

### Basic Course Information

Semester:	<b>Spring 26</b>	Instructor Name:	<b>Matt Turner</b>
Course Title & #:	<b>ACR 101</b>	Email:	<a href="mailto:Matthew.Turner@imperial.edu">Matthew.Turner@imperial.edu</a>
CRN #:	<b>21088</b>	Webpage (optional):	
Classroom:	<b>3115</b>	Office #:	<b>3118</b>
Class Dates:	<b>2/17/26 - 6/12/26</b>	Office Hours:	<b>Mon- Thur 7- 8 am</b>
Class Days:	<b>T &amp; TH</b>	Office Phone #:	<b>(760)355-6372</b>
Class Times:	<b>T 10:15AM - 12:45AM Th 10:15AM- 12:45AM</b>	Emergency Contact:	<b>Dept Secretary: Tisha Nelson 760-355-6161 Tues &amp; Thurs/ 760- 355-6361 Mon-Friday</b>
Units:	3.0	Class Format:	<b>Face to Face</b>

### Course Description

This is a course of study in heating, ventilation, air conditioning, and refrigeration trade. This course includes the study of the laws of thermodynamics, the refrigeration cycle, brazing of refrigerant lines, understanding the use of and maintenance of heating, ventilation, air conditioning, and refrigeration equipment, applicable safety practices, and the proper use of refrigerants.

### Course Prerequisite(s) and/or Corequisite(s)

*None*

### Student Learning Outcomes

Upon course completion, the successful student will have acquired new skill, knowledge and or attitudes as demonstrated by being able to

1. Perform a standing pressure test on a vessel using dry nitrogen.
2. Make connections with copper tubing using both low-temperature solder and high-temperature brazing material.
3. Perform a deep vacuum test using a high-quality vacuum pump and an electronic vacuum gage.

## Course Objectives

**Upon satisfactory completion of the course, students will be able to:**

Demonstrate competency and mastery of the body-of-knowledge in Employee Responsibilities within the HVAC/R Industry.

Demonstrate a thorough knowledge of the Laws of Thermodynamics, Gases & Pressures.

Demonstrate a thorough knowledge of materials used in the HVAC/R industry.

Demonstrate a thorough knowledge of brazing techniques.

Demonstrate a thorough knowledge of the refrigeration cycle.

Demonstrate a thorough knowledge of the tools and electric meters commonly used in the industry.

Demonstrate safe work practices.

Demonstrate a thorough knowledge of the use of refrigerant recovery machines.

### Lecture Outline

1. Employee Responsibilities.
2. Ohms Law.
3. Electrical Meters and Test Equipment.
4. Wiring Materials.
5. Wiring Diagrams.
6. Electrical Components.
7. Installing and Wiring of Circuits.
8. Electrical Installation Safety Practices

### Lab Outline

- 1. Employee Responsibility**
- 2. Building and Electrical Codes.**
- 3. HVAC/R Installation Materials,**
- 4. Brazing of Line Sets,**
- 5. Installation of Split-Systems,**
- 6. Installation of Heat Pumps.**
- 7. Installation of Gas Packs,**



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8. HVAC equipment Installation guided by industry Safety Practices.
9. Building and Electrical Codes.
10. HVAC equipment Installation guided by industry
11. Safety Practices.

**Personal protective equipment: Safety glasses, Leather gloves, ear protection, work footwear, proper workwear, shirt and pants. ( will be required in all labs)**

### Textbooks & Other Resources or Links

**Modern Refrigeration and Air Conditioning, 22<sup>nd</sup> Edition, eBook Autor: Andrew D Althouse, Carl H. Turnquist, A.F. Bracciano, and G.M Bracciano ISBN: 979-8-88817-489-0.**

### Course Requirements and Instructional Methods

**Teaching Methods:** Discussion of assignments and instructional methods will be a combination of all methods of instruction, which can be classified as telling, lecturing, or discussing; showing or demonstrating.

**Out of Class Assignments:** The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

#### **What if I need to borrow technology or access to WIFI?**

1. To request a loaner laptop, MYFI device, or other electronic device, please submit your request here: <https://imperial.edu/students/student-equity-and-achievement/>

2. If you'd like access the WIFI at the IVC campus, you can park in parking lots "I & J". Students must log into the IVC student WIFI by using their IVC email and password. The parking lots will be open Monday through Friday from 8:00 a.m. to 7:00 p.m.

The course grade is based on total points accumulated during the semester. There is a maximum of 1648 points. Very limited extra credit points may be available, either through some class participation activity, group work or perfect attendance. Failing to turn in regular assignments will stop you from being able to earn extra credit points and late assignments will have points subtracted. Final Grades are calculated as follows:

Below is the Instructional Scale:

***\*Grade breakdown is subject to change***

**Grading Rubrics:** In addition to the percentages and points listed above the following grading rubric (standards expected) will be used when grading student assignments. The description that best fits your work will be the assigned grade.

Breakdown (1648 points)

Midterm Exam: 200 Pts

Final Exam: 300Pts

Quiz's : 398 Pts

Lab activities: 650 Pts.

**\*Class Participation: 100 Pts.**

Total points 1648 pts.

Teaching Methods: Discussion of assignments and instructional methods will be a combination of all methods of



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instruction, which can be classified as telling, lecturing or online lecturing, discussing; showing or demonstrating.

**\*Class participation and lab will be part of your grade for this semester. Grade Points**

A 1648-1483

B 1482-1318

C 1317-1154

D 1153-989

F Below 989

## Course Policies

### Attendance

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See General Catalog for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences. What does it mean to "attend" an online class?

### What does it mean to "attend" an online class?

Attendance is critical to student success and for IVC to use federal aid funds. Acceptable indications of attendance are:

- Student submission of an academic assignment

## Course Grading Based on Course Objectives

Student submission of an exam

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property. **Imperial Valley College Course Syllabus**

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

- Plagiarism is taking and presenting as one's own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to "cite a source" correctly, you must ask for help.
- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the General Catalog for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following:

- (a) plagiarism;
- (b) copying or attempting to copy from others during an examination or on an assignment;
- (c) communicating test information with another person during an examination;
- (d) allowing others to do an



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assignment or portion of an assignment; (e) using a commercial term paper service.

### **Classroom Etiquette**

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
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- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the **General Catalog**.
- Children in the classroom: Due to college rules and state laws, only students enrolled in the class may attend; children
- are not allowed.

### **Online Netiquette**

- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word.

Basically, netiquette is a set of rules for behaving properly online.

- Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

### **How am I expected to act in an online "classroom" (especially Zoom)?**

Attending a virtual meeting can be a challenge when there are many students on one conference call.

Participating in such meetings may count as class attendance, but disruptive behavior may also result in you not being admitted to future meetings. Follow the tips below for best results:

#### **1) Be RESPECTFUL**

a. Your written, verbal, and non-verbal communications should be respectful and focused on the learning topics of the class.

#### **2) Find a QUIET LOCATION & SILENCE YOUR PHONE (if zooming)**

a. People walking around and pets barking can be a distraction.

#### **3) EAT AT A DIFFERENT TIME.**

a. Crunching food or chugging drinks is distracting for others.

b. Synchronous zoom times are set in advance so reserve meals for outside class meetings.

#### **4) ADJUST YOUR LIGHTING SO THAT OTHERS CAN SEE YOU**

a. It is hard to see you in dim lighting so find a location with light.

b. If your back is to a bright window, you will be what is called "backlit" and not only is it hard on the eyes (glare) but you

look like a silhouette.

#### **5) POSITION THE CAMERA SO THAT YOUR FACE AND EYES ARE SHOWING**

a. If you are using the camera, show your face; it helps others see your non-verbal cues. **Imperial Valley College Course**

b. You may be at home, but meeting in pajamas or shirtless is not appropriate so dress suitably. Comb your hair, clean your teeth, fix your clothes, etc. before your meeting time to show self-respect and respect for others

**6) Be READY TO LEARN AND PAY ATTENTION**

- a. Catch up on other emails or other work later.
- b. If you are Zooming, silence your phone and put it away.
- c. If you are in a room with a TV – turn it off.

**7) USE YOUR MUTE BUTTON WHEN IN LOUD PLACES OR FOR DISTRACTIONS**

a. Pets barking, children crying, sneezing, coughing, etc. can happen unexpectedly. It's best if you conference in a private space, but if you can't find a quiet place, when noises arise **MUTE** your laptop.

**8) REMEMBER TO UNMUTE WHEN SPEAKING**

- a. Follow your instructor's directions about using the "raise hand" icon or chat function to be recognized and to speak, but make sure you have unmuted your device.
- b. Do not speak when someone else is speaking

**9) REMAIN FOCUSED AND PARTICIPATE IN THE MEETING**

- a. Especially when the camera is on YOU, we can all see your actions. Engage in the meeting. Look at the camera. Listen to instruction. Answer questions when asked.
- b. Do not use the Zoom meeting to meet with your peers or put on a "show" for them.

**10) PAUSE YOUR VIDEO IF MOVING OR DOING SOMETHING DISTRACTING**

- a. Emergencies happen. If you need to leave the room or get up and move about, stop your video.

**Students Rights and Responsibilities**

Students have the right to experience a positive learning environment and to due process of law. For more information regarding student rights and responsibilities, please refer to the IVC **General Catalog**.

**Other Course Information**

**Additional Services for Students**

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.

**How do I access services now that we are mostly online?**

- **CANVAS LMS.** Canvas is Imperial Valley College's Learning Management System. **To log onto Canvas**, use this link: [Canvas Student Login](#). **The Canvas Student Guides Site** provides a variety of support available to students 24 hours per day. Additionally, a 24/7 Canvas Support Hotline is available for students to use: 877-893-9853.
- **Learning Services.** In order to accommodate students and maximize student success during the COVID-19 Pandemic, all tutoring support is being provided through one Zoom link (**IVC online Tutoring**). When campus is open again, there are several learning labs to assist students. Whether you need support using computers, or you need a tutor, please consult your **Campus Map** for the **Math Lab; Reading, Writing & Language Labs;** and the **Study Skills Center**.

**Library Services.** Visit the Spencer Library's page on the IVC website for a wealth of valuable resources and online access to databases, e-books and more. Contact us so we can help you with instructional and research development skills (for those conducting research and writing academic papers). When campus re-opens, students also have access to **Imperial Valley College Course Syllabus**

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a. Follow your instructor's directions about using the "raise hand" icon or chat function to be recognized and to speak,

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## **12) REMAIN FOCUSED AND PARTICIPATE IN THE MEETING**

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tutoring services in the Study Skills Center as well as private study rooms for small study groups. There is more to our library than just books!

- **Career Services Center.** The Career Services Center is dedicated to serve all IVC students and Alumni. Services include Career Assessments, Resume and Cover Letter Assistance, Interview Preparation, Internship Opportunities and Job Placement.

- **Child Development Center.** The Preschool and Infant/Toddler Centers are on-campus demonstration lab programs that meet the educational, research, and service needs of the institution and community at large. The Preschool program (children three to five years of age) and the Infant/Toddler program (newborn to three years of age) is in buildings 2200 and 2300. Service is available to families who meet the California Department of Education qualifications for enrollment. The centers are open during COVID from Monday-Friday 7:15-5:30. Breakfast, lunch and snack are provided through the California Adult and Child Food Program. Location: Buildings 2200 and 2300. Phone: (760) 355-6528 or (760) 355-6232. Application: <https://forms.imperial.edu/view.php?id=150958>

#### **Extended Opportunity Program and Services (EOPS)**

The Extended Opportunity Program and Services (EOPS) offers services such as priority registration, book



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grants, transportation assistance, individualized counseling, tutoring, and community referrals to eligible students. Our staff is available to assist and support students in navigating personal, psychological, academic, and/or career-related issues through empathy, cultural- competence, and a commitment to equity and social justice. Also under the umbrella of EOPS is the CARE (Cooperative Agency Resources for Education) Program, designed to serve single parents and assist with addressing issues that are particular to this population. Students that are single parents receiving TANF/Cash Aid assistance may qualify for our CARE program. For additional information about the EOPS or CARE Imperial Valley College Course Syllabus – Electrical Trades IV / EWIR-096 11 Programs please contact our Program Office 760.335-6407 and/or visit our Program website [www.imperial.edu/students/eops](http://www.imperial.edu/students/eops) for eligibility criteria and application procedures. We look forward to serving you! - **EOPS/CARE Staff**

### **Student Equity Program**

The Student Equity & Achievement Program strives to improve Imperial Valley College’s success outcomes, particularly for students who have been historically underrepresented and underserved. The college identifies strategies to monitor and address equity issues, making efforts to mitigate any disproportionate impact on student success and achievement. Our institutional data provides insight into the student populations who historically, are not fully represented. SEA addresses disparities and/or disproportionate impact in student success across disaggregated student equity groups including gender, ethnicity, disability status, financial need, LGBTQIA+, Veterans, foster youth, homelessness, and formerly incarcerated students. The SEA Program also houses IVC’s Homeless Liaison, Foster Youth Liaison, Formerly Incarcerated Liaison, and Military Affiliated Liaison, who provide direct services and referrals to students in need. SEA strives to empower students experiencing insecurities related to food, housing, transportation, textbooks, and shower access. We recognize that students who struggle meeting their basic needs are also at an academic and economic disadvantage, creating barriers to academic success and wellness. We strive to remove barriers that affect IVC students’ access to enrollment, education, degree and certificate completion, and the ability to transfer to a university. SEA also provides outreach at local Imperial County high schools to ensure graduating seniors are successfully matriculated into the college and have a strong support system. Please visit us online for assistance at <https://imperial.edu/students/student-equity-and-achievement/> or call us at 760-355-6465 or when campus reopens, visit Building 401.

### **What if I cannot afford food, books, or need other help? Imperial Valley College Course Syllabus – : Electrical Wires & Protection**

We have many resources that are available to you. Please tell us what you need by submitting your request(s) here: <https://imperial.edu/students/student-equity-and-achievement/>

### **Other Course Information**

In Person Learning

### **IVC Student Resources**

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit <http://www.imperial.edu/studentresources> or click the heart icon in Canvas.

### **Anticipated Class Schedule/Calendar**

*[Provide a tentative overview of the readings, assignments, tests, and/or other activities for the duration of the*



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course. A table format as in the example below may be used for this purpose.]

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 2/17/26	Syllabus & Introduction Careers and Certification ( chapter 1 )	
Week 2 2/23/26	Quiz 1 ( 56 Pts ) Safety (chapter 2) Safety Lab, (proper PPE, etiquette shop and lab rules, keep it professional ) <b>50 Points</b>	
Week 3 3/2/26	Quiz on Safety Chapter 2 <b>32 points</b> Service Call (chapter 3 ) Service call Labs ( fill out service ticket, locate unit data ) <b>50 Points</b>	
Week 4 3/9/26	quiz on chapter 3 <b>21 points</b> Energy and Matter (chapter 6 ) energy and matter lab ( BTU, density, kelvin, energy, convection) <b>50 points</b>	
Week 5 3/16/26	<b>quiz on chapter 6 24 Points</b> Gases ( chapter 7 ) Gases Lab ( gas's, pressure difference, vacuum, microns ) <b>50 points</b>	
Week 6 3/23/26	quiz on chapter 7 <b>28 points</b> Basic Refrigeration Systems ( chapter 9) Basic Refrigeration Lab ( identify Parts and functions, Compressor, EVAP, COND , txv ) <b>50 points</b>	
Week 7 3/30/26	<b>Quiz on chapter 9 45 Points</b> <b>Tools &amp; Supplies ( Chapter 4 )</b> <b>tools &amp; supplies lab ( identify standard and most used tools for HVAC industry ) proper uses &amp; technique 50 points</b>	
Week 8 4/6/26	NO SCHOOL Quiz on chapter 4 <b>43 points</b>	

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 9 4/13/26	Working with tubing & piping Unit ( chapter 5 ) Lab on Brazing and Techniques <b>50 points</b> Midterm either ( quiz of completed chapters & or Hands on lab reflecting previous skills or both ) <b>200 points</b>	
Week 10 4/20/26	quiz on chapter 5 <b>38 points</b> Introduction to Refrigerants ( chapter 10 ) Lab ( show the difference in gas's in units and pressure difference, along with typical gas we use now, verse previously ) <b>50 points</b>	
Week 11 4/27/26	quiz on chapter 10 <b>42 points</b> Equipment and Instruments for Refrigerant Handling and Services ( chapter 11 ) Lab ( standard vs digital gauges, scales, vacuum pumps, safe handling and how to use them) <b>50 points</b>	
Week 12 5/4/26	<b>quiz on chapter 11 39 points</b> <b>Working with Refrigerants ( chapter 12 )</b> <b>working with refrigerants lab ( checking the charge, checking for leaks, recovering gas, and charging a system with a scale)</b> <b>50 points</b>	
Week 13 5/11/26	quiz on chapter 12 <b>30 points</b> Basic Compression refrigeration and air conditioning system ( chapter 8 ) basic compression and refrigeration and a/c systems Lab <b>50</b>	
Week 14 5/18/26	<b>quiz on chapter 8 38 points</b> <b>Lab recovery and pressure testing 50 points</b>	
Week 15 5/26/26	Lab <i>a high-quality vacuum pump</i> Vacuuming and testing <b>59 points</b>	
Week 16 6/1/26	Final prep lab	
Week 16 6/8/26	Final <b>300 points</b>	

**\*\*\*Subject to change without prior notice\*\*\***

