**Eugenio María de Hostos Community College**
**Natural Sciences and Mathematics Departments**
**Winter Institute 2014**

| Time | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| 9:30 - 12:30 | MAT A-534 | PHY A-534 | MAT A-534 | PHY A-534 |

| Time | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| 1:30 - 4:30 | MAT A-534 | CHE A-534 | MAT A-534 | CHE A-534 |

| Time | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| 12:30 - 2:30 | ENGR 204 A-517 | ENGR 204 A-517 | ENGR 204 A-517 | ENGR 204 A-517 |

| Time | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| 9:30 - 11:30 | ENGR 103 C-556 | ENGR 103 C-556 | ENGR 103 C-556 | ENGR 103 C-556 |

| Time | Monday | Tuesday | Wednesday | Thursday |
|---|---|---|---|---|
| 2:00 - 5:00 | CE 23100 A-535 | CE 23100 A-535 | CE 23100 A-535 | CE 23100 A-535 |

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Hostos Community College

**Engineering at Hostos Community College**
**Joint Degree/Dual Admission**
**A.S./B.E. Programs**
**with The City College of New York**

Chemical Engineering
Civil Engineering
Electrical Engineering
Mechanical Engineering

For more information about the engineering programs contact:

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Natural Sciences Department
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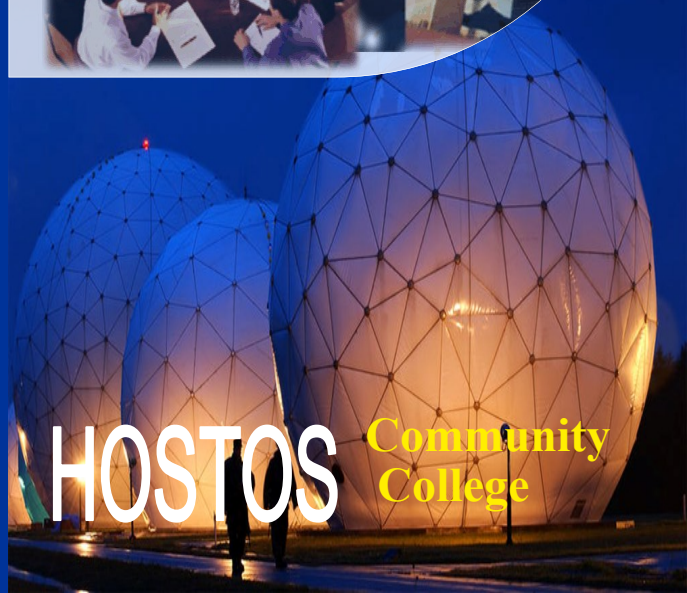
The Office of Academic Affairs
500 Grand Concourse, B439
Bronx, NY 10451

# STEM Winter Institute 2014



# Eugenio María de Hostos Community College
# Mathematics and Natural Sciences Departments
# STEM Winter Institute 2014

## Bridge to Chemistry 210 & 220

**Semester:** Winter Intersession 2014 (January 6 to January 24)
**Instructors:** **Prof. Francisco Fernández** (Sciences Dept.) and **Prof. Dionicio Taveras** (Math Dept.)
**Class Hours:** 1:30 pm – 4:30 pm
**Class Room:** A-534
**Class Days:** MAT: M & W CHE: T & TH

**Objectives:**

On completing this course students should be able to start studying chemistry as part of the first college chemistry course (**Chemistry 210, Chemistry 220**)

**Threshold Concepts and their Applications:**

| Math Threshold Concepts | Chemistry Application |
|---|---|
| **Basic mathematical Concepts:**<br>• Calculators<br>• Unit Conversions<br>• Percent<br>• Scientific Notations | • Applications in Chemistry<br>• Stoichiometry<br>• Thermo chemistry<br>• Solutions, Percent composition, Percent yield<br>• Solubility, ionic equilibrium |
| **Other mathematical issues & Algebra:**<br>• Logarithms<br>• Significant Figures<br>• First Degree Equations<br>• Second and Higher degree equations | • pH<br>• Equilibrium<br>• Thermodynamics<br>• Gases<br>• Chemical equations |
| **Data Processing:**<br>• Functional Relationships<br>• Graphs<br>• Problem Analysis | • Gases<br>• Chemical Equations<br>• Balancing Redox Equations<br>• Hess Law<br>• Chemical Equilibrium<br>• Thermo chemistry<br>• Thermodynamics<br>• Applied Chemistry |

## Bridge to Physics 210

**Semester:** Winter Intersession 2014 (January 6 to January 24)
**Instructors:** **Prof. Yoel Rodríguez** (Sciences Dept.) and **Prof. Dionicio Taveras** (Math Dept.)
**Class Hours:** 9:30 am – 12:30 pm
**Class Room:** A-534
**Class Days:** MAT : M &W PHY 210: T & TH

**Objectives:**

On completing this course students should be able to start studying mechanics as part of the first college physics course

**Threshold Concepts and their Applications:**

| Math Threshold Concepts | Physics Application |
|---|---|
| **Trigonometry**<br>• Right Triangle Trigonometry<br>• Definition of Trigonometric Functions: sin(a), cos(a), and tan(a); and their inverses $\sin^{-1}(a)$, $\cos^{-1}(a)$, and $\tan^{-1}(a)$),<br>• Identities | • Physics-Related problems (Daily-life situations)<br>• Newton's laws of motion (First Law, Second Law, and Third Law of motion) |
| **Linear Algebra**<br>• Vectors and Vector Addition<br>• Unit Vectors<br>• Products of vectors | • Physics-related problems<br>• Motion along a straight line<br>• Motion in two or three dimensions<br>• Newton's Laws of Motion |
| **Calculus**<br>• Derivatives<br>• Integrals | • Motion Along a straight line<br>• Motion in two or three dimensions<br>• Newton's Laws of Motion |

## Bridge to CE 23100

**Semester:** Winter Intersession 2014 (January 6 to January 24)
**Instructors:** **Mr. Stanley Tineo and Prof. Yoel Rodríguez (Advisor)**
**Class Hours:** 2:00 pm – 5:00 pm
**Class Room:** A-535 **Class Days:** M -TH

- Statics of Particles: Vector Forces
- Rigid Bodies: Equivalent System of Forces
- Equilibrium of Rigid Bodies
- Distributed Forces: Centroids and Centers of Gravity
- Analysis of Structures: Trusses, Frames and Machines
- Beams: Shear and Bending Moment Diagrams

## Bridge to Engr 103

**Semester:** Winter Intersession 2014 (January 6 to January 24)
**Class Hours:** 9:30 am - 11:30 am
**Class Room:** C-556
**Class Days:** M - TH

**Threshold Concepts and their Applications:**

## Bridge to Engr 204

- Coding
- Linear Algebra
- Numeric Integration
- Complex Numbers
- Statistics

**Semester:** Winter Intersession 2014 (January 6 to January 24)
**Class Hours:** 12:30 am - 2:30 pm
**Class Room:** A-517
**Class Days:** M - TH

| Basic Concepts | Basic Laws: | Methods of Analysis |
|---|---|---|
| • Systems of Units<br>• Charge and current<br>• Voltage<br>• Power and Energy<br>• Circuits Elements | • Ohm's Laws<br>• Nodes, Branches, and Loops<br>• Kirchhoff's Laws<br>• Series Resistors and Voltage division<br>• Wye-Delta transformations | • Nodal Analysis with Voltage Sources<br>• Mesh analysis with Current Sources<br>• Nodal and Mesh Analysis by Inspection<br>• Circuit Analysis with PSpice |
| **Circuits Theorems** | **Operational Amplifiers** | **Capacitors and Inductors** |
| • Linearity Property<br>• Superposition<br>• Source Transformation<br>• Thevenin's Theorem<br>• Norton's Theorem<br>• Derivations of Thevenin's and Norton's Theorems | • Operational Amplifiers<br>• Ideal Op Amplifiers<br>• Inverting Amplifier<br>• Noninverting Amplifier<br>• Summing Amplifier<br>• Difference Amplifier<br>• Cascaded Op Amp Circuits | • Capacitors<br>• Series and Parallel Capacitors<br>• Inductors<br>• Series and Parallel Inductors<br>• Sinusoids/ Phasors<br>• Source Transformation / Equivalent Circuits |