New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Proposal_Classification_Chart.pdf) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | Physics in the kitchen |
| **Date** | **08/25/2014** |
| **Major or Minor** | **n/a** |
| **Proposer’s Name** | **Ilya Grigorenko, Claire Stewart, Roman Kezerashvili** |
| **Department** | Physics, Hospitality Management Departments |
| **Date of Departmental Meeting in which proposal was approved** | **This proposal was approved at the Physics Department Meeting, on Sep 4th, 2014.** |
| **Department Chair Name** | **Roman Kezerashvili** |
| **Department Chair Signature and Date** | Oct 1st , 2014 |
| **Academic Dean Name** | **Karl Botchway** |
| **Academic Dean Signature and Date** | Oct 1st , 2014 |
| **Brief Description of Proposal**  (Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | Introduction to physical concepts that are behind food cooking processes. Emphasis is given on the general concepts and qualitative description Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the kitchen. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report. |
| **Brief Rationale for Proposal**  (Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body). | This interdisciplinary course teaches students to acquire, process and apply new knowledge across different fields. Students learn how to apply the knowledge of physics laws to improve food cooking processes. |
| **Proposal History**  (Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | **It is a new proposal** |

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

**ALL PROPOSAL CHECK LIST**

|  |  |
| --- | --- |
| Completed CURRICULUM MODIFICATION FORM including: |  |
| * Brief description of proposal |  |
| * Rationale for proposal |  |
| * Date of department meeting approving the modification |  |
| * Chair’s Signature |  |
| * Dean’s Signature |  |
| Evidence of consultation with affected departments  List of the programs that use this course as required or elective, and courses that use this as a prerequisite. |  |
| Documentation of Advisory Commission views (if applicable). |  |
| Completed [Chancellor’s Report Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-09-Chancellor_Report_Quick_Reference_Guide1.doc). |  |

**EXISTING PROGRAM MODIFICATION PROPOSALS**

|  |  |
| --- | --- |
| Documentation indicating core curriculum requirements have been met for new programs/options or program changes. |  |
| Detailed rationale for each modification (this includes minor modifications) |  |

**Chancellor’s Report Information**

**Department:** **Physics, Hospitality Management Proposer:** **Ilya Grigorenko, Claire Stewart, Roman Kezerashvili Date:** **08/25/2014**

**Course Code:** **PHYS1010 Course Number:** **1010 Course Title:** **Physics in the kitchen**

**Course Description:** Introduction to physical concepts that are behind food cooking processes. Emphasis is given on the general concepts and qualitative description Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the kitchen. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report.

**Course Catalog Description:** This course is designed to introduce the main Physics concepts behind food cooking processes.

|  |  |  |  |
| --- | --- | --- | --- |
| **From:** |  | **To:** |  |
| **Description** |  | **Description** | Introduction to physical concepts that are behind food cooking processes. Emphasis is given on the general concepts and qualitative description Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the kitchen. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report. |
| **Class Hour** |  | **Class Hours** | 3 |
| **Lab Hours** |  | **Lab Hours** | 1 |
| **Credits** |  | **Credits** | 3 |
| **Prerequisite:** |  | **Prerequisite:** | Math 1175 or higher |
| **Pre- or corequisites:** |  | **Pre- or corequisites:** |  |
| **Corequisite:** |  | **Corequisite:** |  |

Rationale: This interdisciplinary course teaches students to acquire, process and apply new knowledge across different fields. Students learn how to apply the knowledge of physics laws to improve food cooking processes.

**New York City College of Technology  
Interdisciplinary Committee**

**Criteria for an Interdisciplinary Course**

1. **Interdisciplinary Studies Definition**

Interdisciplinary studies involve two or more academic disciplines or fields of study organized around synthesizing distinct perspectives, knowledge, and skills. Interdisciplinary study focuses on questions, problems, and topics too complex or too broad for a single discipline or field to encompass adequately; such studies thrive on drawing connections between seemingly exclusive domains. Usually theme-based, interdisciplinary courses intentionally address issues that require meaningful engagement of multiple academic disciplines. Pedagogical strategies focus on, but are not limited to, inquiry or problem-based learning.

Although many academic disciplines, such as African American Studies and Engineering, are inherently interdisciplinary, to be considered an interdisciplinary course at City Tech the course must be team-taught[[1]](#footnote-1) by more than one faculty member from two or more departments[[2]](#footnote-2) in the College. An interdisciplinary course, by definition, has an interdisciplinary theme as its nucleus. In its essence, such a course brings the analytic methods of two or more academic disciplines to bear on a specific problem or question. Thus, a course in Music History is not likely to be considered interdisciplinary, but a course in Music History from an economist’s perspective might very well lead to such a course. The application of different methods and concepts is the key to assessing whether a course is or is not interdisciplinary. The term interdisciplinary is occasionally used to identify individual projects or assignments, but these, though possibly commendable, fall short in the necessary scope for learning experiences that demand in-depth exposure to the methodologies of distinct intellectual disciplines, and the creative application of these methodologies to specific problems.

Studies show that interdisciplinary courses improve student learning (Elrod & Roth, 2012; Klein, 2010; Lattuca, 2001; Lattuca, Voigt, & Fath, 2004; Project Kaleidoscope, 2011). To foster interdisciplinary learning, the Interdisciplinary Committee has identified goals and outcomes that students taking interdisciplinary courses should be able to achieve.

**Learning Outcomes of Interdisciplinary Courses**

Students will be able to:

* Purposefully connect and integrate across-discipline knowledge and skills to solve problems
* Synthesize and transfer knowledge across disciplinary boundaries
* Comprehend factors inherent in complex problems
* Apply integrative thinking to problem-solving in ethically and socially responsible ways
* Recognize varied perspective
* Gain comfort with complexity and uncertainty
* Think critically, communicate effectively, and work collaboratively
* Become flexible thinkers

**New York City College of Technology**

**Interdisciplinary Committee**

**Application for Interdisciplinary Course Designation**

**Date 8-25-14**

**Submitted by** **\_\_\_\_\_\_\_\_\_Ilya Grigorenko, Claire Stewart, Roman Kezerashvili** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Department(s)**

**Physics, Hospitality Management**

1. **Proposal to Offer an Interdisciplinary Course**

1. Identify the course type and title:  
     
    An existing course\_\_\_\_\_\_\_\_\_\_\_n/a\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
     
   **X** A new course PHYS 1010 Physics in the Kitchen

 A course under development \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Provide a course description \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Introduction to physical concepts that are behind food cooking processes. Emphasis is given on the general concepts and qualitative description Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the kitchen. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report. |
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1. How many credits will the course comprise? 3 How many hours? 60
2. What prerequisite(s) would students need to complete before registering for the course? Co-requisite(s)?

|  |
| --- |
| Math 1175 or higher |

1. Explain briefly why this is an interdisciplinary course.

The course explains various physical phenomena behind processes related to food cooking. Students will learn how to explain and improve the cooking processes using the knowledge gained during the course. In particular, the course emphasizes the physical basis of safety procedures. Priority is given to explanation of the general concepts and qualitative description.

1. What is the proposed theme of the course? What complex central problem or question will it address? What disciplinary methods will be evoked and applied?

The main theme of the course is that behind even the simplest cooking procedure there are many physical processes. One can achieve better control over these processes and achieve better results by making use of these fundamental laws of physics.

1. Which general learning outcomes of an interdisciplinary course does this course address?   
   Please explain how the course will fulfill the bolded mandatory learning outcome below. In addition, select and explain at least three additional outcomes.

**X** **Purposefully connect and integrate across-discipline knowledge and skills to solve problems**

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| Throughout the semester, students will learn from different angles of view about the cooking process from representatives of the Physics and Hospitality Management Departments. Students will connect this knowledge and their own experience during the laboratory experiments. They will develop their interdisciplinary view on the cooking processes in the laboratory experiments and present it in their lab reports and exam work. |

**X** **Synthesize and transfer knowledge across disciplinary boundaries**

|  |
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| Students will be given an opportunity to make presentations to describe physical processes behind a cooking procedure of their choice. They will learn how to apply the knowledge gained during the course. They will exhibit their skills and active usage of various physics processes beyond the course material and examples. |

 Comprehend factors inherent in complex problems

|  |
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| Students will leaned how to identify the major factors affecting the outcome in the cooking processes. |

 Apply integrative thinking to problem solving in ethically and socially responsible ways

|  |
| --- |
| Students will learn that the knowledge of physical processes in kitchen appliances may prevent the harm to the personnel of the kitchen. |

 Recognize varied perspectives

|  |
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| Students will also lean how people acquired scientific knowledge in the kitchen. Kitchens can be considered historically as first scientific labs, and cooking as an experiment in controlled environment. |

**X** **Gain comfort with complexity and uncertainty**

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| Students will learn that even very complex process can be analyzed and understood using the scientific approach. Students will learn how to use interdisciplinary cooking literature for their need. |

**X** **Think critically, communicate effectively, and work collaboratively**

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| During this course students will perform laboratory experiments in groups and will learn how to write laboratory reports. In these reports students will analyze their results, explain which physical effects are taken into account, and also learn how to explain and analyze the measurement errors associated with their experiments. They will understand that any physical experiment (even in the kitchen) unavoidably contains errors, which should be estimated and described, and are a very significant part of scientific thinking. |

**x Become flexible thinkers**

|  |
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| Students will learn how to correct cooking errors in the kitchen based on rational decisions derived from physics knowledge gathered throughout the semester. In addition, the professors will demonstrate unintentional changes of the conditions can lead to innovation, both in the laboratory as well as in the kitchen. |

 Other

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|  |

**General Education Learning Goals for City Tech Students**

* **Knowledge:** Develop knowledge from a range of disciplinary perspectives, and hone the ability to deepen and continue learning.
* **Skills:** Acquire and use the tools needed for communication, inquiry, creativity, analysis, and productive work.
* **Integration**: Work productively within and across disciplines.
* **Values, Ethics, and Relationships**: Understand and apply values, ethics, and diverse   
  perspectives in personal, professional, civic, and cultural/global domains.

1. How does this course address the general education learning goals for City Tech students?

|  |
| --- |
| Physics in the Kitchen will allow students to apply knowledge they acquire through lecture and lab work in a tangible manner that they can practice at home on a daily basis. Students can integrate their interest in cooking and food through their relationship with the scientific world. They will be able to use creativity by solving kitchen “mysteries” as well as learning to write lab journals and managing tools and equipment in a safe and productive manner. |

1. Which department would house this course[[3]](#footnote-3)? Physics Department   
   Would all sections of the course be interdisciplinary?  No **X** Yes
   1. Would the course be cross-listed in two or more departments? X No  Yes   
      Explain.

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| This course initially will be listed at the Physics Department. Further modifications may be done dependent on the results of the first semester. |

* 1. How will the course be team-taught[[4]](#footnote-4)? **X** Co-taught  Guest lecturers  Learning community  
       
     If co-taught, what is the proposed workload hour distribution? It will be 75% Physics Department and 25% Hospitality Management Department  
     X Shared credits  Trading credits   
     If guest lecturers, for what approximate percentage of the course?  Minimum 20%[[5]](#footnote-5)  other: \_\_%  
       
     Please attach the evaluation framework used to assess the interdisciplinarity of the course.[[6]](#footnote-6)

|  |
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| For this course the student evaluation of teaching will be performed in the second half of the semester using standard evaluations forms. The faculty observation will be scheduled one time from the Physics Department and one time from the Hospitality Department during the semester. The results will be shared and discussed after the completing the course. |
|  |

1. Would the course be designated as:

 a College Option requirement[[7]](#footnote-7)? **X** an elective?  a Capstone course[[8]](#footnote-8)?  other? Explain.

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| This course will satisfy the Interdisciplinary course requirement of the College Option component of City Tech’s general education. |

**CURRICULUM PROPOSAL – NEW COURSES AND PROGRAMS**

**LIBRARY RESOURCES & INFORMATION LITERACY**

Please complete this form for all **new** courses/programs and **major changes** to existing courses/programs. The information you provide will assist the library in planning for new acquisitions; this information will not affect course or program proposals either positively or negatively.

Consult with library faculty subject selectors **early** in the planning of course proposals. This will ensure enough time to allocate budgets if materials need to be purchased.

Find the library faculty subject selector for your department here:

<http://library.citytech.cuny.edu/about/faculty/subject.php>

**Course proposer:** please complete boxes 1-5.

**Library faculty subject selector:** please complete box 6.

**#1**

|  |  |
| --- | --- |
| **Title of proposal**  **Physics in the kitchen** | **Department/Program**  Physics |
| **Department Chairperson/Coordinator**  Roman Kezerashvili | **Expected date course(s) will be offered**  Fall 2015  **# of students: 18** |
| **Proposed by**  Assist Prof. Ilya Grigorenko,  Physics Department, [igrigorenko@citytech.cuny.edu](mailto:igrigorenko@citytech.cuny.edu)  Prof. Roman Kezerashvili, Physics Department, [rkezerashvili@citytech.cuny.edu](mailto:rkezerashvili@citytech.cuny.edu)  Assist Prof. Claire Stewart, Department of Hospitality Management, [cstewart@citytech.cuny.edu](mailto:cstewart@citytech.cuny.edu)  (include email & phone) | **Date**  08/25/2014 |

**#2**

|  |
| --- |
| **Brief description of course(s) and/or program**  This course is designed to introduce the main Physics concepts behind food cooking processes. |

**#3**

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| --- |
| **Are City Tech library resources sufficient for course assignments? Please elaborate.**  The library has to buy more textbooks by Harold McGee, On Food and Cooking, (2004) |

**#4**

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| --- |
| **Are additional resources needed for course assignments? Please elaborate.**  **Books / electronic books**  **Journals / electronic journals**  **Databases and other electronic resources**  **Multimedia (DVDs, CDs, CD-ROMs, etc.)**  **Other**  **Please include author, title, publisher, edition, date and price.**  Harold McGee, "On Food and Cooking”, (2004)   * **Publisher:** Scribner; Rev Upd edition (November 23, 2004) price $25 (Amazon) |

**#5**

|  |
| --- |
| **Library faculty focus on strengthening students' information literacy skills in finding, evaluating, and ethically using information. We are available to collaborate with instructors regarding development of assignments, and to provide customized information literacy instruction and research guides for your course.**  **Do you plan to consult with the library faculty subject specialist for your area? Please give details.** |

**#6**

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| **Library Faculty Subject Selector\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Comments and Recommendations**  **Date** |

**New York City College of Technology,**

**Department of Physics**

**PHYS1010 Syllabus**

**Physics in the Kitchen**

**Professor**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**E-Mail:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Phone:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Office:**\_\_\_\_\_\_\_\_\_\_\_\_ **Office Hrs**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Number of hours, credits:** 4 hours/week, 3 hours lecture+1 hours laboratory (2 hour lab meeting biweekly), 3 credits

**Course Description:** This interdisciplinary course is designed to introduce the physical concepts that are behind food cooking processes to non-science majors. The use of mathematics is limited to simple calculations. Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the kitchen for the students. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report.

**Pre/Co-requisites:** MATH 1175 or higher

**Recommended texts:** Harold McGee, On Food and Cooking, (2004). A lab manual that will be provided by the Physics Department in your lab section.

**Assessment:** Students will be evaluated though lab reports and exams. The final grade will be based on aweighted average of the grades from the lab reports and exam as follows:Midterm Exams 1 and 2: 50%, Final Exam: 25%, Labs: 25%

**College Policy on Absence/Lateness College academic integrity policy:** Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, oﬀering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**College Policy on Absence/Lateness :** A student maybe absent without penalty for10% of the number of scheduled class meetings during the semester as follows:

Class Meets Allowable Absences

1 time/week 2 classes

2 times/week 3 classes

3 times/week 4 classes

**Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Lecture** | **Lab** | **Reading** |
| 1 | HMGT: History of cooking,  Safety in the kitchen. |  | Pages 218-225 |
| 2 | What is food made of: atoms, molecules. Chemical bonds. Food in different phases: solid, liquid and gas. Density. | Density measurements. | Pages 1178-1186 |
| 3 | Phase transitions. Changing  the boiling and freezing temperatures by additives. Cooking under pressure. |  | Pages 1186-1187 |
| 4 | Mixtures: solutions (sugar water), suspensions (milk), emulsions (cream), foams (bread),  gels (fruit jellies). Water hard-  ness. Solutions. | Solutions. | Pages 1187-1189 |
| 5 | Physics of heat generation and  transfer: history, overview.  **EXAM 1** |  | Pages 1133-1134 |
| 6 | Heat transfer: thermal conductivity, radiation, convection. Thermal insulation. | Browning/Maillard reaction and taste,  Toast vs. Bread | Pages 1134-1135 |
| 7 | Materials for cooking:  Cookware, cooking vessels: (stainless steel, aluminum, copper, Teflon, etc.) Glass vs. Pyrex. |  | Pages 1144-1148 |
| 8 | Heating using different physical principles: ovens, microwave ovens. Calorimetry and heat capacity. | Calorimetry. | Pages 1137-1142 |
| 9 | Fuels for cooking. Heat of combustion |  | Pages 1137 |
| 10 | Energy content of the food: calories.  **EXAM 2** | Calories calculation. | Pages 11, 53 |
| 11 | Acidity, pH scale. |  | Pages 59,63 |
| 12 | Archimedes' principle. Archimedes' law | Egg flotation: fresh or not. | Pages 66-67 |
| 13 | Physics of smell propagation: diffusion, air convection. |  | Pages 174,187 |
| 14 | Boiling eggs and whipping foam: physics of proteins structure change | Eggs boiling | Pages 415-420 |
| 15 | Optical properties, transparency, colors mixing for decoration.  **FINAL EXAM** |  | Pages 475-478 |

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | Physics in the kitchen |
| **Proposal Date** | 08/25/2014 |
| **Proposer’s Name** | **Ilya Grigorenko, Claire Stewart, Roman Kezerashvili**, Physics and Hospitality Management Departments |
| **Course Number** | PHYS1010 |
| **Course Credits, Hours** | 3 credits, 4 hours |
| **Course Pre / Co-Requisites** | MATH 1175 or higher |
| **Catalog Course Description** | Introduction to physical concepts that are behind food cooking processes. Emphasis is given on the general concepts and qualitative description Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the kitchen. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report. |
| **Brief Rationale**  Provide a concise summary of why this course is important to the department, school or college. | This interdisciplinary course teaches students to acquire, process and apply new knowledge across different fields. Students learn how to apply the knowledge of physics laws to improve food cooking processes. |
| **Intent to Submit as Common Core**  If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | no |
| **Intent to Submit as An Interdisciplinary Course** | yes |
| **Intent to Submit as a Writing Intensive Course** | no |

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** |  |
| * Title, Number, Credits, Hours, Catalog course description |  |
| * Brief Rationale |  |
| Completed [Library Resources and Information Literacy Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/curriculum_modification_library_form.doc) |  |
| **Course Outline**  Include within the outline the following. |  |
| Hours and Credits for Lecture and Labs  If hours exceed mandated Carnegie Hours, then rationale for this |  |
| Prerequisites/Co- requisites |  |
| Detailed Course Description |  |
| Course Specific Learning Outcome and Assessment Tables   * Discipline Specific * General Education Specific Learning Outcome and Assessment Tables |  |
| Example Weekly Course outline |  |
| Grade Policy and Procedure |  |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) |  |
| Library resources and bibliography |  |
| **Course Need Assessment.**  Describe the need for this course. Include in your statement the following information. |  |
| Target Students who will take this course. Which programs or departments, and how many anticipated?  Documentation of student views (if applicable, e.g. non-required elective). |  |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. |  |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. |  |
| Where does this course overlap with other courses, both within and outside of the department? |  |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? |  |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. |  |
| **Course Design**  Describe how this course is designed. |  |
| Course Context (e.g. required, elective, capstone) |  |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? |  |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) |  |
| How does this course support Programmatic Learning Outcomes? |  |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. |  |
| **Additional Forms for Specific Course Categories** |  |
| [Interdisciplinary Form](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/Application-for-Interdisciplinary-Course-Designation.docx) (if applicable) |  |
| [Common Core (Liberal Arts) Intent to Submit](http://openlab.citytech.cuny.edu/collegecouncil/files/2014/08/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) |  |
| Writing Intensive Form if course is intended to be a WIC (under development) |  |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. |  |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** |  |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). |  |
| Established Timeline for Curricular Experiment |  |

**Outline of the course**

**Course code:** PHYS 1010

**Title:** Physics in the Kitchen

**Number of hours, credits:** 4 hours, 3 credits

**Catalog Description:**

Introduction to the physical concepts that are behind food cooking processes to non-science majors. Laboratory work complements the course to gain hands-on experience and make use of the physical concepts in the. Laboratory exercises are performed to explain the scientific method and to allow students to learn how to perform experiments and compose a lab report.

**Pre/Co-requisites:** MATH 1175 or higher

**Recommended or typical texts:**

Harold McGee, “On Food and Cooking”, (2004).

**Course Objectives:**

Upon completion of PHYS 1010, the students will be able to:

a. Identify relevant physical laws

b. Integrate and process interdisciplinary knowledge c. Improve quality of prepared food

d. Enhance safety while cooking

e. Learn how to apply the scientific method to laboratory experiment

f. Develop hypothesis, data and error analysis

g. Understand how to use measuring devices

h. Apply working in groups and communicating effectively

**Scope of assignments and other course requirements:**

Students will apply the acquired theoretical knowledge to do their lab assignments. There will be two midterm exams and final exam.

**Method of grading:**

Students will be evaluated though lab reports and exams. The final grade will be based on a weighted average of the grades from the lab reports and exam as follows:

Midterm Exams 1 and 2: 50%, Final Exam: 25%, Labs: 25%

**College academic integrity policy:**

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

**College Policy on Absence/Lateness**

A student may be absent for 10% of the number of scheduled class meetings during the semester as follows:

Class Meets Allowable Absences

1 time/week 2 classes

2 times/week 3 classes

3 times/week 4 classes

**Date of most recent revision of this document:** November 25, 2014

**Technology statement:**

Before entering the course, students should be familiar with the use of a scientific calculator. During the course, students will develop some understanding of basic scientific calculations and will get hands-on experience with the lab equipment. Also students will learn to use functions of MS Word (equation editor, tables and inserting ﬁgures) and MS Excel (spreadsheet calculations and graphing).

**Sample sequence of topics and approximate time allocations:**

**The tag “PHYS” corresponds to the lectures/labs at the Physics Department, the tag “HMGT”-  
to the Hospitality Management Department.**

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| --- | --- | --- | --- |
| **Week** | **Lecture** | **Lab** | **Chapters** |
| 1 | HMGT: History of cooking, safety in the kitchen.  the kitchen. |  | Pages 218-225 |
| 2 | PHYS: What is food made of: atoms, molecules. Chemical bonds. Food in different phases: solid, liquid and gas. Density. | HMGT: Density measurements. Students will learn how to measure the density of different food samples: solid, granular and liquid using scales and measuring containers. | Pages 1178-1186 |
| 3 | PHYS: Phase transitions. Changing the boiling and freezing temperatures by additives. Cooking under pressure. |  | Pages 1186-1187 |
| 4 | PHYS: Mixtures: solutions (sugar water), suspensions (milk), emulsions (cream), foams (bread), gels (fruit jellies). Water hardness. Solutions. | HMGT: Solutions. Students  will learn how to prepare a sodium chloride solution with a certain concentration. They will learn also how to calculate the resulting concentration of a mixture of two solutions with unequal concentrations. | Pages 1187-1189 |
| 5 | PHYS: Physics of heat generation.  transfer: history, overview. |  | Pages 1133-1134 |
| 6 | PHYS: Heat transfer: thermal conductivity, radiation, convection. Thermal insulation. | HMGT: Browning/Maillard reaction and taste. Toast vs. Bread.  . | Pages 1134-1135 |
| 7 | HMGT: Materials for cooking: Cook-ware, cooking vessels: (stain- less steel, aluminum, copper, Teflon, etc.) Glass vs. Pyrex. |  | Pages 1144-1148 |
| 8 | PHYS: Heating using different physical principles: ovens, microwave ovens. Calorimetry and heat capacity. | PHYS: Calorimetry. Students  will learn how to measure the heat capacity of different materials. | Pages 1137-1142 |
| 9 | PHYS: Fuels for cooking. Heat of combustion. |  | Pages 1137 |
| 10 | PHYS: Energy content of the food: calories. | PHYS: Calories calculation.  Students will learn how to calculate the energy content of a meal. They will also learn how to design a meal that satisfies some constraints (for example, limited sodium in- take, proteins, fat and carbohydrates). | Pages 11, 53 |
| 11 | PHYS: Acidity, pH scale. |  | Pages 59,63 |
| 12 | PHYS: The Archimedes’ principle. | HMGT: Archimedes’ law. Egg flotation: fresh or not. Students will learn the Archimedes’s principle and measure the density of an object with a complex shape. | Pages 66,67 |
| 13 | PHYS: Physics of smell propagation:  diffusion, air convection. |  | Pages 174,187 |
| 14 | PHYS: Boiling eggs and whipping  foam: physics of proteins structure change (coagulation) at high temperature or under physical stress. | HMGT: Eggs boiling at different temperatures. Using the pressurized boilers available at the Hospitality Department students will experiment with the boiling time and boiling temperature to achieve a certain degree of the protein coagulation. | Pages 415-420 |
| 15 | PHYS: Optical properties, transparency, colors mixing for decoration. |  | Pages 475-478 |

**Intended learning outcomes: Course specific**

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| **Outcomes** | **Method of assessment** |
| a. Identify relevant physical laws (PHYS: Knowledge, HMGT: Skill) | Daily assessment, midterm and final exam |
| b. Integrate and process interdisciplinary knowledge (PHYS: Knowledge, Skill, HMGT: Knowledge, Skill; Gen. Ed.: Integration) | Daily assessment, midterm and final exam |
| c. Improve quality of prepared food (HMGT:  Knowledge, Skill) | Lab observations, daily assessment |
| d. Enhance safety while cooking | Lab observations, daily assessment |
| e. Learn how to apply scientific method to lab-  oratory experiment (PHYS: Knowledge, Skill , HMGT: Knowledge, Skill) | Midterm and final exam |
| f. Develop hypothesis, data and error analysis  (PHYS: Knowledge, Skill, Gen. Ed.: Skill) | Daily assessment, midterm and final exam |
| g. Understand how to use measuring devices  (PHYS: Knowledge, Skill, HMGT: Knowledge, Skill) | Daily assessment, midterm and final exam |
| h. Apply working in groups and communicating effectively (PHYS: Knowledge, Skill, HMGT: Knowledge, Skill, Gen. Ed.: Integration) | Class participation, Students’ self-assessment,  daily assessment |

1. [↑](#footnote-ref-1)
2. [↑](#footnote-ref-2)
3. [↑](#footnote-ref-3)
4. [↑](#footnote-ref-4)
5. [↑](#footnote-ref-5)
6. [↑](#footnote-ref-6)
7. [↑](#footnote-ref-7)
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