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Part I: Course Information

Course Type
☒ Existing/Restructured
☐ New Course

Course Prefix & Number: **CHEM 1307**

Texas Common Course Number (TCCN): **CHEM 1307**

Course Title: **Introductory Chemistry II**

Course Catalog Description

Introductory Chemistry II (3,3,0) A survey of organic, biochemistry, food/physiological, and environmental/consumer chemistry. Topics include functional groups, nomenclature, carbohydrates, lipids, proteins, enzymes, bioenergetics, catabolism, anabolism, nucleic acids, nutrition, digestion, body fluids, neurotransmitters, hormones, immunoglobulins and current topics.

Course Prerequisites: none

Available Online?
☐ Yes
☒ No

Part II: THECB Course Objectives
None listed

See Attached Syllabus

Part III: THECB Skill Objectives
1. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. Empirical and Quantitative Skills: to include applications of scientific and mathematical concepts.
4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

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Part IV: Course Student Learning Outcomes (SLO)
Upon successful completion of this course, students will:

Learning Outcomes

1. Compare and contrast the natures and bonding characteristics of organic and inorganic molecules.
2. Draw structural representations of organic molecules and describe shapes.
3. Name, describe physical and chemical properties; and discuss uses of alkanes and alkenes.
4. Name; describe physical and chemical properties; and discuss uses of alkenes, alkynes, and aromatics.
5. Name; describe physical and chemical properties; and discuss uses of alcohols, phenols, esters, and thiols.
6. Name; describe physical and chemical properties; and discuss uses of aldehydes and ketones.
7. Name; describe physical and chemical properties; and discuss uses of esters and salts.
8. Name; describe physical and chemical properties; and discuss uses of amines and amides.
9. Describe the nature, structure, physical properties, and chemical properties of carbohydrates.
10. Describe the nature, structure, physical properties, and chemical properties of lipids.
11. Describe the nature, structure, physical properties, and chemical properties of protein and enzymes.
12. Illustrate and explain the major anabolic and catabolic pathways for carbohydrate, lipid, and protein metabolism.

See Attached Syllabus

Skill Objective:	**Critical Thinking Skills:** to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
THECB Course Objective	SLO #2 Draw structural representations of organic molecules and describe shapes.
Course Student Learning Outcome	SLO #2 Draw structural representations of organic molecules and describe shapes.
General Learning Activities	Students will draw Lewis Structures and use VSEPR to predict structures and shapes of various molecules given chemical formulae. Based upon these findings, students will extrapolate to physical and chemical properties. See attached activity—Lewis Structures.
Assessment ***Must Include Assignment & Rubric***	Exam questions. See attached rubric.

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Skill Objective:	**Communication Skills:** to include effective written, oral, and visual communication
THECB Course Objective	SLO # 7 Name; describe physical and chemical properties; and discuss uses of esters and salts. SLO #8 Name; describe physical and chemical properties; and discuss uses of amines and amides.
Course Student Learning Outcome	SLO # 7 Name; describe physical and chemical properties; and discuss uses of esters and salts. SLO #8 Name; describe physical and chemical properties; and discuss uses of amines and amides.
General Learning Activities	Lab groups will prepare and present powerpoint presentations and short papers about drugs that contains at least one of the following functional groups: ester, salt, amine, amide. See the attached assignment--pharmacology.
Assessment ***Must Include Assignment & Rubric***	Exam questions. See attached rubric

Skill Objective:	**Empirical and Quantitative Skills:** to include applications of scientific and mathematical concepts.
THECB Course Objective	SLO #5 Name; describe physical and chemical properties; and discuss uses of alcohols, phenols, esters, and thiols.
Course Student Learning Outcome	SLO #5 Name; describe physical and chemical properties; and discuss uses of alcohols, phenols, esters, and thiols.
General Learning Activities	Students will extract ethanol from various consumer products and calculate the percent alcohol and proof. See attached Wow that has a kick
Assessment ***Must Include Assignment & Rubric***	Exam questions. See attached rubric

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Skill Objective:	**Teamwork:** to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
THECB Course Objective	SLO #6 Name; describe physical and chemical properties; and discuss uses of aldehydes and ketones.
Course Student Learning Outcome	SLO #6 Name; describe physical and chemical properties; and discuss uses of aldehydes and ketones.
General Learning Activities	Student lab teams will extract citral from various citrus fruits, observe it's chemical and physical properties, and make calculations predicting amount of fruit needed for commercial production of the oil. See attached orange oil lab.
Assessment ***Must Include Assignment & Rubric***	Exam questions. See attached rubric

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Syllabus: Introductory Chemistry II

Course Number: CHEM 1307/1107
Semester & Year:

Instructor Information

Name: Dr. Catherine Howard (Dr. Cat.)
Office: Chemistry room 209
Telephone: 903-823-3285
E-mail: catherine.howard@texarkanacollege.edu
Office Hours: 9-12 Tuesday

9-12 Thursday

Fridays by appointment

Textbook Information

Organic and Biochemistry for Today 7th Edition, Seager, S., and Slabaugh, M., 2004. ISBN 0-534-39582-1

Student Learning Outcomes for the Course

1. Compare and contrast the natures and bonding characteristics of organic and inorganic molecules.
2. Draw structural representations of organic molecules and describe shapes.
3. Name, describe physical and chemical properties; and discuss uses of alkanes and alkenes.
4. Name; describe physical and chemical properties; and discuss uses of alkenes, alkynes, and aromatics.
5. Name; describe physical and chemical properties; and discuss uses of alcohols, phenols, esters, and thiols.
6. Name; describe physical and chemical properties; and discuss uses of aldehydes and ketones.
7. Name; describe physical and chemical properties; and discuss uses of esters and salts.
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12. Illustrate and explain the major anabolic and catabolic pathways for carbohydrate, lipid, and protein metabolism.

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Student Requirements for Completion of the Course and Due Dates

Instructional Method: During the class meetings, the lecture method will be used and new course material presented. In addition, the student will be required to participate in activities, discussions, and prepare presentations at various times during the semester. The student will also be required to participate in one lab activity per week. PowerPoint slides used in the course are available for the student to copy online through the TC website: http://www.texarkanacollege.edu, click on "TC online" from the TC homepage and then scroll down to find this class. In addition, all lectures are available as pod casts from the same site. These recordings can be listened to at a computer terminal or loaded onto an mp3 player and accessed at any time. Students are also encouraged to follow their instructor and class on Twitter. Instructions for signing up will be provided in class.

Lab sections are scheduled to be 3 hours in length. During these sessions, experiments will be conducted, occasionally tests will be given, pre and post test reviews made, and homework questions addressed. In short, these sessions are intended to provide time for experimentation hand hands on learning, as well as serve as study sessions for the course. Each student will be assigned a lab partner to work with during the semester.

Course: The course will cover chapters 1-6 in the textbook and portions of chapters 7, 8, 9, 10, and 13. In all, 6 tests will be given. As a general policy, I do not give make-up exams. If you anticipate missing a test, or if something urgent comes up, you must contact me as soon as possible. Exams are returned the following class period. If you have not made arrangements with me before the next class period following the exam, your exam grade will be a zero.

Test 1—chapter 1

Test 2—chapter 2.

Test 3—chapter 3.

Test 4—chapters 4 and 5

Test 5—portions of chapters 6, 9, 10, 7, 8--biomolecules

Test 6---final exam.

In addition projects, presentations, papers, and other assignments will be made periodically. In addition homework assignments will be made from time to time. Class participation will also be considered in determining your final grade. The lab sessions each week will consist of experiments that support the course material, study sessions, and occasional testing.

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Student Assessment

You can check your average at any time with the online gradebook Engrade. Go to www.engrade.com and provide the information given to you by your instructor to log into your account.

Your course grade can be calculated as follows:

5 exam grades

1 comprehensive final grade

1 class participation average

1 homework average

1 lab average

Total grades = 9.

Grading Scale

Grade	
A	90-100
B	80-89
C	70-79
D	60-69
F	59-below

Class Schedule

Week	Material to be covered
1	Chapter 1
2	Chapters 1
3	Chapter 1
4	Test #1, Chapter 2
5	Chapters 2
6	Test #2, Chapter 3
7	Chapter 3

8	Spring Break
9	Chapter 3
10	Test #3, Chapter 4
11	Chapter 4
12	Chapter 5
13	Chapter 5, Test #4
14	Chapters 6 and 9
15	Chapters 10 and 7
16	Chapter 8, Test #5
17	Final Exam: Tuesday May 13 at 11:00

Attendance Policy

Role will be taken each day. If a student stops attending class, the date of the last attendance will be submitted to the Registrar, and a grade of "F" will be recorded. As a result the student may lose scholarships or grants or have to repay funds already rewarded. Below please find the official Texarkana College Absentee Policy:

ABSENTEE POLICY

Texarkana College's absentee policy allows instructors to withdraw a student from a course due to excessive absences. If a student leaves and returns during class or leaves the class before the class is over, he/she **may** be considered absent. Three tardies constitute one absence. It is the student's responsibility to check the syllabus for each instructor's tardy policy.

In some workforce/vocational areas, such as nursing and cosmetology, certification requirements necessitate an absentee policy that is more stringent than the institutional policy. In these instances, the matter of certification takes precedence over local policies, since certification policies are established by the State of Texas.

Faculty members **are not** obligated to provide opportunities for students to make-up missed assignments and tests as a result of a student's absence from class. The institution is not required to take attendance with the exception of workforce/vocational areas, where certification requirements require taking attendance. However, experience demonstrates that regular attendance enhances academic success. As such, students are expected to attend each meeting of their registered courses.

A student should not stop attending a class without formally withdrawing from the course by the institutions published Last Day for Students to Drop. If a student stops attending class after the published Last Day for Students to Drop, the student **may** receive a grade of "F" in the class. The instructor will submit the last date of attendance for students receiving a grade of "F" or "W".

Withdrawal from a course(s) **may** affect a student's current or future financial aid eligibility. Students should consult the Financial Aid Office to learn both short and long term consequences of a withdrawal.

EXCUSED ABSENCES

A student's absence due to school trips and/or school business will not be counted against a student's allowable

number of absences. Military duty and absences for Holy Days (FBD LEGAL) are covered in a separate section of the catalog and the student handbook. These are the only excused absences that are considered by Texarkana College. Responsibility for work missed for any absence is placed on the student. Instructors are required to allow students to make up work missed if the absence is due to military duty* or religious holy days when students follow the correct notification procedures. Instructors are not required to allow students to make up work for absences due to other reasons. Make-up policies are listed in each individual instructor's syllabus.

**Students interested in Health Occupations should check with the division chair prior to entering the program.*

ONLINE/HYBRID COURSE ABSENCES

Absence in an **online course** is defined as the lack of an active post or submission within the course including discussion board posts, written assignments, and tests. This standard will be used to determine all absentee issues, including but not limited to, 12th Day Census Reports, last date of attendance, and involuntary withdrawal from a course due to absences. All online students must complete an Enrollment Verification activity within the first week of class (activity depends upon the professor); otherwise the professor **may** drop the student for not having attended. Students must complete at least one activity in their online class per week. Each week in which a student does not complete an activity will be counted as an absence.

If a student is taking a hybrid course, and it does not meet during the first week of class, the student must also complete an Enrollment Verification activity within the first week of class; otherwise the student **may** be dropped for not having attended.

MAXIMUM ALLOWABLE ABSENCES

After official registration, the following number of unexcused absences will be the maximum allowable before a student **may** be dropped from the class. Mandated program certification requirements detailed for certain programs regarding the maximum allowable unexcused absences takes precedence over the following information.

Academic Classes

A COURSE THAT MEETS FOR THE FULL 16 WEEK SEMESTER	
Class or Lab Meets:	An instructor **may** withdraw a student from a course if absences exceed:
Once a week (Night classes or Friday classes)	2
Twice a week (MW or TR classes)	4
Three times a week (MWF or TRF classes)	6
Four times a week (MTWR classes)	8
	Three tardies count as one absence
A COURSE THAT MEETS FOR 14 WEEKS OF THE SEMESTER	

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Class or Lab Meets: Twice a week (MW or TR classes)	An instructor **may** withdraw a student from a course if absences exceed: 4 Three tardies count as one absence.
A COURSE THAT MEETS FOR 8 WEEKS OF THE SEMESTER (Fast-Track)	
Class or Lab Meets: Four times a week (MTWR classes)	An instructor **may** withdraw a student from a course if absences exceed: 4 Three tardies count as one absence.
A COURSE THAT MEETS FOR 5 WEEKS OF THE SEMESTER (Summer Sessions)	
Class or Lab Meets: 3 times a week (MTW) (evening classes) 4 times a week (MTWR) (day classes)	An instructor **may** withdraw a student from a course if absences exceed: 2 2 Three tardies count as one absence.

<u>Workforce Classes</u> (This does not include Health Occupations. See Health Occupations Handbook regarding absences for that program.)

Day Classes	Evening Classes
Class meets: 5 days a week (MTWRF) The instructor **may** withdraw a student from a course if absences exceed five (5) up until the published Last Day for Students to Drop. Absences that exceed this number after the drop day may result in the student receiving an "F" in the program for that semester. Three tardies count as one absence. You are considered tardy from the designated class start time through the first 15 minutes of class. After that you will be counted absent.	Class Meets: 4 evenings a week (MTWR) The instructor **may** withdraw a student from a course if absences exceed five (5) up until the published Last Day for Students to Drop. Absences that exceed this number after the drop day may result in the student receiving an "F" in the program for that semester. Three tardies count as one absence. You are considered tardy from the designated class start time through the first 15 minutes of class. After that you will be counted absent.

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Make-up Policy

As a general policy, **I DO NOT GIVE MAKE UP EXAMS**. If you anticipate missing a test, or if something urgent comes up, you must contact me as soon as possible!!!! Exams are returned and discussed the following class period. **If you have not made arrangements with me before the next class period following the exam, your exam grade will be a zero.**

Academic Dishonesty Policy

Scholastic dishonesty, involving but not limited to cheating on a test, plagiarism, collusion, or falsification of records will make the student liable for disciplinary action after being investigated by the Dean of Students. Proven violations of this nature will result in the student being dropped from the class with an "F".

This policy applies campus wide, including TC Testing Center, as well as off-campus classroom or lab sites, including dual credit campuses. This information can be found in the Student Handbook at https://texarkanacollege.edu.

Disability Act Statement:

Texarkana College complies with all provisions of the Americans with Disabilities Act and makes reasonable accommodations upon request. Please contact Larry Andrews at 903.823.3283, or go by the Recruitment, Advisement, and Retention Department located in the Administration building for personal assistance.

If you have an accommodation letter from their office indicating that you have a disability which requires academic accommodations, please present it to me so we can discuss the accommodations that you might need for this class. *It is best to request these changes at the beginning if not before the start of class* so there is ample time to make the accommodations..

Financial Aid:

Attention! Dropping this class may affect your funding in a negative way! You could owe money to the college and/or federal government. Please check with the Financial Aid office before making a decision.

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"Protocol, alcohol, and geritol"

Adlai E. Stevenson

INTRODUCTORY ORGANIC AND BIOCHEMISTRY

WOW, THAT HAS A KICK!

THE ALCOHOL CONTENT OF CONSUMER PRODUCTS

Purpose

The purpose of this lab is to determine the alcohol content of a consumer product using the organic laboratory technique of simple distillation.

Discussion

Alcohols are arguably some of the most important organic compounds. Not only are they prevalent in body chemistry in the guises of carbohydrates, cholesterol, visual pigments such as retinol—just to name a very few—but, their uses extend to many drug formulations such as the anticancer drug, taxol, and the antiemetic, emetrol. Because small alcohols are hydrophilic and such good solvents for water-based solutions, their uses include acting as a solvent for various consumer product formulations. Ethanol, the two carbon alcohol, in particular, is used in products such as after-shave lotion, cologne, liquid cold remedies, mouth washes, not to mention, alcoholic beverages such as beer, wine, champagne, and liquor.

Using the organic lab technique distillation, we can determine exactly how much ethanol is in a consumer product. In this experiment, we are not trying to separate the alcohol from the water in the solution, but instead, to remove these two volatile compounds from the rest of the sample mixture. In effect, we are separating alcohol and water from the rest of the mixture. Because we can't distill all of the liquid in

the sample—destruction of expensive glassware—we will be adding some water to our samples before distillation, and then stopping the process when just this same volume of water remains in the flask.

Once we've separated the alcohol and water from the mixture, we can determine the percent composition of the alcohol/water mixture in various ways. In this experiment we will use density. Remember that pure water has a density of 1.00 g/ml, and pure ethanol has a density of 0.798 g/ml at 20^{o}C. Mixtures of these two liquids will have densities between these values, and by reference to tables in handbooks; your measured density can be converted into percent alcohol.

Procedure

1. From home bring a consumer product to test for alcohol content. Check the label to make sure that ethanol is the alcohol present—rubbing alcohol is isopropyl alcohol and will not work, and cough syrups, although they do contain ethanol, don't work well for this experiment due to their thickness.
2. Set up a distillation apparatus as you have in previous experiments. Be sure not to use undue force when inserting the thermometer, and make sure that water is flowing correctly through the condenser and that your thermometer is properly located. Have your set up checked by your instructor.
3. If your sample is carbonated, you will need to shake it in a 500 ml Erlenmeyer flask for 5-10 minutes until the fizzing subsides before proceeding.
4. Remove the thermometer from the still set up, insert a long stem funnel, and pure 50 ml of your sample into the still pot followed by 25 ml of water. Remove the funnel, add boiling chips, and replace the thermometer.
5. Begin heating your flask. Heat strongly at first until a ring of condensing vapors is seen moving up towards the thermometer bulb, then cut back the heat so that the drops of distillate come over at a rate of about one drop per second.
6. Note the temperature of your distillate vapors during the course of the distillation and record your observations in the Observations section of this handout. By the time you have collected 50 ml of distillate, STOP. The temperature should have risen to 98^{o}C to 100^{o}C.
7. Determine the density of the distillate. Weigh an empty 50 ml graduated cylinder and tare. Add 35-45 ml of distillate and reweigh. The mass of your sample divided by its volume is its density. Record.
8. Refer to the alcohol/water density tables provided to determine the alcohol content of your solution. Record.

Observations

1. Nature of sample. Describe your sample—what is the product name, where did you buy it, how much did it cost, what is its color , smell, etc.

2. Distillation. List here any particular observations you made during the distillation process.

3. Distillate characteristics. Describe your final product, the distillate. What color is it? What does it smell like? How much did you get? Etc.

4. Temperature vs distillate volume

Distillate volume (ml)	Temperature (^{o}C)
1	
10	
20	

30	
40	
50	

Results

5. Density of distillate. Divide the mass of the distillate from step 7 in Procedure by the volume of the distillate.

6. What is the percentage alcohol in your product (use the table provided)?

7. What is the proof of your product?

Conclusions and Comments

Discuss how your experiment went, include comments about what results you expected, problems you encountered, factors that you believe might have affected the results, things you might have done differently. Did this experiment raise any questions that you would like to further explore?

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INTRODUCTORY CHEMISTRY II LAB

EXPLORING FUNCTIONAL GROUPS

The purpose of this experiment is to introduce various important functional groups of organic molecules. In addition, we will practice drawing Lewis diagrams, condensed formulas, molecular formulas, and experiment with nomenclature.

Part One

Each lab team will be given two or more line-angle structures. Your first task is to make a molecular model, using the model kits provided, of each of your structures.

Taking the model for each of your molecules, you will **1.)** draw the Lewis diagram, **2.)** circle and identify the functional group(s), **3.)** draw the condensed structure, **4.)** write the molecular formula, **5.)** draw the carbon skeleton, and **6.)** *try* to name it using your textbook as a reference.

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Part Two

After you have completed Part One with your molecules, exchange **models** with another group and repeat steps 1-6 (draw the Lewis, circle and id functional groups, draw condensed, write molecular formula, draw the carbon skeleton, and try to name it). **In addition try to draw its line-angle formula.**

Part Three

Repeat this process until you have analyzed all of the models made by students in your lab section.

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Introductory Organic and Biochemisty

Applications of Organic Chemistry Activity

Pharmacology

"I tried sniffing coke once, but the ice cubes got stuck in my nose." unknown

What makes something a drug? By definition **drugs** are chemical compounds that affect living processes. Although, the word "drug" has a negative, almost illegal connotation, not all drugs are bad. In fact pharmaceuticals have drastically improved both the quality and quantity of human life. Developing these drugs, understanding how they work and how to dose them is the arena of pharmacology. Benet, Mitchell, and Sheiner describe **pharmacology** as including "the knowledge of the history, source, physical and chemical properties, compounding, biochemical and physiological effects, mechanisms of action, absorption, distribution, biotransformation, and excretion, and therapeutic and other uses of drugs." (The Pharmacological Basis of Therapeutics, 8th Ed., Goodman & Gilman eds., 1990)

For the last several weeks, we've been discussing organic compounds, various functional groups, and their important reactions. In this activity, you will apply some of your organic chemistry knowledge by investigating the pharmacology of a drug of your choosing (clear your choice with me so we don't have any duplicates) in terms of chemistry, metabolism, and action in the body. Your research will result in a short report (two pages minimum typed), a three minute presentation to your peers, and a one page handout for the class.

In your research be sure to include the following topics:

- History of the drug
- Structure of the drug and identification of functional groups
- Chemistry (metabolism and mode of action including reactions involving the functional group(s))
- Effects of the drug (pharmacological properties)
- How the drug is excreted
- Dosage

- Toxic reactions and side effects

I'm not very concerned about the style used in writing the paper (MLA, APA, etc), I mostly want the information and where you got it.

In your presentation you can use Power Point, short film clips, transparencies, posters, and any other visual aide you can think of.

(You are no allowed to pass around the drug for sampling!!!)

You will be given a lab period to get started on the work for your project—at that time the presentation schedule will be discussed.

Classes of drugs to think about with a few examples of each:

Class	examples
Antibiotics	Amoxil, Augmentin, Keflex, Cechlor, Zithromax, Cipro, Bancocyn, Bactrim
Drugs affecting G.I. function	Pepcid, Zantac, Nexium, Propulsid, Prilosec
Cardiovascular drugs	Altace, Calan, Cardene, Inderal, Lasix, Lipitor, Lopressor, Nitroglycerine, Procardia, Plavix, Zestril, Zocor
Drugs affecting renal function	Thiazides, Osmitrol, Diamax, Edecrin, Aldactone, Pitressin, Benemid
Autacoids (anti-inflammatory drugs)	Benadryl, Atarax, Phenergan, aspirin, ibuprofen, acetaminophen, caffeine, theophylline, Indocin

Drugs affecting CNS—anesthetics, sedatives, psychiatric disorders, epilepsy	Benzodiazepines (valium), morphine, halothane, Propofol, lidocaine, cocaine, barbiturates (Phenobarbital), Ambien, thorazine, Seroquel, Haldol, Zyprexa, Abilify, Prozac, Amitryptyline Tegretol, Zorontin, Depakene
Drugs affecting blood--anticoagulants	Coumadin, Heparin
Illicit drugs	LSD, methamphetamine, marijuana, cocaine, heroin, angel dust, roxy

These are only some examples to get you started—you can choose any drug you wish, as long as it hasn't been chosen already.

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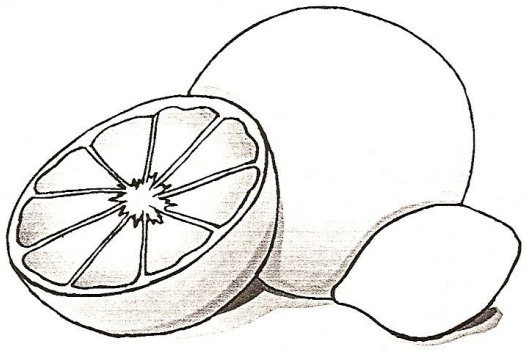
ISOLATION OF ORANGE OIL



The aroma of freshly cut orange, or other citrus fruit, comes primarily from a mixture of terpene hydrocarbons primarily limonene produced in the oil glands in the orange peel. Two aldehydes are also present, p-cymene and citral. Once isolated from the peel, this mixture is known as "orange oil". These plant oils are also called "essential" oils, not because they serve some essential biological function, but because of the essence, or pleasant odor.

Orange oil can be obtained from the peel in several ways, including solvent extraction, cold pressing, and steam distillation. In this experiment, we will use the latter approach. Steam distillation is a technique for purifying high-boiling liquids that are immiscible with water. A mixture of water and the substance to be purified is brought to a boil, and the two distill together at a temperature slightly below the boiling point of pure water. This is useful for liquids that might decompose at their normal boiling point if distilled in the usual way.

Once extracted, the oil can be used for various purposes. One common application is as a solvent. Many general purpose cleaner, surface cleaners, hand cleaners, furniture polishes, bar soaps, and pet shampoos are made from orange peel extracts. In addition orange oil is often used in flavor applications. Very small amounts of orange oil, usually cold pressed, may be incorporated into certain food products including reconstituted orange juice, non-juice beverages, cookies and pastries, candies, extracts for baking, and marinades. The third major industrial use of orange oil is as a fragrance. In this function the oil mixture is employed in aerosol air fresheners, gel air fresheners, solid air fresheners, candies, product scenting and in aromatherapy products.

In aromatherapy, the fruity, sweet scent of orange oil has been traditionally used to brighten mood, calm and reduce stress, and as an environmental disinfectant. The complex odor is thought to relieve apathy, emotional abuse, worry addiction, burnout, hopelessness, and self-

consciousness. In general, the aroma is thought to be generally calming, and is often blended with lavender, clove, myrrh, clary sage, lemon, and neroli.

PROCEDURE

Obtain the peel of one grapefruit (or two oranges, lemons, or limes). Weigh the peel, then cut it into tiny pieces or grind it in a blender, using just enough water to facilitate grinding. It is not necessary to reduce the peel to a pulp; small chips will work fine as long as they will fit through the neck of the distilling flask. Transfer the ground peel to a 500 mL round bottom flask. Assemble the proper apparatus for a simple distillation using a 125 mL Erlenmeyer flask cooled in ice for the receiver. Add water to the round bottomed flask as necessary to make the volume 300-350 mL.

Proceed to distill the sample collecting about 2-drops of distillate per minute. After about 50 mL have been distilled, add slowly 50 mL of water to the round bottom flask to partially maintain the initial volume in the distilling flask. In all, collect about 100 mL of distillate.

Allow the distillate to stand watching the orange oil separate from the water as two distinct layers. The orange oil is less dense than water and will be on the top. Remove this layer with a pipette measuring the final volume of your orange oil in a graduated cylinder. Place your final product in a clean test-tube and use to answer the following questions.

QUESTIONS

1. Using the mass of the peeling that you started with, and the volume of oil that was produced, calculate the mL of oil produced per gram of orange peeling.
2. Based on the calculation above, how many oranges would be needed to produce 1.0 Liters of orange oil?
3. Close your eyes, and waft the oil fragrance towards your nose, write down your olfactory impressions.
4. Look up the structure of the aldehyde citral that is a component of this oil. Draw it. What alcohol could be used to produce this aldehyde?
5. What if you wanted to synthesize citral and all you had access to were alkenes. Show the steps you could use to make it. (at least three reactions).
6. Draw the acid that citral could be oxidized to.
7. Why do you think we collected our product in a cold flask?
8. List three name brands of products currently on the market that contain orange oil. Have you tried any of these? If so, what did you think?

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Communication RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric and Making Learning Real

Definition

Written communication is the development and expression of ideas in writing.
Oral Communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.
Visual Communication is the use of images to persuade, entertain, inform, and enlighten an observing audience of products, ideas, and messages.

	Does Not Meet Any Expectations 1	Meets Few Expectations 2	Meets Expectations 3	Exceeds Some Expectations 4	Exceeds All Expectations 5
Quality of Information and Organization	Presentation lacks main points and related details. Information lacks connection to the presentation topic. Information is not organized.	Main points are not clear and lack significant detail. Some information is linked to the presentation topic. Information is loosely organized.	Main points are somewhat clear but could use more detail. Most information is linked to the presentation topic. Information is organized.	Main points are clear and detailed. Information is linked to presentation topic. Information is well organized.	Main points are very clear and very detailed. Information is directly linked to presentation topic. Information is very organized.
Nonverbal Communication	Speaker appears very uneasy and insecure. Speaker faces away from the audience or makes no eye contact. Speaker appears disengaged from the audience. Speaker uses few body motions or gestures or has gestures or movements that distract the audience.	Speaker appears uneasy and somewhat insecure. Speaker rarely faces the audience or makes eye contact. Speaker rarely appears to be engaging with the audience. Speaker uses few body motions or has gestures or movements that distract the audience..	Speaker appears generally at ease and confident. Speaker sometimes faces the audience and maintains eye contact. Speaker sometimes appears to be engaging with the audience. Speaker's body motions and gestures neither support nor detract from presentation.	Speaker appears fairly comfortable and confident. Speaker generally faces the audience and maintains good eye contact. Speaker generally appears to be engaging with the audience. Speaker uses body motions and gestures well.	Speaker appears very comfortable and confident. Speaker consistently faces the audience and maintains good eye contact. Speaker consistently appears to be engaging with the audience. Speaker uses body motions and gestures very effectively.
Quality of Verbal Communication	Speaker's voice is consistently too weak or too strong. Speaker fails to use inflections to emphasize key points and create interest or often uses inflections inappropriately. Speaker's talking paces is consistently too slow or too fast.	Speaker's voice is frequently too weak or too strong. Speaker rarely uses inflections to emphasize key points and create interest or speaker sometimes uses inflections inappropriately. Speaker's talking pace is often too slow or too fast.	Speaker's voice is generally steady strong and clear. Speaker sometimes uses inflections to emphasize key points and create interest. Speaker's talking pace is appropriate.	Speaker's voice is steady, strong, and clear. Speaker often uses inflections to emphasize key points and create interest. Speaker's talking pace is mostly appropriate.	Speaker's voice is very confident, steady, strong, and clear. Speaker consistently uses inflections to emphasize key points or to create interest. Speaker's talking pace is consistently appropriate.

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Visual Tools	Visual aids demonstrate no creativity or clarity and are often difficult to read. Presentation is weakened by the visual tools.	Visual aids have limited creativity or clarity or are sometimes difficult to read. Presentation is not enhanced by the visual tools.	Visual aids are reasonably creative, clear, and easy to read. Presentation is sometimes enhanced by the visual tools.	Visual aids are usually creative, clear, and easy to read. Presentation is often enhanced by the visual tools.	Visual aids are very creative, clear, and easy to read. Presentation is consistently enhanced by the visual tools.
Appropriate Use of Vocabulary	Few or no terms are included in the presentation. May or may not be used appropriately. Lacks context.	Several terms are included in the presentation. May or may not be used appropriately. May lack context.	Most terms are included in the presentation. Generally used appropriately. Generally used in appropriate context.	All terms are included in the presentation. Used effectively. Used in context.	All terms are included in the presentation. Used in unique and creative ways. Used in context
Precision and Detail in Documents Produced	Written documents have numerous errors and lack detail. Little carte taken in the production.	Documents may have some errors and show some detail. Some care has been taken in production.	Evident that written documents are correct and show a general attention to detail and accuracy. General care has been taken in production.	Clearly evident that written documents are correct, detailed and accurate. Care has been taken in production.	Documents are clear, well-constructed, accurate, and show attention to detail. Extra care has been taken in the production of written documents.
Overall Presentational Effectiveness	The presentation was weak and not effective.	The presentation was average and somewhat effective.	The presentation was good and effective.	The presentation was very good and effective.	The presentation was exceptional and extremely effective.

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CRITICAL THINKING VALUE RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

	Does Not Meet Any Expectations 1	Meets Few Expectations 2	Meets Expectations 3	Exceeds Some Expectations 4	Exceeds All Expectations 5
Explanation of Issues	Did not state issue.	Issue is stated without clarification or description.	Issue is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined and/or backgrounds unknown.	Issue is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.
Evidence	Does not identify the basic components of an issue	Information is taken from sources without any interpretation. Viewpoints of experts are taken as fact, without question	Information is taken from sources with some interpretation but not enough to develop a coherent analysis or synthesis.	Information is taken from sources with enough interpretation to develop a coherent analysis or synthesis.	Information is taken from sources with enough interpretation to develop a comprehensive analysis or synthesis.
Influence of Context and Assumptions	Did not show awareness of the issue.	Show an emerging awareness of present assumptions.	Questions some assumptions. Identifies relevant information when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Thoroughly analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.
Student's Position	Takes no position on issue	Specific position is stated but is simplistic and obvious.	Specific position acknowledges different sides of an issue.	Specific position takes into account the complexities of an issue. Others' points of view are acknowledged within position.	Specific position is imaginative. Limits of position acknowledged. Other points of view are synthesized.
Conclusions and Related Outcomes	Does not use previously learned information in new situations.	Conclusion is inconsistently tied to some of the information discussed; related	Conclusion is logically tied to information; some related outcomes are identified.	Conclusion is logically tied to a rage of information, including opposing viewpoints; related	Conclusions and related outcomes are logical and reflect student's informed evaluation and ability to place

		outcomes are oversimplified.		outcomes are identified clearly	evidence and perspectives discussed in priority order

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Empirical and Quantitative Skills RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

The ability to formulate an inquiry that is scientific or mathematical in nature, and then manipulate and analyze numerical data and/or follow an investigative process using empirical and/or quantitative reasoning to satisfy the inquiry and create informed conclusions.

	Does Not Meet Any Expectations 1	Meets Few Expectations 2	Meets Expectations 3	Exceeds Some Expectations 4	Exceeds All Expectations 5
Identification	The purpose, components, and variables of the investigation/project are not identified.	The purpose, components, and variables of the investigation/project are somewhat identified.	The purpose, components, and variables of the investigation/project are mostly identified	The purpose, components, and variables of the investigation/project are clearly identified..	The purpose, components, and variables of the investigation/project are clearly identified.
Assimilation	The information that is required for an analysis of all investigative components is not evident. If applicable, values are incorrectly translated into variables and no necessary formulas are present.	The information that is required for an analysis of all investigative components is somewhat evident. If applicable, values are incorrectly translated into variables and some necessary formulas are present.	The information that is required for an analysis of all investigative components is mostly evident. If applicable, some values are correctly translated into variables and most necessary formulas are present.	The information that is required for an analysis of all investigative components is evident. If applicable, most values are correctly translated into variables and all necessary formulas are present.	The information that is required for an analysis of all investigative components is clearly evident. If applicable, values are correctly translated into variables and all necessary formulas are present.
Analysis	Most investigative or quantitative components are not scrutinized. The steps followed are illogical and/or irrelevant to the desired result. The proper tools/ technology were not used and/or integrated into the final product. Any notation is not consistent and not defined.	Some investigative or quantitative components are scrutinized. Some steps followed are somewhat logical and relevant to the desired result. The proper tools/ technology were somewhat used and not integrated into the final product. Any notation is somewhat consistent but not defined.	All investigative or quantitative components are somewhat scrutinized. The steps followed are mostly logical and relevant to the desired result. The proper tools/ technology were mostly used and somewhat integrated into the final product. Any notation is mostly consistent and defined.	All investigative or quantitative components are scrutinized. The steps followed are logical and relevant to the desired result. The proper tools/ technology were used and mostly integrated into the final product. Any notation is consistent and well defined.	All investigative or quantitative components are methodically scrutinized. The steps followed are logical and relevant to the desired result. The proper tools/ technology were used and well integrated into the final product. Any notation is consistent and well defined.
Presentation	A summary of the analysis is either	A partial summary of the analysis is	A summary of the analysis is	A good summary of the analysis is	A concise summary of the

	inadequately presented or not presented at all. The presented information is mostly incorrect, and/or of poor quality, and/or the terminology/figures are inaccurate and/or hard to understand. Few or no visual representations of evidence are acceptably scaled/ represent the analysis findings.	presented. The presented information is somewhat correct, of adequate quality, and the terminology/figures are somewhat accurate and relatively easy to understand. Some visual representations of evidence are acceptably scaled and represent the analysis findings.	presented. The presented information is mostly correct, of good quality, and the terminology/figures are mostly accurate and easy to understand. Most visual representations of evidence are acceptably scaled and represent the analysis findings.	presented. The presented information is correct, of good quality, and the terminology/figures are accurate and easy to understand. Most visual representations of evidence are well-scaled and/or well represent the analysis findings..	analysis is presented. The presented information is correct, of high quality, and the terminology/figures are accurate and easy to understand. All visual representations of evidence are well-scaled and well represent the analysis findings.
Application	The integration does not include all steps of the investigation and does not lead to an accurate, nor complete conclusion that relates to the initial investigative argument.	The integration of most steps of the investigation lead to a somewhat accurate, partially complete conclusion that is relative to the initial investigative statement.	The coherent integration of most steps of the investigation lead to an accurate, mostly complete, acceptable conclusion that is relative to the initial investigative statement.	The coherent integration of all steps of the investigation lead to an accurate, mostly complete, relevant conclusion that is relative to the initial investigative statement.	The coherent integration of all steps of the investigation lead to an accurate, complete, relevant conclusion that is relative to the initial investigative statement.

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Teamwork Skills RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

Teamwork is behaviors under the control of individual team members, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions.

	Does Not Meet Any Expectations 1	Meets Few Expectations 2	Meets Expectations 3	Exceeds Some Expectations 4	Exceeds All Expectations 5
Contributes to Team Meetings	Does not collect any relevant information; no useful suggestions to address team's needs;	Shares ideas but does not advance the work of the group.	Offers new suggestions to advance the work of the group	Offers alternative solutions or courses of action that build on the ideas of others.	Helps the group move forward by articulating the merits of alternative ideas or proposals
Facilitates the Contributions of Team Members	Often argues with team mates; doesn't let anyone else talk; occasional personal attacks and "put-downs"; wants to have things done his way and does not listen to alternate approaches;	Engages group by taking turns and listening to others without interrupting.	Engages group by restating the views of other members and/or asking questions for clarification.	Engages group by constructively building upon or synthesizing the contributions of others..	Engages group by both constructively building upon and synthesizing the contributions of others as well as noticing when someone is not participating and inviting him/her to engage.
Individual Contributions Outside of Team Meetings	Completes no assigned tasks outside of team meetings.	Completes some assigned tasks by deadline.	Completes all assigned tasks by deadline; work accomplished advances the project.	Completes all assigned tasks by deadline; work accomplished and is thorough, comprehensive, and advances the project.	Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project. Proactively helps other team members complete their assigned tasks to a similar level of excellence.
Fosters Constructive Team Climate	Is argumentative and does not work with the team.	Supports a constructive group climate by treating other members respectfully.	Supports a constructive group climate by treating other	Supports a constructive group climate by treating other members respectfully,	Supports a constructive group climate by treating other members respectfully,

			members respectfully and conveying a positive attitude about the group and its work.	conveying a positive attitude about the group and its work, and motivating other group members.	conveying a positive attitude about the group and its work, motivating other group members, and providing assistance to group members.
Responds to Conflict	Is not present enough to engage in conflict.	Passively accepts alternate viewpoints/ideas/opinions.	Redirects focus toward common ground, toward task at hand (away from conflict)..	Identifies and acknowledges conflict and stays engaged with it.	Addresses conflict directly and helps to manage/resolve it in a way that strengthens overall group cohesiveness.