. Evaluate evidence and arguments critically or analytically.**	Readings will be assigned for which students will have to evaluate various points of view in written homework responses. They will then be required to bring their interpretations of these readings and their responses to class discussions. Exams and quizzes will also be designed to evaluate students critical thinking skills.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Students will be required to develop a presentation on an oceanographic issue impacting or impacted by society. They will be required to present data in support of their position.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will be required to answer questions on exams, quizzes and homework sets on oceanographic topics including the interdisciplinary nature of this field and the relevance of the various aspect to society (i.e. ocean circulation and climate, ocean fisheries, medicines from the sea, ocean mining) .
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will learn to evaluate the various impacts that society has on ocean processes including the effects of a warming climate, increasing ocean acidification, sustainable fishing practices, energy from the sea and transportation.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	

8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Students will learn the pros and cons of various uses of the oceans including oil exploration, fishing, aquaculture, medicines from the sea and how science informs management concerning the health of the oceans.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

EESC 1050 Society and The Ocean

Outcomes Anticipated for Course

1. Students will integrate physical, chemical and biological variables in order to describe seasonal variability in the ocean.
2. Students will assess potential oceanographic risks in New York City coastal neighborhoods.
3. Students will be able to analyze a seafood menu to make ecologically sustainable choices.
4. Students will use technology to effectively collect and communicate data.

Course Outline		
Week	**Lecture**	**Assignments**
1	History of Ocean Science	
2	Boundaries: the coasts and submarine topography	
3	Introduction to On-Line oceanographic databases	Group work assignment in multi-media classroom
4	Temperature	Temperature profiles assignment
5	Salinity	Salinity profiles and variability assignment
6	Ocean Movements: currents, tides,	
7	Mid-term examination	
8	Nitrogen and Phosphorus	Nitrogen and phosphorus data assignment
9	Oxygen and Carbon	Oxygen and Carbon Data Assignment
10	Light in the Sea; Sound in the Sea	
11	Productivity; the Iron hypothesis	
12	Presentations by Groups	Synthesis assignments due
13	Adaptations to Ocean Life in the Plankton, Nekton, and Benthos: AMNH fieldtrip	
14	Fisheries and Aquaculture	

Method of Evaluation

Database-Related Assignments 20%

- The class will be divided into 4-person groups, to investigate different kinds of oceanographic station data: hydrography, nutrients, dissolved gases, plankton, bacteria, and photosynthetic rates.
- For each station in a seasonal time series, the data will be plotted as a function of depth.
- The students will be required to develop hypotheses to explain the depth distributions, and how they change over time.
- The data from each group will be compiled, and compared and interpreted.
- The data will be interpreted in terms of the dynamics in the larger ocean region (e.g., the North Atlantic)

Group Presentation 20%

- Each group will make an oral presentation of the data, and say how the data fits within the overall picture of the seasonal cycle.
- Each group will accompany their presentation with submission of a report which discusses their results.

Midterm Exam 20%

Final Exam 40%

Method of Assessment

Three forms of assessment will be used in this course: 1) group assignments; 2) group presentation; and 3) exams. Each of these assessments aims to characterize the degree of achievement of distinct objectives of the course.

Group assignments: These provide practical experiences in using oceanographic data from on-line data sources. In this way, the collection and plotting of the data as a function of depth will assess essential skills of observation, description, generation of hypotheses, and explanation as applied to oceanography. These group assignments will provide a scaffolded support for students, leading to the group presentations.

Group presentations: These require students to form cooperative groups, negotiate times to meet, share information, and allocate tasks effectively. This activity will provide an indication *students ability to work in teams, and provide support to peers.* Furthermore, the oral presentations require the use of technology such as *Powerpoint or webpages to deliver the content effectively*. The group assignments involve authentic research data collected with the most up-to-date methods, and thereby serve as a means to assess student learning related to their *ability to integrate data from biology, chemistry, geology, and physics, and to analyze research and to make informed scientific conclusions.* The group presentations and reports will also assess how well the students can participate in future community efforts to mitigate effects of climate-induced changes to coastal environments.

Exams: The midterm and final exam will be essay and short-answer based, and will be the means by which students will be assessed on their knowledge of the *the way in which ocean science affects their lives*. It is also the means by which will demonstrate their ability to describe their ability to link key concepts of ocean science to specific localities and examples from the New York region. Embedded within each final exam will be one question on potential hazards to a given coastal neighborhood in New York City, and one question on sustainable seafood choices based on a restaurant menu. Students will be made aware that these themes will be present on the exam to encourage targeted study of these two questions that correspond directly with two of the course's learning objectives

Bibliography

Course Textbook

Chamberlin, W. S. and T. D. Dickey, 2007. “Exploring the World Ocean,” McGraw-Hill. New York.

Supporting Texts

Bigg, G. 1996. “The Oceans and Climate,” Cambridge.

Broecker, W. S. and T. H. Peng, 1982.“Tracers in the Sea,” Eldigio Press, 1982

Diamond, J., 2005. “Collapse,” Penguin.

Emery, W. J. and R. E. Thompson, 2001. “Data Analysis Methods in Physical Oceanography, Elsevier

Gore, A. Jr., 2006. “An Inconvenient Truth.” Rodale Press.

Heezen,” B. and C. D. Hollister, 1971. “The Face of the Deep. Oxford Univ. Press.

Kurlansky , M. 1996. “Cod, A Biography of the Fish that Changed the World”, Penguin Book, 1996

Miller, C. B., 2004. “Biological Oceanography,” Blackwell.

Murphy, D., 2006. “To Follow the Water.” Basic Books, New York

Philander, G., 2004. “Our Affair with El Nino.” Princeton Univ. Press.

Pickard, G. L. and W. J. Emery, 1990. “Descriptive Physical Oceanography,”

Sieburth, J. M., 1980. “Sea Microbes,” Cambridge.

Web-sites

Climate Science: http://www.realclimate.org

Satellite Ocean Color Homepage: http://oceancolor.gsfc.nasa.gov

U.S. Joint Global Ocean Flux Study: http://usjgofs.whoi.edu

Wikipedia: http://en.wikipedia.org/wiki/Main_Page

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits/3contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM10844600140002 **Version No.** 99.002 **Created by** Honigwachs, Lea

Created on 2019-03-06T16:31:38 **Last Updated on** 2019-03-06T16:39:51 **Status Updated on** 2019-03-06T16:44:24

Current Status Approved **Course Selected:** **Subject** HNSC. (HNSC - Health & Nutrition Sci) **Catalog Nbr** 1100

Course Revision & College

Form Submission Revised Submission **College** Brooklyn College

Please describe revisions that have been made to this course SLOs have been revised to better meet Pathways requirements.

Course Data

Course ID 110798 **Subject** HNSC. (HNSC - Health & Nutrition Sci) **Catalog Nbr** 1100

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Personal and Community Health

Course Description 3 hours; 3 credits Basic health concepts. Personal responsibility for health maintenance and improvement for individuals, families, and communities

Department Health and Nutrition Sciences

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

Syllabus_HNSC_1100.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will describe how health and medical knowledge are developed. Students will explain how individual-level health behaviors and structural-level factors influence health status. Students will evaluate the quality of health information from selected sources, including the Internet, to determine their scientific bases.
*** 2. Evaluate evidence and arguments critically or analytically.**	Students will critically assess the evidence for specific medical treatments and the controversies surrounding their use, e.g., vaccination.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Students will analyze a specific personal health behavior (e.g., vaping), and determine the need to change or adapt their behavior based on current scientific and medical knowledge.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will understand and apply basic concepts of epidemiology (e.g., morbidity and mortality rates, life expectancy) in describing the major causes of death and disability in the US (e.g., cardiovascular disease, cancer). Students will identify and explain how selected diseases and conditions (e.g., cardiovascular disease, cancer, accidents, mental illness, sexually transmitted infections, drug use and abuse) develop and may be prevented.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	

7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Students will understand the biological basis of cancer processes (e.g., stages of tumor development, role of DNA, impact of carcinogens/anti-carcinogens) and articulate how emerging cancer research impacts medical and public health policy regarding such issues as gene mutation screening, group-specific risk assessment and intervention, and environmental regulation. Students will evaluate different methods of contraception and illustrate knowledge of controversies surrounding the methods.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Students will describe the role of scientific knowledge in the creation of policies about topics such as the availability of firearms, the legalization of cannabis, abortion policy, etc.
A. If there is a change to the course title, what is the new course title?	
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Chair (Approver) Comments
Comments Approved.

HNSC 1100 Course Outline

Course Description

Basic health concepts. Personal responsibility for health maintenance and improvement for individuals, families, and communities.

Course Objectives

1. Identify the relationship between personal and community health.
2. Identify how the body functions and how individual actions and choices influence wellness.
3. Demonstrate knowledge of current and factual information regarding health.
4. Assess how personal attitudes, values and beliefs influence health behavior.
5. Describe how major determinants of health can be modified and used to improve health.
6. Describe techniques for critical analysis of health information.

Required Readings

Connect Core Concepts in Health, BRIEF, 14th Edition, by Paul M. Insel & Walton T. Roth MD. (McGraw-Hill Education).

A weekly selection of required readings will be distributed in class. When relevant links to these readings will be posted on Blackboard. Students are expected to read all assigned materials.

Course Requirements

1) Current Event Response Papers 10%
   Students will write two separate one-page papers responding to a recent article from a newspaper, magazine, or legitimate, credible website. Articles should be dated within two weeks of the assignment and should focus on a current event related to class topics.
2) Misconceptions about Health 25%
   You will choose one area where you think there is fundamental mistaken information about health to explore. Details of the assignment will be provided in class.
3) Health Policy Paper 5%
   Describe the role of scientific knowledge in the creation of policies about topics such as the availability of firearms, the legalization of cannabis, abortion policy, etc.

   Midterm 25%
4) Final Exam (cumulative) 30%
5) Attendance and participation 5%

Class Topics and Reading Assignments

Session	Topic	Readings/ Assignments
1	INTRODUCTION TO CONCEPTS IN HEALTH - Structural Barriers to Health - Definitions & Dimensions of Health - Health Information - Determinants of Wellness - Health Status, Measures of Health/Epidemiology - Relative Risk/Health Risk Appraisal	Text: Chapter 1 Selected readings

	- Health Behavior Theories - Changing Health Behavior/ Behavior Change Contracts	
2	PSYCHOLOGICAL HEALTH - Access to Mental Health Care - Psychological Health: Determinants - Maslow's Hierarchy of Needs - Coping Skills/Illness/Therapies	Text: Chapter 3 Selected readings DUE: Current events response paper
3	STRESS - Causes/Types of Stress/Stress Response - Stress Related Illness - Stress Management	Text: Chapter 2 Selected readings
4	UNDERSTANDING SEXUALITY - Intimate Relationships and Communication - Reproductive Systems (Anatomy and Function) - Contraception	Text: Chapters 4, 5, 6 Selected readings
5	REPRODUCTIVE HEALTH - Abortion - Pregnancy and Childbirth	Text: Chs.7,8 Selected readings
6	SUBSTANCE USE, MISUSE, ABUSE - OTC, Prescription Medication - Tobacco/ Alcohol and other Psychoactive Drugs	Text: Chs.9, 10 11 Selected readings
7	NUTRITION & PHYSICAL FITNESS - Essential Nutrients, Deficiency Disease - Nutritional Guidelines (RDAs) - Physical Fitness - Components of Fitness	Text: Chs. 12, 13 Selected readings DUE: Current events response paper
8	MIDTERM	
9	CARDIOVASCULAR HEALTH & DISEASE - Risk Factors/Causes/Prevention/Treatment	Text: Ch. 15 Selected readings

10	CANCER - Risk Factors/Causes/Prevention/Treatment	Text: Ch. 16 Selected readings
11	INFECTIOUS DISEASE - Pathogens, Disease Transmission - Resistance and Immunity - Sexually Transmitted Infections	Text: Chs. 17, 18 Selected readings
12	ENVIRONMENTAL HEALTH - Population growth and control - Air quality and pollution - Water quality and pollution - Solid waste / Chemical / Radiation / Noise pollution	Text: Ch. 19 Selected readings
13	INJURIES - Unintentional injuries - Violence and intentional injuries - Sexual assault and bystander intervention / social norms	Text: Ch. 21 Selected readings DUE: Misconceptions assignment
14	AGING AND END OF LIFE - Changes of aging - Aging and life expectancy - Planning for death - Coping with dying and loss	Text: Chs. 22, 23 Selected readings DUE: Health policy paper

Course Submission Form

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Form ID CCOREFORM10844600127001 **Version No.** 97.001 **Created by** Honigwachs, Lea

Created on 2018-11-14T14:29:48 **Last Updated on** 2018-11-14T14:37:06 **Status Updated on** 2018-12-22T18:59:51

Current Status Approved **Course Selected:** **Subject** HNSC. (HNSC - Health & Nutrition Sci) **Catalog Nbr** 1200

Course Revision & College

Form Submission Initial Submission **College** Brooklyn College

Course Data

Course ID 110800 **Subject** HNSC. (HNSC - Health & Nutrition Sci) **Catalog Nbr** 1200

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Fundamentals of Nutrition

Course Description 3 hours; 3 credits Fundamental principles of nutrition as they relate to optimum health of the individual and the family. Social, economic,and educational implications. Evaluation of various mass media relating to the field. This course does not satisfy the department requirement for students majoring in foods and nutrition. (Not open to students who are enrolled in or who have completed Health and Nutrition Sciences 2210 [29].)

Department Health and Nutrition Sciences

Pre-Requisites/Co-Requisites

Course Syllabus [Attachment Filename(s)]

Syllabus_HNSC_1200.doc

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will critique and evaluate nutritional information in print and on the web for reliability and validity. Students will evaluate and analyze the nutritional quality of their diet using 3-day diet records and an online nutrition analysis program.
*** 2. Evaluate evidence and arguments critically or analytically.**	Students will critically analyze and evaluate nutrition research studies and compare these studies looking at hypotheses, design, variables, measurements and conclusions.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	After evaluating and comparing two research studies, student will write a report supporting their conclusions.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Students will calculate their energy, protein, vitamin and mineral requirements and using nutritional analysis software, and will compare their intake to their recommended requirements.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Based on gender, age and body composition, students will calculate their nutritional intake, evaluate their diets and plan a program to reach their recommendations based on the Dietary Reference intakes. Using the Nutrition Facts panel on a food label, students will be asked to calculate amounts of macro and micro nutrients, compare them to daily values and evaluate nutritional content claims.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	

8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	Throughout the semester, class discussion will focus on the role of the food industry transforming our food supply and the impact on the health of our nation, including rising rates of obesity and diabetes. We discuss the science underlying these changes and steps individuals can take to mitigate these effects. Students are required to post responses on Blackboard.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
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Chair (Approver) Comments
Comments This is a valuable course for all students that very clearly lays out LO and relevance to a "Scientific World".

Below are two separate syllabi for HNSC 1200 that are used in two different versions of the course respectively.

Brooklyn College of the City University of New York
Department Of Health and Nutrition Sciences

Course: Fundamentals of Nutrition – HNSC 1200 -Web-enhanced

Term: Class time/location:

Professor: Contact info: Office hours:

Course Description:
Utilization of food by the body. Nutrient requirements under varying conditions of growth, occupation, climate. Energy metabolism and weight control. Calculation and computation of nutrients composition of selected foods, food groups. (Prerequisite: Bio 4/Biol 1002)

Course Objectives:
Upon completion of this course, the student should be able:

- Describe the components of a healthy diet utilizing dietary goals, guidelines and nutritional standards..
- Utilize sources of consumer information relevant to nutrition (e.g., labeling).
- Identify the accepted name(s) of each macronutrient (carbohydrate, protein, lipids, water) and micronutrient (vitamins and minerals); their common food sources; recommended intake level; and major functions in the body.
- Discuss the adverse health effects associated with a deficiency and toxicity for each nutrient.
- Describe the role of diet in the development of chronic diseases, such as cardiovascular disease, cancer, and diabetes.
- Utilize the scientific method to distinguish between well-researched evidence on nutrition and some of the basic fallacies and myths in this field.
- Demonstrate proficiency in understanding, interpreting, evaluating and applying quantitative data and information.
- Demonstrate critical thinking and analytical thinking through the completion of nutritional assessment projects.

Course Requirements:

Required Text

Grosvenor, M. B. & Smolin, L.A. Visualizing Nutrition Everyday Choices (2nd ed.). Wiley, 2012.

Lecture Schedule

Week 1	Environmental and nutritional contributions to health and disease Overview of the US diet: Whole foods vs. partitioned foods, the current food supply Nutritional genomics	Chapter 1
	The essential nutrients DRIs-nutritional requirements	

Learning objectives:

- Define nutrition, and essential nutrients
- Identify the basic composition and the broad functions of the six major classes of nutrients.
- Outline the body's needs for energy, the nutrients that provide energy, and the way that the energy in food is measured.
- Describe how the DRIs are determined and when they are used including the EAR, RDA, AI and ULs

Supplemental materials:
Blackboard for PP slides

Week 2	Phytonutrients/antioxidants Mediterranean diet	Ch 1

Learning objectives:

- Describe phytochemicals and functional foods.
- Describe the roles of phytochemicals in food and the physiological effects of phytochemicals in the body.
- List major phytochemicals that might protect the body from cancer and heart disease.
- Define functional foods and discuss their role in disease prevention.
- Identify methods to help the consumer evaluate the safety and effectiveness of functional foods.

Supplemental materials:
- Blackboard for PP slides
- Read "A Closer Look at Phytochemicals" from the American Institute for Cancer Research
- Liu HR, Potential Synergy of Phytochemicals in Cancer Prevention: Mechanism of Action, J Nutr 2004; 134:3479S-3485S
- Explore the different categories of phytochemicals http://lpi.oregonstate.edu/infocenter/phytochemicals/i3c/
- Browse through some of the health benefits and common food sources of the individual phytochemical compounds listed on the Phytochemicals.Info webpage

Week 3	Dietary guidelines USDA MyPlate Food labeling and selection	Ch 2

- Summarize the primary objectives of Healthy People 2010 (2020).
- Describe food exchange system for diet planning.

- List and provide examples for implementing the key recommendations of the U.S. Dietary Guidelines for Americans.
- Describe the effect of alcohol on the body.
- Outline the attributes of the MyPlate food guidance system and describe how it may be used by consumers.
- State what information must be contained on a food label based on FDA regulations.
- Interpret the Nutrition Facts label.
- Define enriched and fortified foods.
- Describe the different types of claims allowed on food labels.

Supplemental materials:
Blackboard for PP slides

http://www.cnpp.usda.gov/dietaryguidelines.htm

How to Understand and Use the Nutrition Facts Label
http://www.fda.gov/Food/ResourcesForYou/Consumers/NFLPM/ucm274593.htm

Alchohttp://college.cengage.com/nutrition/shared/Whitney_Alcohol_rc3_20100715/index.html

Week 4	Nutritional assessment Nutrition research studies	Ch 1

- Define nutritional adequacy and its impact on nutritional status and overall health.
- Outline the ABCDs of nutritional status assessment.
- Describe different research designs.
- Explain the purposes and procedures for each of the steps in the scientific method.
- Discuss the value and limitations of studies such as The Framingham Heart Study and The National Health and Nutrition Examination Surveys (NHANES) in assessing the overall health of a population..

Supplemental materials:
Blackboard for PP slides

	Digestion and absorption	Ch. 3

Learning objectives:

- Describe and list the functions of the gastrointestinal (GI) tract, including the accessory organs.
- Discuss several gastrointestinal disorders in terms of cause, symptoms, and treatment .

- Explain the process by which major nutrients (fat, protein, carbohydrates) are broken down and absorbed by the body.
- Describe how the major nutrients are transported after absorption and where they are stored in the body.
- Identify how metabolic waste products are removed from the body.

Supplemental materials:
Blackboard for PP slides

Week 5 & 6	Carbohydrates: sugar and starch	Ch. 4
	Diabetes & Hypoglycemia Effects of sugar, starches & artificial sweeteners	
	Effects of fiber in our diet	
	Evaluating Published Research Project due(10%)	

Learning Objectives:

- Describe the major types of carbohydrates that are found in food, and be able to identify the types found in any particular food..
- Discuss the functions of carbohydrates in the body.
- Outline how various types of carbohydrates are digested, absorbed, and utilized by the body.
- Describe how blood glucose levels are maintained, how glucose is taken up by cells, and how energy storage in the body is regulated. Explain the roles of hormones in the regulation of blood glucose.
- Discuss current research regarding the relationships among dietary carbohydrates, obesity, diabetes, and other chronic illnesses.
- Compare and contrast the various forms of diabetes mellitus.
- Describe the two types of hypoglycemia.
- Explain glycemic load and the pros and cons of its use in meal planning.
- Describe the various alternative sweeteners – nutritive and non- nutritive and effect on the body.
- Discuss the role of dietary fiber in human nutrition.
- Identify the Daily Value and DRI for fiber and methods to increase fiber in the diet.

Supplemental materials:
Blackboard for PP slides

http://college.cengage.com/nutrition/shared/Whitney_Metabolic_Syndrome_rc3_20100715/index.html

	Midterm examination (30% of grade)	

Week 7 & 8	Lipids: fats and oils	Ch. 5

	Essential fatty acids	
	Phospholipids/sterols	
	Lipid digestion Diet and Heart Disease	

Learning Objectives:

- Identify the food sources, functions, and dietary recommendations for various lipids important to humans, including the essential and non-essential fatty acids, saturated and unsaturated fatty acids, cholesterol, and trans fatty acids.
- Describe the eicosanoids derived from the essential fatty acids n-3 and n-6 and their functions.
- Describe the structure and functions of mono-, di-, and triglycerides, phospholipids, cholesterol, and those lipids such as LDL and HDL that circulate in the body.
- Outline the recommendations for dietary intake and food sources of the various types of lipids.
- Describe research findings that discuss the benefits or drawbacks of specific types of dietary fats on the health of the body.
- Describe the genetic and dietary factors that will increase and decrease risk for heart disease.

Supplemental materials:
Blackboard for PP slides.

Week 9	Protein and amino acids	Ch. 6

Learning Objectives:

- Discuss amino acid structure and differentiate among essential, nonessential, and conditionally essential amino acids.
- Define complete versus incomplete proteins and identify sources of each.
- Describe the chemical structure of a protein.
- Describe how protein is digested, absorbed, and metabolized by the body.
- List the functions of protein and amino acids in the body.
- Explain the difference between high-quality and lower-quality proteins and the concept of a limiting amino acid.
- Discuss protein deficiency and protein excess and the health problems that result.

Supplemental materials:
Blackboard for PP slides.

	Cancer	
	Controversies Project due (10%)	

Learning Objectives:

- Describe the phases of cancer development: initiation, promotion, progression and metastasis
- Discuss the risk factors: genetic, environmental and lifestyle
- Discuss the role of nutrients in the prevention or promotion of cancer risk

Supplemental materials:
Blackboard for PP slides.

Week 10	**QUIZ** (10% of grade) Fat soluble vitamins: Vitamin A, D, E, and K	Ch. 7

Learning objectives:

- Describe how the fat-soluble vitamins are absorbed, transported, and stored in the body.
- Discuss the interrelationships between the fat and fat-soluble vitamin content of one's food intake.
- Identify the food sources and functions in the body of each of the fat-soluble vitamins—vitamins A, D, E, and K.
- Identify the deficiency and toxicity syndromes for each of the fat-soluble vitamins.
- Describe the roles of the various fat-soluble vitamins in the health of eyes, vision (especially in dim light), cell differentiation, growth, reproduction, skin health, bone health, heart health, the clotting of blood, and the immune response.
- Identify nutrients that function as antioxidants and explain how they function as such.

Supplemental materials:
Blackboard for PP slides

Week 11	Water soluble vitamins: Vitamin C and B complex	Ch. 7

Learning objectives:

- Describe the major functions of the water-soluble vitamins—the B vitamins and vitamin C.
- Describe how the water-soluble vitamins are absorbed, transported, and stored in the body.
- Identify food sources and state the recommended intake of each of the water-soluble vitamins.
- Describe the signs and symptoms of water-soluble vitamin deficiencies and toxicities.
- Describe the population group or groups at risk for water-soluble vitamin deficiencies.

Supplemental materials:
Blackboard for PP slides

Week 12	Water and Macrominerals	***Diet diary due***	Ch. 8

Learning objectives:

- Define the term mineral and explain how minerals are classified.
- Identify the major minerals and their structural and functional roles.
- Identify for each mineral the requirements and nutrient-dense dietary sources as well as any concerns related to bioavailability, deficiency, and toxicity.
- Identify which minerals function as electrolytes and the functions of electrolytes in the body.
- Discuss the pros and cons of attempting to meet mineral needs from foods versus supplements.
- Discuss the various roles of water in the body and the processes for regulation of the total amount as well as the distribution of water.
- Explain the factors that influence bone development and maintenance, and provide general guidelines for prevention of osteoporosis.

Supplemental materials:
Blackboard for PP slides

Week 13	Trace minerals Toxic metals	Ch. 8

Learning objectives:

- Describe the structure and major functions of each trace mineral.
- Identify significant food sources for each trace mineral.
- Outline how each trace mineral is absorbed, metabolized, and regulated in the body.
- Discuss the deficiency and toxicity signs and symptoms for each trace mineral and the existing corresponding disease states.
- Identify the toxic metals and risk for disease.

Supplemental materials:
Blackboard for PP slides

Week 14	Energy Balance and Weight Control	Ch. 9

Learning objectives:

- Explain the major concept of energy balance.
- Describe several methods used to determine body composition.
- List the health risk factors associated with obese and underweight individuals.

- Calculate the BMI when given weight and height information and be able to apply and interpret the BMI calculations in any given situation.
- Compare and contrast the health consequences of android vs. gynoid obesity.
- Calculate waist hip measurement and describe health effects.
- Discuss how the hormones leptin and grhelin function in the body to regulate the appetite.
- Discuss how influences outside of the body can impact appetite and weight control efforts..
- Discuss the role that regular physical activity can play in weight loss and maintenance efforts.
- Describe how behavior changes can help in successful weight loss and maintenance of a long-term healthy body composition.
- Compare and contrast risk factors for the development of anorexia nervosa and bulimia nervosa.

Supplemental materials:
Blackboard for PP slides

	FINAL EXAM (25% of grade)	

GRADE DISTRIBUTION:

Midterm	25%
Diet Analysis Project	25%
Final Exam	25%
Controversies project	10%
Evaluating Published research	10%
Participation & Discussion Board	5%
TOTAL GRADE	100%

No makeup exams will be given, unless there is verifiable documentation of an emergency situation. Class attendance and participation is mandatory; lateness on 2 separate days will be counted as one absence. Your assignments must be submitted on time; late submissions will be penalized. Assignments will be discussed in detail in class.

Syllabus: Fundamentals of Nutrition – HNSC 1200 -Web-enhanced

Course Description:
Utilization of food by the body. Nutrient requirements under varying conditions of growth, occupation, climate. Energy metabolism and weight control. Calculation and computation of nutrients composition of selected foods, food groups. (Prerequisite: Bio 4/Biol 1002)

Course Objectives:
Upon completion of this course, the student should be able:

- Describe the components of a healthy diet utilizing dietary goals, guidelines and nutritional standards..
- Utilize sources of consumer information relevant to nutrition (e.g., labeling).
- Identify the accepted name(s) of each macronutrient (carbohydrate, protein, lipids, water) and micronutrient (vitamins and minerals); their common food sources; recommended intake level; and major functions in the body.
- Discuss the adverse health effects associated with a deficiency and toxicity for each nutrient.
- Describe the role of diet in the development of chronic diseases, such as cardiovascular disease, cancer, and diabetes.
- Utilize the scientific method to distinguish between well-researched evidence on nutrition and some of the basic fallacies and myths in this field.
- Demonstrate critical thinking and analytical proficiency in understanding, interpreting, evaluating and applying quantitative data and information through the completion of nutritional assessment projects.

Course Requirements:

This is a Web-enhanced course, you must log on to Blackboard to access supplemental course materials for each lecture and required assignments. Part of your course grade is participating in this online environment and posting to the discussion board. There will be 4 threads or discussion topics during the semester and you are required to have a minimum of 2 posts per discussion.

Required Text

Sizer, F. & Whitney, E. Nutrition: Concepts and Controversies (12th ed.). Thompson-Wadsworth, CA, 2011. ISBN # 0538734949

Assignments:

1. Diet Analysis Project: Detailed instructions for completing your diet analysis project can be accessed on Blackboard. Briefly, you will be asked to carefully record your dietary

intake for 3 days, you will then analyze your intake using an online nutritional software program. In addition, you will calculate your caloric, protein, fat and vitamin and mineral requirements and compare them to your 3 day average intake and then write a detailed report discussing the results.

2. Evaluating Published Research Project: After our classes on the scientific method and understanding various research studies, you will be asked to read two articles written on a nutrition-related topic. Evaluate these articles using the chart found on Blackboard then summarize your findings compare differences you observed between the two articles, indicate which article you find more credible using at least 3 specific examples.

3. Critiquing Information found on the Internet: Log on to your Blackboard account and view each of the websites provided. Evaluate each of these sites by completing the chart provided.

4. Understanding Food Labels Project: Using the Nutrition Facts panel on a food label provided you will be asked to calculate grams of macro and micro nutrients, compare to daily values and evaluate nutritional content claims.

Lecture Schedule

Week 1	Environmental and nutritional contributions to health and disease Overview of the US diet: Whole foods vs. partitioned foods, the current food supply Nutritional genomics	Chapter 1 Ch. 12 Controversy 11 pg. 440-444
	The essential nutrients DRIs-nutritional requirements	

Learning objectives:

- Define nutrition, and essential nutrients
- Identify the basic composition and the broad functions of the six major classes of nutrients.
- Outline the body's needs for energy, the nutrients that provide energy, and the way that the energy in food is measured.
- Describe how the DRIs are determined and when they are used including the EAR, RDA, AI and ULs

Supplemental materials:
Blackboard for PP slides

Week 2	Phytonutrients/antioxidants Mediterranean diet	Controversy 2

Learning objectives:

- Describe phytochemicals and functional foods.

- Describe the roles of phytochemicals in food and the physiological effects of phytochemicals in the body.
- List major phytochemicals that might protect the body from cancer and heart disease.
- Define functional foods and discuss their role in disease prevention.
- Identify methods to help the consumer evaluate the safety and effectiveness of functional foods.

Supplemental materials:

- Blackboard for PP slides
- Read "A Closer Look at Phytochemicals" from the American Institute for Cancer Research
- Liu HR, Potential Synergy of Phytochemicals in Cancer Prevention: Mechanism of Action, J Nutr 2004; 134:3479S-3485S
- Explore the different categories of phytochemicals http://lpi.oregonstate.edu/infocenter/phytochemicals/i3c/
- Browse through some of the health benefits and common food sources of the individual phytochemical compounds listed on the Phytochemicals.Info webpage

Week 3	Dietary guidelines USDA MyPlate Food labeling and selection	Ch 2 Controversy 3

- Summarize the primary objectives of Healthy People 2010 (2020).
- Describe food exchange system for diet planning.
- List and provide examples for implementing the key recommendations of the U.S. Dietary Guidelines for Americans.
- Describe the effect of alcohol on the body.
- Outline the attributes of the MyPlate food guidance system and describe how it may be used by consumers.
- State what information must be contained on a food label based on FDA regulations.
- Interpret the Nutrition Facts label.
- Define enriched and fortified foods.
- Describe the different types of claims allowed on food labels.

Supplemental materials:
Blackboard for PP slides

http://www.cnpp.usda.gov/dietaryguidelines.htm

How to Understand and Use the Nutrition Facts Label
http://www.fda.gov/Food/ResourcesForYou/Consumers/NFLPM/ucm274593.htm

Alchohttp://college.cengage.com/nutrition/shared/Whitney_Alcohol_rc3_20100715/index.html

Week 4	Nutritional assessment Nutrition research studies	pg. 331-334 p. 13-17

- Define nutritional adequacy and its impact on nutritional status and overall health.
- Outline the ABCDs of nutritional status assessment.
- Describe different research designs.
- Explain the purposes and procedures for each of the steps in the scientific method.
- Discuss the value and limitations of studies such as The Framingham Heart Study and The National Health and Nutrition Examination Surveys (NHANES) in assessing the overall health of a population..

Supplemental materials:
Blackboard for PP slides

	Digestion and absorption	Ch. 3

Learning objectives:

- Describe and list the functions of the gastrointestinal (GI) tract, including the accessory organs.
- Discuss several gastrointestinal disorders in terms of cause, symptoms, and treatment .
- Explain the process by which major nutrients (fat, protein, carbohydrates) are broken down and absorbed by the body.
- Describe how the major nutrients are transported after absorption and where they are stored in the body.
- Identify how metabolic waste products are removed from the body.

Supplemental materials:
Blackboard for PP slides

Week 5 & 6	Carbohydrates: sugar and starch	Ch. 4
	Diabetes & Hypoglycemia Effects of sugar, starches & artificial sweeteners	
	Effects of fiber in our diet	
	Evaluating Published Research Project due(10%)	

Learning Objectives:

- Describe the major types of carbohydrates that are found in food, and be able to identify the types found in any particular food..
- Discuss the functions of carbohydrates in the body.
- Outline how various types of carbohydrates are digested, absorbed, and utilized by the body.

- Describe how blood glucose levels are maintained, how glucose is taken up by cells, and how energy storage in the body is regulated. Explain the roles of hormones in the regulation of blood glucose.
- Discuss current research regarding the relationships among dietary carbohydrates, obesity, diabetes, and other chronic illnesses.
- Compare and contrast the various forms of diabetes mellitus.
- Describe the two types of hypoglycemia.
- Explain glycemic load and the pros and cons of its use in meal planning.
- Describe the various alternative sweeteners – nutritive and non- nutritive and effect on the body.
- Discuss the role of dietary fiber in human nutrition.
- Identify the Daily Value and DRI for fiber and methods to increase fiber in the diet.

Supplemental materials:
Blackboard for PP slides

http://college.cengage.com/nutrition/shared/Whitney_Metabolic_Syndrome_rc3_20100715/index.html

	Midterm examination (30% of grade)	

Week 7 & 8	Lipids: fats and oils Essential fatty acids	Ch. 5
	Phospholipids/sterols	
	Lipid digestion Diet and Heart Disease	Ch. 11 p. 412-422

Learning Objectives:

- Identify the food sources, functions, and dietary recommendations for various, including the essential and non-essential fatty acids, saturated and unsaturated fatty acids, cholesterol, and trans fatty acids.
- Describe the eicosanoids derived from the essential fatty acids n-3 and n-6 and their functions.
- Describe the structure and functions of mono-, di-, and triglycerides, phospholipids, cholesterol, and those lipids such as LDL and HDL that circulate in the body.
- Describe research findings that discuss the benefits or drawbacks of specific types of dietary fats on the health of the body.
- Describe the genetic and dietary factors that will increase and decrease risk for heart disease.
- Discuss lifestyle and dietary factors that will increase and decrease heart disease risk.

Supplemental materials:

Blackboard for PP slides.

Week 9	Protein and amino acids	Ch. 6

Learning Objectives:

- Discuss amino acid structure and differentiate among essential, nonessential, and conditionally essential amino acids.
- Define complete versus incomplete proteins and identify sources of each.
- Describe the chemical structure of a protein.
- Provide an overview of genetics, epigenetics, and nutrigenomics and their relationship to health.
- Describe how protein is digested, absorbed, and metabolized by the body.
- List the functions of protein and amino acids in the body.
- Explain the difference between high-quality and lower-quality proteins and the concept of a limiting amino acid.
- Discuss protein deficiency and protein excess and the health problems that result.

Supplemental materials:
Blackboard for PP slides.

	Cancer	Ch. 11pgs 429-438
	Controversies Project due (10%)	

Learning Objectives:

- Describe the phases of cancer development: initiation, promotion, progression and metastasis
- Discuss the risk factors: genetic, environmental and lifestyle
- Discuss the role of nutrients in the prevention or promotion of cancer risk

Supplemental materials:
Blackboard for PP slides.

Week 10 & 11	**QUIZ** (10% of grade) Fat soluble vitamins: Vitamin A, D, E, and K	Ch. 7

Learning objectives:

- Describe how the fat-soluble vitamins are absorbed, transported, and stored in the body.
- Discuss the interrelationships between the fat and fat-soluble vitamin content of one's food intake.
- Identify the food sources and functions in the body of each of the fat-soluble vitamins—vitamins A, D, E, and K.
- Identify the deficiency and toxicity syndromes for each of the fat-soluble vitamins.
- Describe the roles of the various fat-soluble vitamins in the health of eyes, vision (especially in dim light), cell differentiation, growth, reproduction, skin health, bone health, heart health, the clotting of blood, and the immune response.

- Identify nutrients that function as antioxidants and explain how they function as such.
- Describe the different processes through which the body generates “active” forms of several of the fat-soluble vitamins.

Supplemental materials:
Blackboard for PP slides

	Water soluble vitamins: Vitamin C and B complex	Ch. 7

Learning objectives:

- Describe the major functions of the water-soluble vitamins—the B vitamins and vitamin C.
- Describe how the water-soluble vitamins are absorbed, transported, and stored in the body.
- Identify food sources and state the recommended intake of each of the water-soluble vitamins.
- Describe the signs and symptoms of water-soluble vitamin deficiencies and toxicities.
- Describe the population group or groups at risk for water-soluble vitamin deficiencies.

Supplemental materials:
Blackboard for PP slides

Week 12	Water and Macrominerals Diet and Blood Pressure Osteoporosis	***Diet Analysis Project due (25%)***	Ch. 8 pg. 422-426 Controversy 8

Learning objectives:

- Define the term mineral and explain how minerals are classified.
- Identify the major minerals and their structural and functional roles.
- Identify for each mineral the requirements and nutrient-dense dietary sources as well as any concerns related to bioavailability, deficiency, and toxicity.
- Identify which minerals function as electrolytes and the functions of electrolytes in the body.
- Discuss the pros and cons of attempting to meet mineral needs from foods versus supplements.
- Discuss the various roles of water in the body and the processes for regulation of the total amount as well as the distribution of water.
- Explain the factors that influence bone development and maintenance, and provide general guidelines for prevention of osteoporosis.

Supplemental materials:
Blackboard for PP slides

Week 13	Trace minerals Toxic metals	Ch. 8

Learning objectives:

- Describe the structure and major functions of each trace mineral.
- Identify significant food sources for each trace mineral.
- Outline how each trace mineral is absorbed, metabolized, and regulated in the body.
- Discuss the deficiency and toxicity signs and symptoms for each trace mineral and the existing corresponding disease states.
- Identify the toxic metals and risk for disease.

Supplemental materials:
Blackboard for PP slides

	Energy Balance and Weight Control	Ch. 9

Learning objectives:

- Explain the major concept of energy balance.
- Describe several methods used to determine body composition.
- List the health risk factors associated with obese and underweight individuals.
- Calculate the BMI when given weight and height information and be able to apply and interpret the BMI calculations in any given situation.
- Compare and contrast the health consequences of android vs. gynoid obesity.
- Calculate waist hip measurement and describe health effects.
- Discuss how the hormones leptin and grhelin function in the body to regulate the appetite.
- Discuss how influences outside of the body can impact appetite and weight control efforts..
- Discuss the role that regular physical activity can play in weight loss and maintenance efforts.
- Describe how behavior changes can help in successful weight loss and maintenance of a long-term healthy body composition.
- Compare and contrast risk factors for the development of anorexia nervosa and bulimia nervosa.

Supplemental materials:
Blackboard for PP slides

Week 14	Life Cycle Nutrition	Ch. 13

- Explain why a nutritionally adequate diet is important long before a pregnancy is established.
- Identify the special nutritional needs of a pregnant teenager as compared to a pregnant adult.
- Evaluate the statement that “no amount of drinking of alcoholic beverages is safe or advisable during pregnancy.”

- Describe the impacts of gestational diabetes and preeclampsia on the health of a mother and her unborn child.
- Discuss the benefits of breastfeeding an infant for both the mother and the child.
- Describe the relationship between childhood obesity and related health conditions.
- Provide a plan to help an obese child develop healthy eating and activity habits so as to improve his or her short-term and long-term health overall.

Supplemental materials:
Blackboard for PP slides

	FINAL EXAM (25% of grade)	

GRADE DISTRIBUTION:

Midterm	25%
Diet Analysis Project	25%
Final Exam	25%
Evaluating Published research	10%
Critiquing Information found on the Internet	5%
Food Labels Project	5%
Participation & Discussion Board	5%
TOTAL GRADE	100%

No makeup exams will be given, unless there is verifiable documentation of an emergency situation. Class attendance and participation is mandatory; lateness on 2 separate days will be counted as one absence. Your assignments must be submitted on time; late submissions will be penalized. Assignments will be discussed in detail in class.

* * *

CUNY COMMON CORE
Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3 credits/3 contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

"Submit" or "Resubmit" must be clicked at the bottom of this form in order to complete the course submission process.

College	Brooklyn
Please check one of the following	◉ Initial Submission ○ Revised Submission
Course Prefix and Number (e.g., ANTH 101, if number not assigned enter XXX)	PHYS 1331
Course Title	Physics: the Simple Laws That Govern the Universe
Department(s)	Physics
Discipline	Physics
Credits	3
Contact Hours	3
Pre-requisites (if none, enter N/A)	N/A
Co-requisites (if none, enter N/A)	N/A
Catalogue Description	The development of physics, in historical context. Applications to everyday life. Laws of universal gravitation and the conservation of energy. Examination of a topic in modern physics in which these classical concepts are transformed, extended, and/or applied. (Not open to students who are enrolled in or have completed Physics 0.1 or 1100 or 1112 or 1150 or 1.6, Integrated Science 1 or Core Studies 7.2.)
Special features (e.g., linked courses)	
Sample Syllabus (5 pages max recommended)	Physics 1331 syllabys.docx 17.48 KB
Indicate the status of this course being nominated.	◉ current course ○ revision of current course ○ a new course being proposed
CUNY COMMON CORE Location Please check the area of the Common Core for which the course is being submitted.	**Required** ○ English Composition ○ Mathematical and Quantitative Reasoning ○ Life and Physical Sciences **Flexible** ○ World Cultures and Global Issues ○ Individual and Society ○ US Experience in its Diversity ◉ Scientific World ○ Creative Expression

Learning Outcomes

In the left column explain the course assignments and activities that will address the learning outcomes in the right column.

Flexible Common Core (18 credits)
Six three-credit liberal arts and sciences courses, with at least one course from each of the following five areas and no more than two courses in any discipline or interdisciplinary field.

Scientific World
A Flexible Core course must meet the three learning outcomes in the right column.

In preparing lab reports, solutions to problems, answers to exam questions, and written exercises; students will interpret, assess, and incorporate information from a variety of perspectives. They will gather this information from a variety of sources including readings, lectures, peer discussion/collaboration, videos and appropriate online sources.	1. Gather, interpret, and assess information from a variety of sources and points of view.
In lab, students will have to assess and interpret their results. Sometimes students must realize a measurement must be redone because their results don't make sense.	2. Evaluate evidence and arguments critically or analytically.
Students will submit lab reports, homework, and written exams in which they must justify their conclusions in writing.	3. Produce well-reasoned written or oral arguments using evidence to support conclusions.

A course in this area **must meet at least three** of the additional learning outcomes in the right column. A student will:

Students will learn and apply Newton's laws, the law of gravitation, concepts of work and energy.	4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to, computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.
Students will practice their analytical problem solving skills. Also, in lab students will learn how to precisely use simple measurement equipment such as rulers and timers.	5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.
Students will learn about the processes through which physical ideas and theories were developed. Much of this process involves the careful comparison of theory to experiment.	6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.
	7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.
Some groups will choose to study such topics as nuclear weapons or energy in an environmental context.	8. Understand the scientific principles underlying matters of policy or public concern in which science plays a role.

Note: A draft of this form cannot be saved. Clicking "close" will result in exiting this form and losing any information that has been entered. "Submit" or Resubmit" must be clicked in order to complete the course submission process.

Close

ID: 848

Filename: Brooklyn_SW_PHYS 1331_848

PHYS1005: The Simple Laws that Govern the Universe

4 hours lecture; 2 credits

Fall 2019

Instructor: *Prof. Kai Shum – kshum@brooklyn.cuny.edu*

Time: *Monday/Wednesday 11:00 – 11:50AM*

Reference Texts: *1. Physics Matters by J. Trefil & R. Hazen, 2007 J. Wiley & Sons*

2. Chapters by OpenStax College (Rice University; http://userhome.brooklyn.cuny.edu/kshum)

Communication with class through website: ***http://userhome.brooklyn.cuny.edu/kshum***

Goal and Objectives: The goal of this course is to provide students with a basic understanding of

the physical processes that govern the Universe and how they relate to our planet's physical environment and increasingly

To human society and its interactions with the physical environment.

Common laws include gravity, laws of motion, the law of conservation of energy, etc.

Specific objectives include ability to conduct, analyze, and interpret simple experimental measurements, analyze

physical problems and generating solutions. Through this course students will be able to present scientific facts,

calculations and experimental results, in written and oral forms.

Bulletin Description: The development of physics, in historical context. Applications to everyday life. Laws of universal gravitation and the conservation of energy. Examination of a topic in modern physics in which these classical concepts are transformed, extended, and/or applied. Satisfies Pathways Flexible Core Scientific World requirement (Not open to students who are enrolled in or have completed Physics 0.1 or 1100 or 1112 or 1150 or 1.6, Integrated Science 1 or Core Studies 7.2 or CORC 1331 or Physics 1331).

Discussion: This course takes the students through a journey that will lead to exposure to our current understanding of the Universe that is consistent with the principles of a Scientific method that are anchored on experimental observations. Students will be able to practice by working with available experimental data and demonstrate that the data are consistent with some of the key laws.

Course Structure: The structure of the course includes the lectures by the instructor, the demonstrations by lab instructors, and the experiments performed by students. The lectures outlined below by the instructor will provide introductions and reasons how observed events in everyday life that comprises the

ways in which people typically act, think, and feel on a daily basis can be interpreted by simple physics laws. The demonstrations by a lab instructor just before student's experiments will illustrate how physics laws can be used to predict the trace of a designed event. Finally, students will be able to perform various experiments based on the lecture materials to further digest what they have learned in lectures.

Course Outline:

- Week 1 – Introduction. The nature of the of the scientific method. Models, theories and laws. The Copernican revolution.
- Week 2 – Kinematics of one-dimensional/two-dimensional (1D/2D) motion through introducing point-mass concept, coordinates, distance, displacement, speed/velocity, &inertial frames.
- Week 3 – Newton's 1st law, two-object problems, Acceleration, and de-accretion
- Week 4 – Vertical motions with gravitational acceleration a = ± g (g = 9.8 m/s^2)
- Week 5 – 2D projectile motions
- Week 6 – Dynamics of motion: Newton's 2nd (F = ma)
- Week 7 – Review,
- Week 8 – **Exam#1**; Solutions of exam#1
- Week 9 – Gravitational force/normal force/friction force/tension,
- Week 10 – Newton's 3rd law (action/reaction forces), concepts of systems/sub-systems
- Week 11 – Energetics of motion: kinetic energy, gravitational potential energy, thermodynamics (1st law, heat, heat-capacity, temperature, radiation laws)
- Week 12 – Thermodynamics (2nd law, latent-heat of evaporation/fusion), Ray-optics (mirrors)
- Week 13 – Review, Ray-optics, **Exam#2**
- Week 14 – Solutions of exam#2, Coulomb's law/Electric field/potential, electric current/power, ohm's law
- Week 14 – Resistors in series and in parallel; nuclear physics; Ray-optics (spherical mirror imaging)

Learning Outcomes:

Students will explain how observations support particular conclusions. The observations will come through laboratory experiments that are designed to directly test the corresponding physical laws. Students will be asked to predict the conclusions based on the laws and quantitatively compare their predictions to the results of the experiments.
Students will learn the basic physical laws that govern the universe. Word problems will demonstrate the use of the physical laws in simple cases.
Students will use units, convert between units and work with different scales.
Students will learn how the scientific method and its reliance on observation and refutability are applied to gain a consistent understanding of the laws that govern the physical environment and the processes that take place there. The development of the scientific method will be demonstrated through analysis of the Copernican revolution asking the students to identify refutability and demonstrate the models, theories and laws that differentiate between the Geocentric and the Heliocentric models of the universe.
Students will perform laboratory experiments in teams weekly involving measurements, data analysis, graph plotting, calculations. Students will learn about the inherent uncertainty in the measurement process. Students will directly compare theory such as laws of motion and gravitational forces that account for the structure of the universe

with simple laboratory experiments and in the process will learn that laws that govern the Universe can be tested (and refuted) in the laboratory.

Examples of assignments connections to learning Outcomes:

Every topic listed in the course outline will be summarized with student's demonstration of related quantitative word problems. All the exams and quizzes will be anchored on solutions of the related word problems. Few examples of these problems on various topics are given below:

1. The speed limit on some interstate highways is roughly 100 km/h. (a) What is this in meters per second? (b) How many miles per hour is this?
2. How many times longer than the mean life of an extremely unstable atomic nucleus is the lifetime of a human? (Hint: The lifetime of an unstable atomic nucleus is on the order of 10^{-22}sec.).

3. Occasionally, the Colorado River near its mouth, flows at a rate of 646 million gallons/day. Survey of the terrain reveals a drop of 50m. How much electricity can I generate by putting hydroelectric power station there?

Laboratory experiments (http://depthome.brooklyn.cuny.edu/physics/lab/Physics-1005-Lab-Fall-2019v1.pdf)

Following are the list of experiments. Most topics listed in the course outline will be demonstrated in laboratory experiments

1. Introduction to measurement and error
2. Rolling a Ball at Constant Speed
3. Speed and acceleration
4. Range and the dynamics of free fall
5. Newton's Second Law
6. Kinetic and Potential Energy
7. Simple pendulum
8. Heat and temperature

9. Calorimetry and Latent Heat

10. Reflection and Image Formation by a Plane Mirror

11. Refraction

12. Electrical Measurements

13. Radioactivity

Students must predict the outcome of individual experiments based on material covered in class and test their predictions by performing the experiments.

Examples of Class discussions:

1. Implications of $E = mc^2$ daily life.
2. Environmental ramifications of the radiation laws.

Methods of Evaluation: Lecture-exams (40%), lab-reports (28%), and final exam (32%).

Electronic Tools: n/a

Addendum – *Required Reading*

REQUIRED-INFO-ON-COURSE-POLICIES:
Your responsibility will be to come on time, participate both individually and on the team activities, think critically, and show respect and concern toward all members of the class.

A. Attendance Policy: **Attendance is required as is arriving to class on-time. The class starts at 9:30am. Plan for it.**

- You are expected to be present and on-time for every class session. Material covered during every class meeting is important for learning the course content as a whole.
- Coming in late and leaving during the class session distracts your fellow classmates and the class discussions in progress. If you have to leave early, just let me know ahead of time.
- If you are regularly late, I will discuss this with you and if the problem persists, your grade may be debited.
- Although the TBL format requires regular on-time attendance, if there are any emergencies, we can discuss any special circumstances. I understand complex lives.

B. Guidelines for Behavior in Class:

- *Behavior toward classmates:* For the semester, we will be a community and will need to negotiate expectations for behavior to maintain an atmosphere in which all students can learn, despite personal, cultural, religious and other social differences. You will be an active part of the learning

process. That means the success of the class is a shared responsibility for all of us to provide the help, collaboration and support for all in the class to benefit to the extent they participate. Each one of you is expected to demonstrate professional attitudes and behaviors during class meetings and while working on team learning assignments. Remember that each one of you will be directly and indirectly influencing others' learning and they are influencing yours.

- *Feedback to the instructor:* if you feel I am not meeting course goals is welcomed and you will not be penalized for it in any way. I work hard on this course and I want you to succeed. If you feel there are problems with the design or delivery of the course, give me your input and we can talk about it.
- *Cell Phone Calls/Leaving the Classroom During Class:* The structure of the setting is perhaps more informal than in a traditional classroom. You may not leave class during the period unless there is a verifiable emergency of some kind. Please go to the bathroom before class (the closest bathrooms are upstairs on the first floor). It is not acceptable to leave class to take phone calls or take long bathroom breaks and you absolutely may not leave the classroom during quizzes without permission.
- *Remove Your Own Waste:* Please keep the classroom clean. Do not leave "junk" (papers, food cartons, plastic water bottles) in the classroom. There are waste baskets in the class room and in the corridor outside.

C. Digital Technology Policy (I really hate to write this section, but it has proven necessary):

- The only acceptable use of electronic devices during class is to access your e-textbook and to answer questions in Learning Catalytics. The use of computers, iPads, netbooks, cell phones or other electronic devices during class for any purposes unrelated to class activities is unacceptable.
- You also may not use your devices between the IRAT and TRAT phases of a class, in order to avoid having people looking up answers to the TRAT.
- You may not use laptops, tablets or cell phones for non-class-related browsing, texting, emailing, social messaging, shopping, gaming, and doing homework for other classes, etc. during class time. Selfies are out as well. Such activities not only reduce/dilute your attention to team and class discussions, but also distract me and other students. If you are using an electronic device not connected with the activities of the class, you are not participating fully in the day's activities. I do not like to embarrass students in class, but I will call you out if you are repeatedly misusing technology during the class and I will call on frequent offenders to answer a question or contribute to a discussion or I take your device until the class is over. You have been warned.
- In the same vein, you should neither make nor answer phone calls during class. Smart phones must be turned off or set to vibrate during class. You may leave the room only in connection to a call that is about a *verifiable emergency*.

REQUIRED INFO ON COLLEGE POLICIES AND PROCEDURES:

A. Class and College Academic Integrity Policies: You are expected to adhere to College standards for academic integrity. In a class that has collaboration involved in daily class activities, it is important to understand the difference between collaboration that is allowed and encouraged, and collaboration that is a violation of academic integrity rules for the class. If in doubt for a specific assignment, ask the instructor and reference your syllabus to determine assignments where collaboration is OK and those when it is not.

It is a violation of academic integrity to obtain answers to individual class quizzes or exams in any form from peers either directly with their cooperation or by looking at their answers without their knowledge, unless collaboration on the quiz or examination has explicitly been permitted and

encouraged by the instructor. Plagiarism of any kind will **NOT** be allowed by College policy. Using others' work/ideas, unless it is a collaborative assignment and so indicated by the instructor, as well as improper citing/referencing will be viewed seriously. Copying and pasting from electronic or other sources on any evaluations without attribution is not permitted.

Brooklyn College Instructors are required to include on syllabi the following statement on the University's policy on Academic Integrity: *"The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both. The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for policy implementation can be found at www.brooklyn.cuny.edu/bc/policies. If a faculty member suspects a violation of academic integrity and, upon investigation, confirms that violation, or if the student admits the violation, the faculty member must report the violation."*

B. Disability-Related Accommodations: The following information about the Center for Student Disability Services is provided for any students needing accommodations to complete the work in the course: *"In order to receive disability-related academic accommodations, students must first be registered with the Center for Student Disability Services. Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with the Director of the Center for Student Disability Services, Ms. Valerie Stewart-Lovell at 718-951-5538*. If you have already registered with the Center for Student Disability Services, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her."

*C. Non-attendance in class due to religious beliefs: S*ee page 65 in the latest Bulletin in reference to the state law regarding non-attendance because of religious beliefs at http://www.brooklyn.cuny.edu/web/off_registrar/2016-17_Undergraduate_Bulletin.pdf For any days of religious observance that prevent attendance in class, students must be given "equivalent opportunity to make up any examination, study or work requirements" missed because of absence due to religious observance.

D. Academic Regulations and Significant Dates: Students are encouraged to familiarize themselves thoroughly with the academic regulations of Brooklyn College and CUNY in the latest online *Undergraduate Bulletin.* Dropping and adding courses, even within drop/add periods can have financial aid implications. Before you drop any courses, you should check with the Financial Aid office if you are in jeopardy of losing some or all financial aid, particularly if you would fall below 12 credits.

*When you **drop** a course, it will not appear on your transcript. When you **withdraw** from a course, a grade of W appears on your transcript. A W grade does not count in your academic index.

(PHYS 1331)

Physics: the Simple Laws That Govern the Universe
Syllabus

sample grading breakdown

lecture-based exams:	40%
written exercises:	25%
lab exercises and reports:	25%
lab exams:	10%

Class will meet for two lecture hours per week.

Week	Topic
1	Introduction: Ancient concepts of motion (e.g., Aristotle, Zeno)
2	Galileo's breakthough on motion (velocity, acceleration, freefall)
3	Newton's 1st and 2nd laws
4	Exercises and Exam
5	Projectile motion; satellite motion from Copernicus to Newton
6	Universal Law of Gravitation; Newton's 3rd law
7	Work and energy
8	Types and examples of energy, thermal energy & processes
9	Review, exercises, exam
10-14	Special topic in modern physics to be chosen by the instructor.

For new instructors, a default topic for the last five weeks will be suggested, on the subject of electricity, circuits, motors, and power generation, as follows:

10	Electrostatic Forces
11	Voltage, Current, Ohm's Law, DC & AC Circuits
12	Electric Power, Circuits, Light Bulbs, Appliances
13	Magnetic Forces, Fields, Faraday's Law
14	Electric Motors and Power Generation

Bibliography (Possible Texts)

- ***Physics: Concepts and Connections***, Art Hobson, Prentice Hall (Jan.2003)
- ***Conceptual Physics***, Paul Hewitt, Addison-Wesley (Jan 2002)
- ***Ideas of Physics***, Douglas Giancoli, Harcourt Brace (1986)

Lab Syllabus

Labs will meet every other week for two hours per meeting. Thus students will average one contact hour of lab per week.

meeting	**Lab**
1	Introduction to Motion; Position and Velocity
2	Force and Motion; Mass and Acceleration
3	Two-Dimensional Projectile Motion
4	Law of the Pendulum—Galileo's Very Practical Discovery

5	Mechanical Equivalent of Heat
6	Electrical Measurements
7	Lab Exercise Related to Lecture Topic Chosen by Instructor*

*Because of the variety of possibilities, these labs will be designed so that the equipment required can fit into a small space ("shoebox" labs) for each group. In addition, computers with data acquisition interfaces will be available.

Lab Bibliography:

- ***Explorations in Physics***, Jackson, Laws, and Franklin, John Wiley (2002)

Course Submission Form

Instructions: All courses submitted for the Common Core must be liberal arts courses. Courses submitted to the Course Review Committee may be submitted for only one area of the Common Core and must be 3credits/3contact hours. Colleges may submit courses to the Course Review Committee before or after they receive college approval. STEM waiver courses do not need to be approved by the Course Review Committee. This form should not be used for STEM waiver courses.

Form ID CCOREFORM1084460093002 **Version No.** 28.002 **Created by** Honigwachs, Lea

Created on 2017-08-07T14:37:34 **Last Updated on** 2017-08-07T14:48:57 **Status Updated on** 2017-09-22T15:13:07

Current Status Approved **Course Selected:** **Subject** PHYS. (PHYS. - Physics) **Catalog Nbr** 1040

Course Revision & College

Form Submission Revised Submission **College** Brooklyn College

Please describe revisions that have been made to this course The submission has been revised to better reflect how the course will meet the Pathways learning goals.

Course Data

Course ID 110420 **Subject** PHYS. (PHYS. - Physics) **Catalog Nbr** 1040

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle The Making of the Atomic Bomb

Course Description The history of the development of the atomic bomb. The scientific breakthroughs of the first half of the 20th century that led to it. The political context in which the bomb developed. The personal stories of the leading scientists involved. The moral issues arising from the development and use of the bomb. (Not open to students who have completed Core Curriculum 3308). Prerequisite: None

Department Physics

Pre-Requisites/Co-Requisites JUNIOR STANDING IS REQUIERED TO TAKE THIS COURSE

Course Syllabus [Attachment Filename(s)]

SYLLABUS_PHYS_1040.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Homework reports on reading assignments from the listed bibliography, including citation of specific relevant material. See, for example, sample assignment 1 in Appendix B.
*** 2. Evaluate evidence and arguments critically or analytically.**	In-class collaborative discussion and comparison of material assigned. See, for example, sample assignment 2 in Appendix B.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	In-class discussion and debate between groups. Final term paper on some aspect of the impact of the making of the atomic bomb on our modern world, and on the ethical arguments involved with its use to end WWII. See lecture 14 in sample syllabus (Appendix A) and sample assignment 3 in Appendix B.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	Midterm and final exams on the history of 19th and 20th Century discoveries which led to our understanding of the atomic nucleus, and our ability to tap into the energy contained in it. See sample exam question 1 in Appendix C.
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	Exams and homework assignments illustrating how experimental techniques were developed to probe the atom and how statistical methods were used to estimate macroscopic effects of nuclear reactions. See sample exam question 2 in Appendix C.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Exams, in-class discussion, and term paper assignments related to an extensive historical analysis of Hiroshima, the factors related to the decision to drop the bomb, and the ethical arguments pro and con that decision. See, for example, sample assignment 3 in Appendix B.

8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

Instructor: Lyudmila Godenko

PHYS 1040

Office 2149(B) Ingersoll

"The Making of the Atomic Bomb"

E-mail: L Godenko@brooklyn.cuny.edu
Office hours: M.,W 12:00- 1:00p.m.

and by appointment

Textbook: **The Making of the Atomic Bomb,** *by Richard Rhodes. Touchstone,1987.*

or other editions.

Welcome to the course. In short this course covers the history of the development of the atomic bomb. It turned out that the scientific breakthroughs in atomic and nuclear physics during 19-th and the first part of 20-th centuries led to development of atomic bomb. We will focus mostly on the role that scientists, science and technology had in developing and resisting nuclear weapons. The course will be taught primarily from the point of view of the history of the science involved. Also the students will see the need for the integrated perspective in order to understand how science, political history, ethical values and personal motivations are interconnected in this story.

This course is *a classroom-driven* course. That means that, although there is a book, it is indented as supportive. The agenda of the course is determined by what is discussed in class meetings. There will be times when the classroom material goes beyond what is covered in the book. This means that you cannot afford to be absent from class. In case you were absent, try such resources as internet, rewrite notes from fellow peers, read supplemental sources, make appointment with me.

Grading : Attendance & quizzes -10%

First and Second lecture exams -20% each

Final exam (assignment) - 25%

Presentations - 25%

Have pleasant and productive semester.

Lecture Outlines

Week	Topics to be discussed	Reading
1	*Atomic theory in the 1800's.* Dalton's law of multiple proportions. Development of the molecular theory of gases. Clausius, Loschmidt, and the first estimation of molecular sizes and masses.	Ch. 2
2.	*Years 1895-1900*: Experiment with gas discharge tubes and photographic emulsions. The discovery of cathode rays, x rays, and radioactivity. The nature and the effects of ionizing radiation.	
3.	*Radioactivity1900-1910:* Marie and Pierre Curie and the search for radioactive elements. Ernest Rutherford and classification of types of ionizing radiation. The discoveries of radioactive transmutation, half-lives and isotopes. Soddy and the first estimates of energy from radioactive decay vs. energy from chemical reactions.	Ch.3
4.	*The nuclear atom 1911-1920*. Alpha scattering and the discovery of the nucleus. Nuclear sizes vs atomic sizes. Niels Bohr and the structure of the nuclear atom. Moseley's work with x-rays and the significance of the atomic number. World War I and its effect on scientific progress.	Ch.3, Ch.4
5.	Review, presentations, **exam1**	
6.	*Years1920-1930*: The invention of the mass-spectrometer. Atomic masses, the reinterpretation of isotopes, mass defects. $E=Mc^2$ and nuclear binding energies.	Ch.6
7.	*Years 1920-1931continued*: The discovery of nuclear reactions. The study of gamma rays. The Coulomb barrier and limitations on nuclear studies and alpha particles.	
8.	*Years 1932-1934*: The discovery of the neutron. Reinterpretation of nuclear structure. The rise of Hitler in Germany and the exodus of German-Jewish scientists. Leo Szilard and the concept of a nuclear chain reaction. Discoveries of the positron and artificial radioactivity.	Ch.7, Ch.8

9.	*Years 1935-1938*: Enrico Fermi's discoveries in neutron activation and neutron moderation. Bohr's development of the liquid drop model of the nucleus. The Spanish civil war. Mussolini and Hitler, and Fermi's decision to leave Italy. The puzzle of the neutron bombardment of uranium. The annexation of Austria and Lise Meitner's exodus from Germany.	Ch.9, Ch.5
10	Review, presentations, **exam 2**	
11	*Years 1938-1939*: Otto Hahn's discovery of nuclear fission. Interpretation of fission by Lise Meitner and Otto Frish; spread of the news to U.S. and initial reactions and experimental verifications. Bohr's interpretation of the significance of U-235.	Ch.11
12	*Years 1939-1942*: The discovery of neutrons from fission. The awakening of the Germans to the potential consequences of fission. Einstein's letter to FDR. The discoveries of neptunium and plutonium. Pearl Harbor. The entrance of the US into the war and its effect on fission research. The Chicago pile.	Ch.10,11,12 Ch.1, 13,14
13.	*Years 1942-1945*: General Leslie Groves, Robert Oppenheimer, and the Manhattan Project. Oak Ridge, Hanford, and Los Alamos. The separation of U-235 and the production of plutonium. The development of the implosion lens.	Ch.15
14.	*Year 1945*: The "Dragon" experiments on critical mass. The death of FDR. The trinity test. Harry Truman and Potsdam. The decision to use the bomb. Hiroshima and Nagasaki. Final perspectives on war in the 20-th century, nuclear proliferation, and the challenge of nuclear terrorism.	Ch.16,17,18,19
	Review, presentation, **Final exam (assignment)**	

Appendix B

Sample assignments

Sample Assignment 1: Is nuclear disarmament a fantasy? Read assigned pages from Rhodes (the textbook) and from the Newsweek article by Tepperman (How Nuclear Weapons Can Keep You Safe) and from the paper by Rhagavan, *Global Nuclear Disarmament, Geopolitical Necessity,* handed out in class. Decide for yourself on the basis of these readings whether nuclear disarmament is a realistic policy goal. Then find from the readings the strongest argument *against* your decision, and explain why you are not persuaded by that argument.

Sample Assignment 2: Is Nuclear Power a Safe Alternative to Fossil Fuels? Read assigned pages in the text regarding the history of reactor development, and the class handouts on Chernobyl, Three Mile Island, and Fukoshima. Find additional articles online supporting the use of nuclear reactors. Draw conclusions as to whether nuclear reactors will have a benefit that outweighs the risks involved.

Sample Assignment 3: Truman and the Decision to Drop the Bomb. Read the assigned pages in the text, and find several articles online regarding the decision to drop the bomb on Japan at the end of WWII. Find well written and solidly researched papers online on both sides of the issue. Why are the bombings of Hiroshima and Nagasaki seen as so different from the fire-bombing of Tokyo? Summarize the best arguments pro and con the decision and defend your own point of view on the issue.

Appendix C

Sample exam questions

Sample Exam Question 1:

Describe Rutherford's experiment in which he fired alpha particles at a gold foil. What did Rutherford conclude from his experimental data regarding the structure of the atom? How did this differ from previously accepted models of the atom?

Sample Exam Question 2:

(a) Explain the meaning of a nuclear cross section. Explain how this concept is used to predict the rate of nuclear reactions.

(b) Explain the concept of critical mass. Explain how this concept is employed in the design of nuclear weapons and reactors.

Course Submission Form

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Form ID CCOREFORM10844600134003 **Version No.** 6.003 **Created by** Honigwachs, Lea

Created on 2018-11-14T16:17:10 **Last Updated on** 2018-11-14T16:21:57 **Status Updated on** 2018-12-22T19:05:18

Current Status Approved **Course Selected:** **Subject** PHYS. (PHYS. - Physics) **Catalog Nbr** 1070

Course Revision & College

Form Submission Revised Submission **College** Brooklyn College

Please describe revisions that have been made to this course The submission has been revised to better reflect how the course will meet the Pathways learning goals.

Course Data

Course ID 110416 **Subject** PHYS. (PHYS. - Physics) **Catalog Nbr** 1070

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Cosmology

Course Description Organization and evolution of the universe. Methods of inquiry over large cosmological distances. The structure of space and time. Lifecycle of stars. The origin of chemical elements. Are we alone in the Universe? (Not open to students who have completed Core Curriculum 3301.) Prerequisite: None

Department Physics

Pre-Requisites/Co-Requisites JUNIOR STANDING IS REQUIERED TO TAKE THIS COURSE

Course Syllabus [Attachment Filename(s)]

SYLLABUS_PHYS_1070.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning		**US Experience in its Diversity**	
Life and Physical Sciences		**Creative Expression**	
		Individual and Society	
	☑	**Scientific World**	

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will be responsible for knowing the basic science needed to understand the present understanding of the structure of the Universe and the history of this understanding. This will be acquired through the textbook supplemented by the lecture, up-to-date reading material from newspapers and science journals and PowerPoint slides. The first assignment is a visit to the NYC Planetarium that results in a report that correlates findings with course material. Second assignment is based on collection of 3000 of information on 3000 stars that was obtained from NASA and used for individual constructions of HR diagram ? one of the most useful presentations in Astronomy and Cosmology. Extra credit encourages students to subscribe to a crowd sourcing site in Astronomy or Cosmology and present a report about their research activity throughout the semester.
*** 2. Evaluate evidence and arguments critically or analytically.**	Students will be able to correlate the theories with the specific experiments that gave rise to these theories. Every major findings in cosmology is being directly associated with the experiments that lead to the findings. The experiments are being describes in terms of the fundamental principles of science in a way that students are able to evaluate the validity of the conclusions.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Initial assignments will be based on relatively simplistic concepts such as "what it will take James Cameroon to film the movie Avatar on site?" the calculation will exposed the students to the large distances and the unrealistic time based on present technology to travel such distances, Students will learn to use and convert units. In addition, throughout the course students are solving problems from real cosmological observations and are being tested on their ability to solve the problems in tests. Every test includes a section on problem solving.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	The course on Cosmology includes the history of the constantly changing views of the universe. The views include past cultural as well as scientific views. The Earth as the center of the universe is continually challenged going from Earth centered, to the Sun centered, to our galaxy (Milky Way), to the observable universe and even includes multiple universes.

5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	About half of the students are without necessary background in basic sciences that include mathematics, Chemistry, Physics and some biology. Students are getting the necessary background in the sciences to understand the cosmology. Necessary areas in Mathematics include some Algebra, Scientific notations and logarithmic presentations.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	Students will learn how the scientific method and its reliance on observation and refutability was applied to gain a consistent understanding of the structure of the universe and the processes that take place there. They will learn to understand that human intuition has limits that need to be overcome through observations.
7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	The last part of the course focused on Astrobiology and the effort to look for life on other planets. Students will discuss what it will take to save the human race following destruction of livable conditions on Earth.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	As part of the Astrobiology introduction the course makes connection with relevant matter of policies in an attempt to provide alternative habitat for the possibility that humans will make this planet uninhabitable.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

Chair (Approver) Comments

Comments The course seems to be basically sound but it may place too much weight on what it is that observational astronomers do as opposed to the understanding obtained from their work. Along these lines, the syllabus includes the sentence, "Students will be able to understand cosmological observations in terms of few physical laws that can be independently tested." This seems like an overstatement, since it is necessary to understand relativity theory and quantum mechanics to understand cosmological observations.
"confirming or trying to refute some fundamental key observations" ? but one cannot refute an observation.
The syllabus should be revised, but the course should be valuable.

PHYS 1070: Cosmology – MW9.

3 hours lecture; 3 credits

Prof. Micha Tomkiewicz – michatom@brooklyn.cuny.edu *Spring 2017*

Monday – Wednesday 9:30 – 10:45AM *135NE*

Text: *"Understanding Our Universe" by Stacy Palen, Laura Kay, Brad Smith and George Blumenthal – 2012 – W.W. Norton & Company.* First or second editions will do.

Communication with class through Blackboard

Bulletin Description: Organization and evolution of the universe that includes topics such as methods of inquiry over large cosmological distances, the structure of space and time, lifecycle of stars, the origin of chemical elements and attempts to address the issue if we are alone in the Universe.

Prerequisite: Junior standing or completion of all lower tier requirements in the same category.

Discussion:

This course takes the students through a journey that will lead to exposure to our current understanding of the structure of the Universe that is consistent with the principles of a Scientific method that are anchored on experimental observations. Students will be able to practice working with available raw astronomical data and demonstrate that the data are consistent with some of the key observations.

Course Outline:

- Week 1 – The Scientific Method and How Science Works: The size of the Universe; Estimation, logic and mathematics; Measurements; Observational science and experimental science; Alternative methods of acquiring knowledge.
- Week 2 – Religion, Mythology and Science: Ancient observations; Keeping track of seasons, calendars and time; Early Greek thinkers; Geocentric and Heliocentric models of the Universe.
- Week 3 – The Copernican Revolution: Copernicus, Brahe, Kepler, Galileo and Newton; The Copernican Revolution and the Scientific Method; Kepler's three laws and working with formulas and units; Galileo's observation; Newton's laws of motion and Newton's law of gravitational attraction.
- Week 4 – Matter and Energy in the Universe: The structure of atoms and molecules; Energy and the two laws of thermodynamics; Temperature; Wien's law and Stefan Boltzmann's law.
- Week 5 – Detecting Radiation from Space: Nature of light and spectrum of electromagnetic radiation; Waves and Particles; Emission and absorption of lines as fingerprints of atoms; The Doppler effect; Standard candles to measure distance; Other methods to measure distance.
- Week 6 – Our Sun - The Nearest Star: Simple observations of the solar systems; Properties of the Sun and how do we measure them; Evidence that the Sun is not powered by fossil fuels; Nuclear Fusion; The Suns interior; logarithmic scales to describe the structure of the Sun.

- Week 7 – How Planetary Systems Form: Archeology of the solar system; The conservation of angular momentum and Helmholtz contraction; The process of accretion and the origin of the planets; Formation of the moon; Alternative theories and how do we know who is right; Resulting Geology.
- Week 8 – Properties of Stars: Distance, chemistry, mass, luminosity, temperature and chemical composition and how do we measure them; The H-R diagram; Main sequence stars and off-main sequence stars; Explaining the H-R diagram; Giants and dwarfs; Constructing the H-R diagram.
- Week 9 – The lifecycle of stars and the evolution of chemistry; Stars life span; The birth and death of stars; The battle with gravity; Quantum theory; The uncertainty principle; The exclusion principle; Degeneracy pressure; Alternative fusion mechanisms; The periodic table of chemical elements and how do they form; White Dwarfs, Supernova, Neutron Stars and Black Holes.
- Week 10 – Einstein – Gravitation and the nature of space and time: The two postulates of Special Relativity; Redefinition of space and time coordinates; Proof of $E=MC^2$ from the postulates; The need for alternative theory of gravity; The General Theory of Relativity; Matter determines the shape of space-time and the shape of space-time determines the behavior of matter; Black Holes and the ultimate victory of gravity; Formation of "something from nothing" near Black Holes.
- Week 11 – The expanding Universe: The experimental observations – the red-shift of galaxies and the Hubble relation and the discovery of the cosmic background radiation; The Big Bang model and alternative models; The Cosmological Principle; Curvature of space and mean density of space; The future of the Universe.
- Week 12 – The first three minutes: What do we know about the evolution of the Big Bang and how do we know it; What can we prove and what do we believe; The need for inflationary expansion; The mechanism of the inflationary expansion.
- Week 13 – The cycle closes – the quest for a unified theory of all four forces: Why do we need a unified theory; A short history of the attempts to develop a unified theory; String theory; Negative energy and dark matter.
- Week 14 – Life in the Universe: Are we alone? What will it take to find out; Short explanation of life on earth; Our current understanding of the evolution of life on earth; The Drake equation; Communication.

Common Goals Addressed by Core Course:

1. To acquire the tools that are required to understand and respect the natural universe. *(includes OARM Goals 5& 18)*

2. To develop the ability to think critically and creatively, to reason logically, and to reason quantitatively. *(includes OARM Goals 2, 5 & 10)*

3. To understand what knowledge is and how it is acquired by the use of differing methods in different disciplines. *(includes OARM Goals 2& 17)*

4. To produce informed and responsible citizens. *(includes OARM Goal 8)*

5. To establish a foundation for life-long learning and the potential for leadership. *(includes OARM Goal 29)*

Objectives of Core Course:

1. Students will be able to understand cosmological observations in terms of few physical laws that can be independently tested.

2. Students will be able to differentiate between explanations that are based on the Scientific Method and explanations that are based on other belief systems.

3. Students will be familiar with reading and constructing graphs using logarithmic scales.

4. Students will be able to use algebraic equations that represent physical laws, to represent physical observations.

5. Students will be able to differentiate between facts, hypothesis and theory (*from OARM Goal 18).*

6. Students will be able to apply cosmological, holistic, approaches to "earthy" experiences and future learning.

Outcomes for this General Education Course:

- Students will be responsible for knowing the basic science needed to understand the present understanding of the structure of the Universe and the history of this understanding. This will be acquired through the textbook supplemented by the lecture, up-to-date reading material from newspapers and science journals and PowerPoint slides.
- Students will be able to correlate the theories with the specific experiments that gave rise to these theories.
- Initial assignments will be based on relatively simplistic concepts such as "what it will take James Cameroon to film the movie Avatar on site?" the calculation will exposed the students to the large distances and the unrealistic time based on present technology to travel such distances, Students will learn to use and convert units. The second half of the semester students select 15 stars from a database supplied by NASA to draw a HR diagram – one of the most basic diagram in cosmology
- Students will learn that Cosmology includes the history of the constantly changing views of the universe. The views include past cultural as well as scientific views. The Earth as the center of the universe is continually challenged going from Earth centered, to the Sun centered, to our galaxy (Milky Way), to the observable universe and even includes multiple universes.
- Students will learn how the scientific method and its reliance on observation and refutability was applied to gain a consistent understanding of the structure of the universe and the processes that take place there. They will learn to understand that human intuition has limits that need to be overcome through observations.
- The last part of the course focused on Astrobiology and the effort to look for life on other planets. We discuss the possibility of what it will take to save the human race following destruction of livable conditions on Earth.

Exams, assignments and grading: There will be a midterm exam (20%), final exam (40%) and two projects. In one project (project A – 10%) the students will write a short report on visiting the planetarium. The other project (project B – 20%) will involve extraction of stars and galaxies data from on-line resources and confirming or trying to refute some fundamental key observations. Extra Credit (10%) will focus on

participation and report writing in an online crowdsourcing project related to Astronomy or osmology.Class participation will count for 10%.

Bibliography:

Additional Reading:

- Edwin A. Abbot:*Flatland,* Dover Publications (1992).
- Albert Einstein: *Relativity,* Three Rivers Press (1961).
- Brian Green: *The Elegant Universe,* Random House (2000)
- Stephen Hawking: *The Universe in a Nutshell,* Bantam Books (2001).
- Robert P. Kirshner: *The Extravagant Universe,* Princeton University Press (2002)

Electronic Tools:

- Data retrieval from internet resources such as Microsoft WorldWide Telescope and Google Sky (part of Google Earth)..
- Blackboard

Course Submission Form

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Form ID CCOREFORM10844600135002 **Version No.** 86.002 **Created by** Honigwachs, Lea

Created on 2018-11-15T14:54:30 **Last Updated on** 2018-11-15T15:01:50 **Status Updated on** 2018-12-22T19:01:09

Current Status Approved **Course Selected:** **Subject** PHYS. (PHYS. - Physics) **Catalog Nbr** 1080

Course Revision & College

Form Submission Revised Submission **College** Brooklyn College

Please describe revisions that have been made to this course The submission has been revised to better demonstrate how the course accomplishes Pathways required learning outcomes.

Course Data

Course ID 110418 **Subject** PHYS. (PHYS. - Physics) **Catalog Nbr** 1080

Catalog Status Approved **Contact Hours** 3 **No. of Credits** 3

CourseTitle Energy Use and Climate Change

Course Description Global energy balance as a function of the chemistry of the atmosphere and its effects on global and local climate. Climatic consequences of human energy use. The long history of climate and the relatively short history of human energy use. The socio-economic and political issues involved in attempts to project and influence future energy use and its climatic consequences. (Not open to students who have completed Core Curriculum 3302.) Prerequisite: None

Department Physics

Pre-Requisites/Co-Requisites JUNIOR STANDING IS REQUIERED TO TAKE THIS COURSE

Course Syllabus [Attachment Filename(s)]

SYLLABUS_PHYS_1080.docx

Location(Required or Flexible) and Learning Outcomes

REQUIRED	FLEXIBLE
English Composition	**World Cultures & Global Issues**

Math & Quantitative Reasoning	**US Experience in its Diversity**
Life and Physical Sciences	**Creative Expression**
	Individual and Society
☑	**Scientific World**

Learning Outcomes: Questions	Learning Outcomes: Responses
*** 1. Gather, interpret, and assess information from a variety of sources and points of view.**	Students will build global climate scenarios by extrapolating data from socio-economic present activities gathered from various sources such as the World bank. Students will calculate the climate consequences of such scenario. Students will do their own energy audit and calculate their carbon footprints based on their own energy bills and other personal information. Students will be able to compare their own energy audit and carbon footprint to with each other, with average American and with average citizens from developing countries.
*** 2. Evaluate evidence and arguments critically or analytically.**	Students will practice making arguments against and pro deniers of anthropogenic causes of climate change. The arguments will be group based.
*** 3. Produce well-reasoned written or oral arguments using evidence to support conclusions.**	Typical data-based assignment is to argue the reasons for the 43 indicators that are grouped in the Climate Change section of the World Bank to be included in this category.
4. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.	
5. Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.	First half of the course is structured so students with no background in science can understand climate change from first principles. Students will demonstrate their mastery through the weekly iRAT and tRAT quizzes.
6. Articulate and evaluate the empirical evidence supporting a scientific or formal theory.	About half of the students are without necessary background in basic sciences that include mathematics, Chemistry, Physics and some biology. Students are getting the necessary background in the sciences to understand the cosmology. Necessary areas in Mathematics include some Algebra, Scientific notations and logarithmic presentations.

7. Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Students will learn how to replace present fossil fuel economies with sustainable energy alternatives. Students will learn the technical issues and the economic consequences of such transition.
8. Understand the scientific principles underlying matters of policy or public concern in which science plays role.	During the second half of the semester students will analyze policies related to an important contemporary issues, such as the Presidential election or the 2015 COP21 Paris meeting, on future sustainability of the physical environment. Relevant contemporary policy issues are anchored in the most recent national or international reports that students learn to evaluate critically.
A. If there is a change to the course title, what is the new course title?	
B. If there is a change to the course description, what is the new course description?	
C. If there is a change to the pre-requisites and/or co-requisites, what are the new pre-requisites and/or co-requisites?	

Chair (Approver) Comments
Comments Excellent course well suited for "Scientific World". References seem a bit old and should certainly include the two climate reports just released by UN and US Gov.

PHYS1080: *Energy Use and Climate Change*

3 hours lecture; 3 credits

Profs. Micha Tomkiewicz – michatom@brooklyn.cuny.edu Fall 2016

Monday – Wednesday 12:50 – 2:05 PM First Class 431NE
subsequent classes 0311N Scale-up room

Bulletin Description: Global energy balance as a function of the chemistry of the atmosphere and its effects on global and local climate. Climatic consequences of human energy use. The long history of climate and the relatively short history of human energy use. The socio-economic and political issues involved in attempts to project and influence future energy use and its climatic consequences.

Prerequisite: Junior standing or completion of all lower tier requirements in the same category.

Bibliography:

- "*The Fork at the End of Now" – Micha Tomkiewicz – Momentum Press-2011*
- *Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report http://www.ipcc.ch/*
- http://climatechangefork.blog.brooklyn.edu/author/climatechangefork/
- Follow up of related public events through public communication channels
- Communication with class through Blackboard.

Both – the book and the blog are posted together on http://libguides.brooklyn.cuny.edu/climate.

The recommended book will be used as a "reading material" in the beginning of the course. It will be used as background that illustrates global environmental impact through investigation of the scientific, social, economic and political issues that focus on climate change.

The focus this semester will be on the presidential elections in the US.

Course Outline:

- Week 1 – Introduction:

Methods of finding the "truth"; Quantitative description of data; Introduction to the issues: Recent history of the atmospheric concentrations of carbon dioxide; recent global temperature changes; energy consumption and the standard of living.

- Week 2 – History:
  One million years history of the climate – Tools and methods; Climate proxies; The Data.

- Week 3 – The Carbon Cycle:
  The carbon budget in air, land and the oceans; Anthropogenic Carbon.

- Week 4 – Energy, Temperature, Entropy and light.

- Week 5 – The Greenhouse effect:
  Blackbody radiation; Calculating average global temperature; Radiative Forcing; Other GHG.

- Week 6 – Light, water and the weather:
  Seasons; Water Cycle; Energy Budget; Feedbacks; Salinity.

- Week 7 – Modeling the future:
  Climate and Weather; IPCC; Validation; Sea Level Rise; Antarctica; Tides and Gravity.

- Week 8 – Men, Energy and Technology:
  The IAPC relation; Population; GDP; Energy Intensity;

- Week 9 – Fossil fuels:
  Intensity; Limit to Growth; "Ultimate" energy reserves.

- Week 10 – Alternative energy sources:
  Primary and Secondary energy sources; Solar Energy; Nuclear Energy; Other alternative energy sources.

- Week 11 – The Economic balance:
  Cost Benefit Analysis; Lowering gas consumption; Price Elasticity; Driving forces for choice.

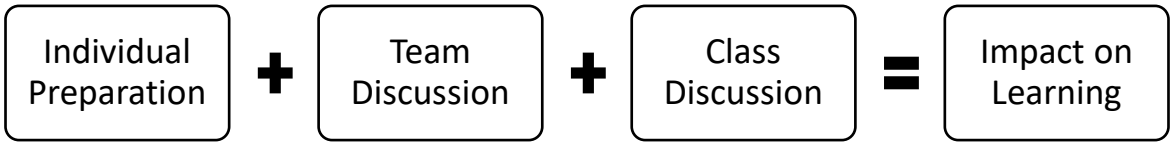
- Week 12 – Politics:
  Common Global Atmosphere; Governance; The Montreal Protocol; The Earth-Summit; The Kyoto Protocol; Global security vs. national security.

- Week 13 – Early Signs:
  The Arctic; Antarctica; Mountains; Biota; Health.

- Week 14 – What Can I Do?
  Personal Energy Audit; Conclusions and summary.

Class Structure and Learning Strategy:

This course will be using the Team-Based Learning (TBL) strategy (www.teambasedlearning.org).



TBL will increase your understanding of course concepts by using them to solve authentic, real-world problems and help you develop your workplace learning skills. The TBL teams will map with the project teams that will be done in a way that will in a way that will integrate course content and hold teams accountable for using course content to make decisions (solve problems) that will be reported publically and subject to cross-team discussion/critique.

Overview of TBL Sequence

Phase 1 – Preparation: You will complete specified preparatory materials (readings and assignments) for each unit.

Phase 2 – Readiness Assurance Test: At the first class meeting of each unit, you will be given a Readiness Assurance Test (RAT). The RAT measures your comprehension and mastery of the assigned readings and helps you deepen your understanding of the course material needed to begin problem solving in Phase 3. Once the test period is over, the instructor may present a short mini-lecture to clarify concepts that are not well understood as evidenced by 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 and based on the assigned preparatory material** (readings and assignments).

- **Individual RAT (iRAT):** You individually complete a multiple-choice test based on the readings.
- **Team RAT (tRAT):** Following the iRAT, the same multiple-choice test is re-taken with your team. These tests use a "scratch and win" type answer card known as an IF-AT. You develop a consensus with our teammates, and then scratch off the opaque coating hoping to reveal a star that indicates a correct answer. Your team is awarded 4 points if you uncover the correct answer on the first scratch, 2 points for the second scratch, and 1 point for the third scratch. If you are incorrect with any scratch, your team needs to reconsider, discuss, and make another decision.

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 publically 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. Sometimes you will hold up colored cards indicating a specific choice, sometimes you will write your answer on small whiteboards, and other times you will complete short worksheets, which will be randomly reported to the rest of the class.

Common Goals Addressed by the Course:

1. To develop the ability to think critically and creatively, to reason logically, and to reason quantitatively (*includes OARM Goals 2, 5 & 10).*

2. To acquire the tools that are required to understand and respect the natural universe. *(includes OARM Goals 5& 18)*

3. To be capable of integrating knowledge from diverse sources (*includes OARM Goal 28).*

4. To produce informed and responsible citizens. *(includes OARM Goal 8&32)*

5. To establish a foundation for life-long learning and the potential for leadership. *(includes OARM Goal 29)*

Objectives of the Course:

1. Students will be able to understand the scientific basis and political ramifications of energy use on global climate.

2. Students will be able to differentiate between explanations that are based on the Scientific Method and explanations that are based on other belief systems.

3. Students will learn how to use data bases as an anchor of experimental observations.

4. Students will be familiar with reading and constructing graphs using logarithmic scales.

5. Students will be able to differentiate between facts, hypothesis and theory (*from OARM Goal 18).*

6. Students will learn skills that will enable them to present their work to a critical audience.

Outcomes for this general Education Course:

- Students will build global climate scenarios by extrapolating data from socio-economic present activities gathered from various sources such as the World bank
- Students will perform their own energy audit and calculate the resulting carbon footprints based on the energy sources that they use
- Students will practice making arguments against and pro deniers of anthropogenic causes of climate change and learn to quantify the quality of data-based arguments..
- Students will learn how to replace present fossil fuel economies with sustainable energy alternatives.

Exams assignments and Grading

There will be five iRATs and five tRATs quizzes that will cover all chapters of the textbook. In addition there will be individual midterm and final exams. First half of the course is structured so students with no background in science can understand climate change from first principles. During the second half of the semester students

will analyze policies related to an important contemporary issues, such as the Presidential election or the 2015 COP21 Paris meeting, on future sustainability of the physical environment.

The course grade will be based on team performance (30%) and individual performance (70%). Team performance will be based on tRATs and team evaluation (10%) and class assignments (20%) . Individual performance will be based on Final exam (30%), Midterm exam (15%), iRATs (10%) and class participation (5%). Class participation will include some take-home projects that will be discussed in the teams and follow-up on current events.

Additional Bibliography:

- *Jared Diamond, "Collapse", Viking (2005).*
- *Frances Drake, "Global Warming", Arnold (2000).*
- *David Goodstein, "Out of Gas", W.W.Norton (2004).*
- *Bjorn Lomborg, "The Skeptical Environmentalist, Cambridge University Press (1998).*
- *Peter H. May and Ronaldo Seroa da Motta, "Pricing the Planet", Columbia University Press (1996).*

Electronic Tools:

- Extensive use of on-line data bases.

Revised April 2020

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