

Division of Natural Sciences and Geology

Department of Chemistry

http://learning.hccs.edu/programs/chemistry

CHEM 1311: General Chemistry I | Lecture | CRN #15747

Summer 2021 | 2nd 5 Weeks (7-12-2021 to 8-15-2021) Unit 3

3-hour lecture course | 48 hours per semester

Instruction Mode: In Person, Lecture

Days and Time: Monday, Wednesday, and Friday; 11:30AM – 2:30PM

Location: Stafford-Scarcella Center, Room W125

Instructor Contact Information

Instructor: Nausha Asrar, Ph.D. Office Phone: 713-718-0000

HCC Email: nausha.asrar@hccs.edu

Instructor's Preferred Method of Communication

I will respond to emails within 24 hours Monday through Friday; I will reply to weekend messages on Monday mornings.

Welcome:

Welcome to General Chemistry I (Lecture) – Chem1311— I'm delighted that you have chosen this course. One of my passions is mentoring my students and I can hardly wait to pass that on. I will present the information in the most exciting way I know, so that you can grasp the concepts and apply them now and hopefully throughout your life. As you read and wrestle with new ideas and facts that may challenge you, I am available to support you. The fastest way to reach me is by my HCC email. The best way to really discuss issues is in person and I'm available during posted office hours to tackle any questions you might have. My goal is for you to walk out of the course with a better understanding of yourself and of human behavior. So please visit me or contact me whenever you have a question.

What's Exciting About This Course

You will learn so much about your life and the lives of those around you. Do you know how one learns? How memory works? Why we have different personalities? How health is related to stress? The course will look at how and why we develop from children that seem to have so much in common to adults that do and do not. What happens? Are there best practices in child rearing and in life-long development or is it just luck? Where are you in your development? And what about schizophrenia and other psychological

disorders? Are they avoidable? What causes them? The information in this course will enable you to understand the people in your life as well as develop new habits to increase your personal success.

Prerequisites and/or Co-Requisites

CHEM 1311 requires college-level reading and writing skills. Research indicates that you are most likely to succeed if you have already taken and passed Reading 0342, Math 0312 and Writing 0310 / 0349 or Math 0312 with INRW 0420. The minimum requirements for enrollment in CHEM 1311 include placement in college-level reading (or take INRW 0420). If you have enrolled in this course having satisfied these prerequisites, you have a higher chance of success than students who have not done so. Please carefully read and consider the repeater policy in the HCCS Student Handbook.

Eagle Online Canvas Learning Management System

This section of CHEM 1311 will use Canvas (https://eagleonline.hccs.edu) to supplement in-class assignments, exams, and activities. Your eagle online Canvas course is paired with your Pearson textbook for all the quizzes that you need to take during the semester. You will also have access to all the tutorial and homework/practices from the textbook. HCCS Open Lab locations may be used to access the Internet and Eagle Online Canvas. It is recommended that you USE FIREFOX OR CHROME AS YOUR BROWSER.

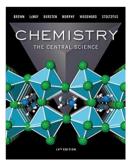
HCC Online Information and Policies

Here is the link to information about HCC Online classes including the required Online Orientation for all fully online classes: http://www.hccs.edu/online/.

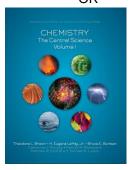
Scoring Rubrics, Sample Assignments, etc.

Look in Eagle Online Canvas for the scoring rubrics for assignments, samples of class assignments, and other information to assist you in the course. https://eagleonline.hccs.edu/login/ldap

Textbook and Course Materials Information



OR



The materials listed below are *required* for this course.

1. Brown, LeMay Jr, Bersten, Murphy, Woodward, Stoltzfus. (2015). *Chemistry: The Central Science*, 14th ed., Pearson, MN.

Either hardcover that contains BOTH volumes I and II (for General Chemistry I and II) ISBN: 978-0-13-441423-2

OR

Softcover Volume I for CHEM 1311 only

ISBN: 978-1-323-85000-8

The texts are included in a package that contains the text as well as an access code and are found at the <u>HCC Bookstore</u>. You may either use a hard copy of the book, or rent the e-book from Pearson.

2. A Nonprogrammable scientific calculator (no graphing calculators permitted in tests and exams). You will need to have access to a computer with internet access, and webcam.

Temporary Free Access to E-Book

Follow these steps to get temporary free access to a digital version of the text for fourteen days:

- Logon to Canvas
- Click "MyLab and Mastering"
- Click "Open MyLab & Mastering"
- Accept License Agreement
- Enter Pearson log-in credentials or create a new account
- Click "Get temporary access without payment for 14 days" near the bottom of the page
- Follow on-screen instructions from here.

Other Instructional Resources

MyLab & Mastering

You will have access to MyLab & Mastering from your canvas course. You will have access to the eBook and practices if you decide to purchase the access code. Instructions on how to get the code and how to use Mylab and Mastering are posted on Canvas as well.

Option A: Students that purchase a new textbook (hard copy) from the bookstore may have an access code bundled with their textbook. Check with the bookstore to find out what they offer for your course.

Option B: An access code may be purchased on-line from Pearson by logging on to Canvas and clicking on My Lab /Mastering. This will help you purchase the access code from Pearson along with an ebook.

Tutoring

provides free, confidential, and convenient academic support to HCC students in an online environment and on campus. Tutoring is provided by HCC personnel in order to ensure that it is contextual and appropriate. Visit the HCC Tutoring Services website for details.

Libraries

The HCC Library System consists of 9 libraries and 6 Electronic Resource Centers (ERCs) that are inviting places to study and collaborate on projects. Librarians are available both at the libraries and online to show you how to locate and use the resources you need. The libraries maintain a large selection of electronic resources as well as collections of books, magazines, newspapers, and audiovisual materials. The portal to all libraries' resources and services is the HCCS library web page at http://library.hccs.edu.

Supplementary Instruction

Supplemental Instruction is an academic enrichment and support program that uses peer-assisted study sessions to improve student retention and success in historically difficult courses. Peer Support is provided by students who have already succeeded in completion of the specified course, and who earned a grade of A or B. Find details at http://www.hccs.edu/resources-for/current-students/supplemental-instruction/.

Course Overview for CHEM 1311

This course is intended for students majoring in one of the physical sciences or life sciences, engineering, or for students who are pursuing pre-professional programs in medicine, dentistry, pharmacy, veterinary medicine, or other health programs. The course is also beneficial to students who are preparing themselves for higher level science courses in their respective curricula.

Science and engineering majors study atomic structure, chemical reactions, thermodynamics, electronic configuration, chemical bonding, molecular structure, gases, states of matter, and properties of solutions. The laboratory includes appropriate experiments.

Most class time will involve lecture and practice exercises. Some class time may be spent working problem sets individually or in groups. Class discussions and questions are always welcome.

Core Curriculum Objectives (CCOs) for all CHEM Core Courses

CHEM 1311 satisfies the chemistry requirement in the HCCS core curriculum. The HCCS Chemistry Discipline Committee has specified that the course address the following core objectives:

- 1. Demonstrate basic mastery of chemistry by writing formula and equations for chemical reactions, performing chemical calculations and recognizing the application of chemistry in our daily lives
- 2. Demonstrate a mastery of introductory and intermediate level chemistry to promote success in higher level chemistry and other science programs in four year universities
- 3. Demonstrate a mastery of General and Organic Chemistry in preparation for allied and professional health programs and engineering
- 4. Conduct laboratory experiments by making measurements, performing chemical reactions and analyzing the results in a group or individual setting.

Course Student Learning Outcomes (CSLOs) for CHEM 1311

Upon completion of CHEM 1311, the student will be able to:

- SLO 1. Give names and formulas of elements, ions, and ionic and molecular compounds.
- 1.1 Given the name, identify the formula and charge of positive and negative ions, and vice-versa.

SLO 2. Categorize, complete, and balance chemical reactions.

- 2.1 Identify given reactions as combination, decomposition, single displacement, and double displacement. 2.2 Starting with the reactants, complete the reaction by writing the reaction products. 2.3 Given the reactants and products, balance the equation for the reaction.
- SLO 3. Do chemistry calculations involving reaction stoichiometry and energy changes.
- 3.1 Convert amounts in units of mass or volume to moles, and vice-versa.
- 3.2 Given the amount of one substance in a reaction, calculate the amount of the other substances that react and form.
- 3.3 Identify the limiting reactant and excess reactant in a reaction where more than one reactant amount is given.
- 3.4 Determine the amount of the excess reactant that remains as unreacted excess. 3.5 Calculate energy changes associated with chemical reactions using Hess's law, standard enthalpies of formation, or calorimetry.
- SLO 4. Relate the properties of electromagnetic radiation (frequency, wavelength, and energy) to each other and to the energy changes atoms undergo which accompany electronic transitions.
- 4.1 Relate frequency, wavelength, and the speed of electromagnetic radiation.
- 4.2 From the frequency or wavelength of electromagnetic radiation, calculate its energy.
- 4.3 Relate the energy change in the hydrogen atom to its electronic transitions using the Bohr model.
- 4.4 Identify and relate the four quantum numbers that can be associated with electrons.
- 4.5 Write the electronic configurations of atoms and ions, including the box diagram method.

SLO 5. Identify the parts of the periodic table and the trends in periodic properties of atoms.

- 5.1 Identify the common regions of the periodic table. Identify by name selected groups of elements in the periodic table.
- 5.2 Using the periodic table, identify the trend (increasing or decreasing in value) of selected properties of atoms such as atomic radius, ionization energy, and electron affinity.

5.3 Identify reaction similarities of elements within the same group in the periodic table.

SLO 6. Relate the properties of gases with the gas laws and extend the application of these relationships to reaction stoichiometry, gas mixtures, and effusion/diffusion of gases.

- 6.1 Relate and calculate the pressure, volume, temperature, or amount of gas using Boyle's law, Charles' law, Gay-Lussac's law, Avogadro's law, the combined gas law, and the ideal gas law.
- 6.2 Perform stoichiometry calculations which involve gaseous substances.
- 6.3 Use Dalton's law and Graham's law to perform calculations involving gaseous mixtures and effusion and diffusion of gases. 6.4 Explain the assumptions of the kinetic-molecular theory of gases.

SLO 7. Depict chemical bonding with dot structures and valence bond theory and determine the molecular shapes (geometry) of molecules based on VSEPR and valence bond theory.

- 7.1 Draw the Lewis dot structure of molecules containing two or more atoms.
- 7.2 Based on the dot structure of the molecule, determine its electron domain geometry and molecular geometry based on VSEPR theory.
- 7.3 Given the dot structure, identify the hybridization of and geometry about each atom.
- 7.4 Explain the nature of sigma and pi bonding using hybrid atomic orbitals.

SLO 8: Calculate density and relate the value to mass and volume measurements for all physical states.

- 8.1 Given either mass, volume, or density, be able to calculate an unknown variable through use of the density equation.
- 8.2 Appreciate the utility of density as an intensive and physical property as an identification tool.

SLO 9: Covert measurements in Metric, SI, and American systems

- 9.1 Convert and assess temperatures in three scales of measurement: Celsius, Fahrenheit, and Kelvin.
- 9.2 Convert measurements of mass, volume, length between established units of official International (SI), Metric, and American systems.

SLO 10: Apply thermochemical principles to evaluate work, heat, and energy relationships based on specific heat, calorimetry, and temperature changes.

- 10.1 Calculate heat based on mass, specific heat or heat capacity, and temperature change.
- 10.2 Understand the transfer of heat as it applies to a system and its surroundings, including calorimeters, by calculating one variable in an equation when presented with others including heat, mass, specific heat or heat capacity, and initial and final temperatures.
- 10.3 Define the meaning of work as it relates to energy in all forms: heat, potential and kinetic.
- 10.4 Apply the Law of Conservation of Energy as it pertains to energy exchange in thermochemical reactions.
- 10.5 Convert between SI and American units of heat.

Learning Objectives for CHEM 1311

Learning Objectives for each CSLO can be found at Learning Objectives for CHEM 1311. Specifically, they are:

- 1.1 Given the name, identify the formula and charge of positive and negative ions, and vice-versa.
- 1.2 Given the name, write the formula of ionic compounds, binary molecular compounds, and acids. Given the formulas

of these types of compounds, name them.

- 2.1 Identify given reactions as combination, decomposition, single displacement, and double displacement.
- 2.2 Starting with the reactants, complete the reaction by writing the reaction products.
- 2.3 Given the reactants and products, balance the equation for the reaction.
- 3.1 Convert amounts in units of mass or volume to moles, and vice-versa.
- 3.2 Given the amount of one substance in a reaction, calculate the amount of the other substances that react and form.
- 3.3 Identify the limiting reactant and excess reactant in a reaction where more than one reactant amount is given.
- 3.4 Determine the amount of the excess reactant that remains as unreacted excess. 3.5 Calculate energy changes associated

with chemical reactions using Hess's law, standard enthalpies of formation, or calorimetry.

- 4.1 Relate frequency, wavelength, and the speed of electromagnetic radiation.
- 4.2 From the frequency or wavelength of electromagnetic radiation, calculate its energy.
- 4.3 Relate the energy change in the hydrogen atom to its electronic transitions using the Bohr model.
- 4.4 Identify and relate the four quantum numbers that can be associated with electrons.
- 4.5 Write the electronic configurations of atoms and ions, including the box diagram method.
- 5.1 Identify the common regions of the periodic table. Identify by name selected groups of elements in the periodic table. 5.2 Using the periodic table, identify the trend (increasing or decreasing in value) of selected properties of atoms such as

atomic radius, ionization energy, and electron affinity.

- 5.3 Identify reaction similarities of elements within the same group in the periodic table.
- 6.1 Relate and calculate the pressure, volume, temperature, or amount of gas using Boyle's law, Charles' law. Gav-

Lussac's law, Avogadro's law, the combined gas law, and the ideal gas law.

- 6.2 Perform stoichiometry calculations which involve gaseous substances.
- 6.3 Use Dalton's law and Graham's law to perform calculations involving gaseous mixtures and effusion and diffusion of

gases.

- 6.4 Explain the assumptions of the kinetic-molecular theory of gases.
- 7.1 Draw the Lewis dot structure of molecules containing two or more atoms.
- 7.2 Based on the dot structure of the molecule, determine its electron domain geometry and molecular geometry based on

VSEPR theory.

- 7.3 Given the dot structure, identify the hybridization of and geometry about each atom.
- 7.4 Explain the nature of sigma and pi bonding using hybrid atomic orbitals.
- 8.1 Given either mass, volume, or density, be able to calculate an unknown variable through use of the density equation. 8.2 Appreciate the utility of density as an intensive and physical property as an identification tool.
- 9.1 Convert and assess temperatures in three scales of measurement: Celsius, Fahrenheit, and Kelvin.
- 9.2 Convert measurements of mass, volume, length between established units of official International (SI), Metric, and

American systems.

- 10.1 Calculate heat based on mass, specific heat or heat capacity, and temperature change.
- 10.2 Understand the transfer of heat as it applies to a system and its surroundings, including calorimeters, by calculating

one variable in an equation when presented with others including heat, mass, specific heat or heat capacity, and initial

and final temperatures.

- 10.3 Define the meaning of work as it relates to energy in all forms: heat, potential and kinetic.
- 10.4 Apply the Law of Conservation of Energy as it pertains to energy exchange in thermochemical reactions.
- 10.5 Convert between SI and American units of heat.

Student Success in CHEM 1311

As with any 3 credit-hour course, expect to spend *at least two hours per night* outside of class reading and studying the material. I will provide practice questions in canvas to help you use those hours (Per night/per week) wisely. Successful completion of this course requires a combination of reading the textbook, attending class, completing assignments, and participating in class discussions. There is no short cut for success in this course; it requires reading, solving problems and studying the material using the course objectives as your guide.

Instructor and Student Responsibilities

As your Instructor, it is my responsibility to:

- Provide the grading scale and detailed grading formula explaining how student grades are to be derived
- Facilitate an effective learning environment through class activities, discussions, and lectures
- Provide a description of any special projects or assignments
- Inform students of policies such as attendance, withdrawal, tardiness and make up
- Provide the course outline and class calendar which will include a description of any special projects or assignments
- Arrange to meet with individual students before and after class as required
 To be successful in this class, it is the student's responsibility to:
- Attend class and participate in class discussions and activities
- Read and comprehend the textbook
- Complete the required assignments and exams
- Ask for help when there is a question or problem
- Keep copies of all paperwork, including this syllabus, handouts, and all assignments
- Attain a raw score of at least 70% on the departmental final exam
- Be aware of and comply with academic honesty policies in the HCCS Student Handbook

Academic Integrity

"Students are responsible for conducting themselves with honor and integrity in fulfilling course requirements. Disciplinary proceedings may be initiated by the college system against a student accused of scholastic dishonesty. Penalties can include a grade of "0" or "F" on the particular assignment, failure in the course, academic probation, or even dismissal from the college. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion." In this class, the penalty for willful cheating on exams is a grade of F in the course.

You are expected to be familiar with the University's Policy on Academic Honesty, found in the catalog. What that means is: If you are charged with an offense, pleading ignorance of the rules will not help you. Students are responsible for conducting themselves with honor and integrity in fulfilling course requirements. Penalties and/or disciplinary proceedings may be initiated by College System officials against a student accused of scholastic dishonesty. "Scholastic dishonesty": includes, but is not limited to, cheating on a test, plagiarism, and collusion. There is a **Zero tolerance** for any type of academic dishonesty. Scholastic Dishonesty will result in a referral to the Dean of Student Services. See the link below for details.

Here's the link to the HCC information about academic integrity (Scholastic Dishonesty and Violation of Academic Scholastic Dishonesty and Grievance): http://www.hccs.edu/about-hcc/procedures/student-rights-policies--procedures/student-procedures/

Attendance Procedures

You are expected to attend all lecture classes regularly. You are also responsible for materials covered during your absences. Instructors may be willing to consult with you for make-up assignments, but it is your responsibility to contact the instructor. Class attendance is monitored daily.

Absences will be excused for illness accompanying a doctor's note, death in the family or other reasons approved by the instructor.

Although it is your responsibility to drop a course for nonattendance, the instructor has the authority to drop you for excessive absences. You may be dropped from a course after accumulating absences in excess of 12.5 percent of the total hours of instruction (lecture and lab). For example:

1. For a 3 credit-hour lecture class meeting 3 hours per week (48 hours of instruction), you may be dropped after 6 hours of absence.

2. For a 4 credit-hour lecture/lab course meeting 6 hours per week (96 hours of instruction), you may be dropped after 12 hours of absence.

Departments and programs governed by accreditation or certification standards may have different attendance policies. Administrative drops are at the discretion of the instructor. *Failure to withdraw officially can result in a grade of "F" in the course.*

Exams

Regular Exams: Three regular exams composed of Multiple Choice Questions (MCQ) and Show Work Questions (SWQ) which count for 50% of your final grade. (See Grading Formula below).

CHEM 1311 Departmental Final Exam: All students will be required to take a comprehensive departmental final exam.

The comprehensive Final exam is also composed of Multiple Choice Questions (MCQ) and Show Work Questions (SWQ) which count for 30% of your final grade. (See Grading Formula below).

Students who are absent from the final exam without discussing their absence with the instructor in advance or within 24 hours afterward will receive a final exam grade of zero.

Make-up exams will NOT be given. So please make every reasonable effort to take the exams on their scheduled dates.

Policy Regarding Making Up Missed a Regular Exam: The Final Exam may substitute or replace your lowest exam score, including a missed exam (grade zero). This is allowed for only one module Exam. All other missed exams will result in a grade of zero. If you take all two module Exams, and score higher on the Final Exam, then the Final Exam will replace the lowest module Exam grade.

Grading Formula

This is the grade distribution for the course

- 3 Module Exams Average = 50%
- Departmental Final Exam (Final) = 30%
- Quizzes (Q av) 20%

Grading Formula

The HCC Grading Scale can be found on this site under HCC Grading System: http://www.hccs.edu/about-hcc/procedures/student-rights-policies-- procedures/student-procedures/

HCCS Grading Scale:

90 -100 - A 80 - 89 - B 70 - 79 - C 60 - 69 - D < 60 - F

HCC Grading Scale can be found on this site under HCC Grading System:

http://www.hccs.edu/about-hcc/procedures/student-rights-policies--procedures/student-procedures/

HCC Eagle Early Alert: The HCC Eagle Alert program is designed to provide timely intervention for students at risk of dropout or academic failure. On a regular basis an early alert for the areas of concern

by the instructor will be conducted. Once the faculty sends the early alert, an email notification is sent to the student and the campus advising manager. The student will then need to set up an appointment with the advisor to discuss helpful resources such as tutoring, etc.

Incomplete Policy: In order to receive a grade of Incomplete ("I"), a student must have completed at least 85% of the work in the course. In all cases, the instructor reserves the right to decline a student's request to receive a grade of Incomplete.

Course Calendar

(Note the dates to study specific chapters are provided for guidance only, so you can study at your own pace. However, quiz and exam dates are fixed.)

Week 1 (July 12 – July 16): Chapter 1: Matter & Measurement

Chapter 2 - Atoms, Molecules & Ions

Week 2 (July 19 – July 23) Chapter 3 – Chemical Reactions & Stoichiometry

Chapter 4 - Reactions in Aqueous Solution

Exam I – Chapter 1 – 3 – On Canvas, Multiple Choice – will open on July 21 and close on July 22

Week 3 (July 26 – July 30): Chapter 5 – Gas Laws

Chapter 6 - Thermochemistry

Exam II - Chapter 4 - 6 - On Canvas, Multiple Choice - will open on July 30 and close on July 31

Week 4 (Aug 2 – Aug 6): Chapter 7 – Electronic Structure of atoms

Chapter 8 - Properties of the Elements

Chapter 9 - Basic Concepts of Chemical Bonding

Week 5 (Aug 9 – Aug 13) Chapter 10– Molecular Geometry and Bonding Theories

Exam III - Chapter 7 - 8 - On Canvas, Multiple Choice - will open on Aug 4 and close on Aug 5

FINAL EXAM of Chap. 1-10, (2 hours) will open on Aug 11 and close on Aug 12

Syllabus Modifications

The instructor reserves the right to modify the syllabus at any time during the semester and will promptly notify students in writing, typically by e-mail, of any such changes.

HCC Policies : Here's the link to the HCC Student Handbook http://www.hccs.edu/resources-for/current-students/student- handbook/

EGLS³

Incomplete Grades

International Student Services Health Awareness Libraries/Bookstore

Police Services & Campus Safety Student Life at HCC

Student Rights and Responsibilities Student Services

Testing

Transfer Planning

Veteran Services

Campus Carry

Link for the HCC information about Campus Carry: http://www.hccs.edu/departments/police/campus-carry/

HCC Email Policy

When communicating via email, HCC requires students to communicate only through the HCC email system to protect your privacy. If you have not activated your HCC student email account, you can go to HCC Eagle ID and activate it now. You may also use Canvas Inbox to communicate.

Housing and Food Assistance for Students

Any student who faces challenges securing their foods or housing and believes this may affect their performance in the course is urged to contact the Dean of Students at their college for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable HCC to provide any resources that HCC may possess.

Office of Institutional Equity; Use the link below to access the HCC Office of Institutional Equity, Inclusion, and Engagement (http://www.hccs.edu/departments/institutional-equity/)

disAbility Services

HCC strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please meet with a campus Abilities Counselor as soon as possible in order to establish reasonable accommodations. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Ability Services. It is the policy and practice of HCC to create inclusive and accessible learning environments consistent with federal and state law. For more information, please go to http://www.hccs.edu/support-services/disability-services/

Title IX

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual's fundamental rights and personal dignity. Title IX prohibits discrimination on the basis of sex-including pregnancy and parental status in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor. The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to:

David Cross
Director EEO/Compliance
Office of Institutional Equity & Diversity
3100 Main, Ph; (713) 718-8271
Houston, TX 77266-7517 or Institutional.Equity@hccs.edu
http://www.hccs.edu/departments/institutionale-quity/title-ix-know-your-rights/

Department Chair Contact Information

Dr. Emmanuel Ewane, emmanuel.ewane@hccs.edu; 713-718-5414