INFINITE 8 INSTITUTE, L3C

NATIONAL COMMERCIAL DRONE APPRENTICESHIP

COMMERCIAL DRONE PILOTING | COMMERCIAL DRONE SOFTWARE DEV

Guidance Document – 08.18.21

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APPRENTICE SPECIAL RULES AND REGULATIONS

1 Introduction

1.1 The following special rules and regulations have been adopted by Infinite 8 Institute, DBA: Infinite 8 Aeronautics: The Drone School's ("hereafter I8I") Quality Pre-Apprenticeship and National Apprenticeship Programs in conformity with the National Apprenticeship Standards. These rules represent the minimum levels of performance which are acceptable to the National and Regional Joint Apprenticeship Committees. While it is expected that all apprentices will exceed these minimums, those who do not will be subject to the below listed penalties.

(Note: The term "Pre-Apprentice", refers to participants of I8I Pre-Apprenticeship Program. "Apprentice" refers to either the Commercial Drone Pilot Apprenticeship Program or the Commercial Drone Software Developer Apprenticeship.).

1.2   About Infinite 8 Institute.

Infinite 8 Aeronautics: The Drone School, is a Division of Infinite 8 Institute, L3C and a Consortium of Commercial Drone pilots, STEM/IT Professionals, Entrepreneurs, and Business Owners. The organization was originally founded in 2013, with the purpose of the design and finance of social impact systems and technologies. The Drone School works to implement the National Pre-Apprentice and Apprenticeships for Commercial Drone Pilots and Commercial Drone Software Developers and assist Commercial Drone pilots, STEM/IT professionals, and entrepreneurs learn completely new skills in areas such as autonomous systems, artificial intelligence, embedded systems. Additional information can be obtained concerning Infinite 8 Aeronautics, and The Drone School at the following locations online:

- Website: www.infinite8institute.com
- Website: www.infinite8institute.com/infinite8aeronautics
- Facebook: www.facebook.com/infinite8institute

1.3 Infinite 8 Aeronautics: The Drone School Owners, Advisory Board

 1.3.1 Owners: Infinite 8 Institute, LLC

1.3.1.1 Advisory Board Members

- Dr. Mary Ferdig, PhD., Sustainability Leadership Institute
- James Waller, Friendship Academy
- Dr. Sharon Waters, PhD., Innovative Grant Concepts
- Prof. Catherine Wilson, Esq., Nebraska College of Law

1.3.1.2 State Licensing Liaisons
- Nebraska – Ean Mikale, J.D. (402) 739-9112
- Alabama - Ean Mikale, J.D. (402) 739-9112
- Virginia - Ean Mikale, J.D. (402) 739-9112
- Colorado - Ean Mikale, J.D. (402) 739-9112

1.3.1.3 Student Financial Assistance Officer
- Nebraska - Ean Mikale, J.D. (402) 739-9112
- Alabama - Ean Mikale, J.D. (402) 739-9112
- Virginia - Ean Mikale, J.D. (402) 739-9112
- Colorado - Ean Mikale, J.D. (402) 739-9112

1.3.1.4 Campus Director
- Nebraska - Nebraska - Ean Mikale, J.D. (402) 739-9116
- Alabama- Abdul Seraaj (334) 271-2402
- Virginia – Regina Lawrence (816) 325-0181
- Colorado – Ean Mikale, J.D. (402) 739-9112

1.3.1.4 Chief Academic Officer
- Nebraska - Ean Mikale, J.D. (402) 739-9112
- Alabama - Ean Mikale, J.D. (402) 739-9112
- Virginia - Ean Mikale, J.D. (402) 739-9112
- Colorado – Ean Mikale, J.D. (402) 739-9112

1.3.1.4 Data Coordinator
- National Office (NE, AL, VA, CO) - Ean Mikale, J.D. (402) 739-9112

1.3.1.5 Certificate of Approval Recipient
- National Office (NE, AL, VA, CO) - Ean Mikale, J.D. (402) 739-9112

1.4   Observed Holidays
Observed holidays based on The Drone Schools course and workshop schedule are provided in the following list. Classes will not be held on these dates. Workshop and course schedules will be adjusted as necessary:
- New Year's Day
- Martin Luther King, Jr. Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Christmas Day
- (DC) All Federal Holidays included.

1.5   Description of Facility and Equipment

- **Omaha Facility**: National Pre-Apprenticeship and Apprenticeship courses and workshops will be held at Quality Clinical Research 10040 Regency Cir, Omaha, NE 68114, unless otherwise specified. Our faculty will provide any handouts, reading materials, high-end computing systems, drones, and other lab materials, with the exception of open-sources materials that can be found freely available online.
- **Montgomery Facility:** The National Pre-Apprenticeship and

Apprenticeship courses will be held at Seraaj Family Homes 400 Cotton Gin Rd, Montgomery, AL 36117. Our faculty will provide any handouts, reading materials, high-end computing systems, drones, and other lab materials, with the exception of open-sources materials that can be found freely available online.

- **Virginia Beach Facility:** The National Pre-Apprenticeship and Apprenticeship courses will be held at Stop, Inc., at 5700 Thurston Ave STE 101, Virginia Beach, VA 23455. Our faculty will provide any handouts, reading materials, high-end computing systems, drones, and other lab materials, with the exception of open-sources materials that can be found freely available online.
- **Denver Facility:** The National Pre-Apprenticeship and Apprenticeship courses will be held at our DC facility, located in the interim at The Grid 445 Broadway, Denver, CO 80203. Our faculty will provide any handouts, reading materials, high-end computing systems, drones, and other lab materials, with the exception of open-sources materials that can be found freely available online.

1.6   Student to Teacher Ratio:

Course	Maximum Student to Teacher Ratio/Journeyman to Apprentice OJT Ratio
Pre-Apprenticeship	4:1 – 1:1
Apprenticeship	4:1 – 1:1

1.7. Apprenticeship/Pre-Apprenticeship Application Periods/Enrollment Procedures and Entrance Requirements

- There are two application periods for the I8I National Apprenticeship Programs, which are August 2 (Open) through December 9 (Closed), and Jan 5 (Open) through March 9 (Closed). The Pre-Apprenticeship has a rolling admissions policy.
- To begin the enrollment process into the Pre-Apprentice/Apprenticeship Programs, potential course participants must go online to https://infinite8institute.com/Apprenticeship, to submit a inquiry. Prospective participants will then be sent a formal application, which can be filled out and emailed to ean@infinite8institute.com, or mailed to I8I headquarters at 10040

Regency Cir, Omaha, NE 68114.

- Each member or prospective participant can also walk into a physical facility to fill out an application at any of our four locations. Once an enrollment request is received, a member of The Drone School staff will review the request, and contact the applicant to discuss the program, and answer any questions the applicant may have.

- Please Note: Please note that new enrollments will be accepted no later than 2-weeks before courses begin to make time for the accrual of necessary course resources, human resources, and equipment.

- The Pre-Apprentice/Apprenticeship applicants will be required to meet with the local Site Director, which will include an overview of the program, financial commitments, and time commitments. Staff will also work with applicants to secure assistance utilizing workforce development dollars, and other resources such as training dollars through the local Department of Labors' Workforce Innovation and Opportunity Act. All programs do not allow students to take out loans to pay for programmatic costs, as it is against our vision statement, to provide debt-free short-term workforce training in emerging high demand technology sectors.

1.8 Description of school's placement assistance

While placement is not guaranteed, and is based on each student's experience, acquired knowledge, and demonstrated ability; staff will work diligently and actively to placed students. However, students who successfully complete the Pre-Apprenticeship Program, and successfully complete an entrance interview for the National Apprenticeship Program, will gain the opportunity to be placed with an existing Sponsoring employer, or we will create a customized path for the student, reaching out to desirable employers to engage new sponsors, in accordance with the prospective apprentices' skills, and/or professional ambitions. Those who forego the Pre-Apprenticeship process, will also be

required to interview, and will be placed in the same interview process, and shall receive the same employment assistance and advocacy. I8I, will also hold a list of prospective apprentices, and current apprentices, who are looking and willing to relocate to other geographic areas to work. I8I, also allows alumni to return and receive free services, such as employment counseling, entrepreneurial coaching, and mentoring.

I8I Pre-apprentices/Apprentices are also required to register with our Discord Channel, where we send out employment opportunities, start-up pitch competitions, government grants and resources, as well as access to Angel Investors and Venture Capital. I8I also works with State and local Labor Departments, Workforce Developments agencies and partners, One-stop Shops for Career Resources, as well as directly reaching out to employers regularly to identify new opportunities for our existing and graduating students.

I8I also provides a career assessment for students, based on Google's internal Management Documentation, where we create life-long career and professional strategic action plans. Pre-apprentices/Apprentices are also encouraged to meet with The Drone School staff, in order to create a Linkedin account and updated profile and/or resume to integrate newly acquired technology skills. Our drone pilots will also have their information placed on Droners.io, as well as Craigslist, in order to market their skillsets to a broader audience.

1.9 Satisfactory Progress and Grading

Please see sections 8 and 9 below for a complete policy on satisfactory progress for programs.

Pre-Apprentice/Apprenticeship Grading Scale:

Grading Scale:
A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69%
 F = 59% or below

Final Exam/White Paper Concept/Demo (50%):

Pre-Apprentices/Apprentices will either undergo a final exam or conduct a final online demo/conceptual presentation in front of staff, employers, or entrepreneurs. The final examination/demo will be worth 50%, during Apprenticeship modules where there is no white paper requirement.

QUIZZES/Class Assignments (30%):

There will be weekly quizzes in the 101 Pre-Apprenticeship course. Quizzes will either be conducted through written form, role-plays, or verbally. Quizzes will relate to current *and previous* topics. A quiz may be given at *any* time during any class period -- immediately after a lecture, at the beginning or end of a class, etc. There will be no make-up quizzes. Quizzes will be given only to those students who are present when the quizzes are passed out.

Weekly course worksheets and assignments will be provided in the absence of course quizzes, such as Block Diagram worksheets, one-page executive summaries, and Lean Business Model Canvass, for example.

<u>CLASS PARTICIPATION (20%):</u>

In a hybrid learning environment with a mixture of online content and in-person hands-on training, or mission-based training, where students are actively working to complete practical industry-specific tasks, under pressure, in realistic environments and conditions, Pre-Apprentice/Apprentice participation is extremely important. Pre-Apprentices/Apprentices will have the opportunity to participate through class discussion, in small teams, as well as during assigned missions. Students will work together in a group of 2-3 individuals. Some projects will also require a larger group dynamic.

1.10   System of making progress reports to students

Student progress will be reported to each student on an individual by individual basis once per module in the Pre-Apprenticeship Program, and Quarterly in the Apprenticeship programs. Students are required to schedule at least one date for office hours with the course instructor during those periods. Courses that require testing of a knowledge-base, will test student comprehension in the form of weekly quizzes, mid-term exams, and final examinations. Pre-Apprentices may not participate in more than two modules during the same quarter.

1.11   Definitions

Flipped Classroom: A flipped classroom is an instructional method and strategy, and a type of blended learning that reverses that traditional learning environment, by delivering instructional content, often online, outside of the classroom. It moves activities, including that may have traditionally been considered homework, into the classroom. Sources: https://www.seas.harvard.edu/news/2013/03/flipped-classroom-will-redefine-role-educators.

Hybrid Learning Model: Hybrid learning is an educational program, that combines

online digital media with traditional classroom methods. It requires the physical presence of both teacher and student, with some elements of student control over time, place, path, or pace. Source: https://sites.psu.edu/hybridlearning/what-is-hybrid/

Mission-based Instruction: Mission-based learning is a student-centered approach created by the Smithsonian EdLab at the National Postal Museum. It encourages students to make meaningful connections between themselves, their communities, and the global community. Source: https://web.archive.org/web/20130731081412/http://edlab.si.edu/

1.12   Payment Policy

Course payment options are available at www.infinite8institute.com/Apprenticeship. The Drone School students with payment agreements in the form of signed invoices, are due prior to the beginning of class. Payment not received prior to the beginning of a course, will deny that student entry into the course, and the student will be forced to take the designated course, during the next time the course is provided, which is generally each quarter. Upon satisfactory course completion and performance, a certificate of completion shall be provided to each student. Student transcripts will be withheld until payment in full for each course has been completed. The student and the school understand that this Agreement may not be amended except in writing and signed by both parties. All refunds requests are subject to the policy outlined in section 1.13 of the I8I National Apprenticeship Rules and Procedures below.

1.13   Refund Policy

Your recorded grades will be available for your review at any convenient time. Do remember to keep all flight logs and quizzes returned to you so that any discrepancies can be easily and fairly straightened out. Except in cases of actual error, final grades are permanent. The applicant can drop the course at any time, however a registration fee of $150, will be non-refundable after three days of

enrollment. The three days of enrollment do not include Saturdays, Sundays, and holidays. Also, the cancellation is based on when the student and school sign the enrollment agreement.

Final "I" or incomplete grades will not be permitted.

You will be encouraged to meet privately with the instructor in his office at least one time outside of class time early in the course and to complete at least one pre and post evaluation-type exercise during the course. Each student reserves the right to cancel their coursework at any time. We encourage students to send such communications to our electronic address at ean@infinite8institute.com, or the general organization electronic mailing address: info@infinite8institute.com. If the right to cancel is not given to any prospective student at the time the agreement is signed, then the student has the right to cancel the agreement at any time and receive a refund on all monies paid to date within (35) days of cancellation in accordance with the school's tuition refund policy (please see table below):

*Nebraska, District of Columbia requirements.

Days to Drop	Percent Refunded
Within 3 days of enrollment	**100%**
After 3 days of enrollment, but before first day of class, excluding Saturdays, Sundays, and Mondays.	**100%, excluding $150 registration fee**
After the first day of class, but no less than 7 calendar days following the first day of class.	**75%**
After 14 calendar days following the commencement of class, but no more than 21 calendar days	**50%**
After 21 calendar days, but no more than 28 calendar days following the commencement of class	**25%**
After 35 or more calendar days following the commencement of class	**Last day to withdraw with a "W"**

*Missouri Refund Policy

Days to Drop	Percent Refunded
Within 3 days of enrollment	100%
After 3 days of enrollment, but before first day of class, excluding Saturdays, Sundays, and Holidays.	100%, excluding $150 registration fee
After the first day of class, but no less than 7 calendar days following the first day of class.	75%
After 50 percent of course, completion.	50%

1.14   Admissions - Admissions is open-enrollment for the Pre-Apprenticeship Program, while applicants must be interviewed for the Apprenticeship Program. However, any U.S. citizen may apply for entry into I8I National Apprenticeship Programs. Only indentured apprentices will be required to undergo a drug and alcohol screening exam. Please refer to section 15, for the complete policy.

Drone License Requirements - New rules were established by the Federal Aviation Administration, for the legal piloting of a drone for commerce. In order to get a license, someone must:

- Be at least 16 years of age
- Have a valid government issued picture ID with name, address, and signature
- Pass an exam administered by the FAA
- Apply for a remote pilot certificate
- Complete a TSA background check
- Pass with a score of 70% on the examination.

Criminal Background Check - Note, that commercial drone pilots must undergo a criminal background check before legally operating aircraft in U.S. airspace, and must receive a security threat assessment background test from the TSA before being allowed to operate. This is the same background test used to screen pilots and airport security personnel. **Having a criminal record is not an immediate**

cause for denial of a license. This also does not apply to Commercial Drone Software Developers.

- A criminal background check is handled by the Transportation Security Administration (TSA). Those convicted of a felony fall into two different categories.
    - The first category is for anyone who is convicted of a felony involved any of the following crimes:
        - Espionage
        - Sedition
        - Treason
        - A federal crime of terrorism
        - A transportation issue involving a significant loss of life, environmental damage, or economic disruption
        - A crime involving explosives (including threats of an explosive)
        - Improper transportation of a hazardous material
        - Murder
        - Racketeering
        - <u>For those falling into any of these areas, they are permanently prohibited from getting a drone license regardless of when the crime occurred.</u>
    - The second category is termed interim disqualifying criminal offenses. These are once for which felons were convicted within seven years of the date of the application, or if the applicant was released from prison after the conviction within five years of the date of the application. Crimes in this category include:
        - Illegal possession, use, sale, purchase, or other dealing with a firearm
        - Extortion
        - Dishonesty
        - Fraud
        - Money laundering

- Bribery

- Smuggling

- Distribution or possession of a controlled substance

- Kidnapping

- Rape or sexual abuse

- Aggravated assault

- Robbery

- Note: Felons who have their records expunged, also will be permitted to state on a drone license application, that he or she has not been convicted of a felony, thus increasing changes for licensing success.

- Termination – The date of termination will be counted as the date, the Apprentices/Pre-Apprentices, formally stipulates they desire to stop the program formally, by letter, or by email. Also, the date of termination for those who have violated policies and procedures, the termination date, will be the date of the final decision of disciplinary action, received by the students from I8I administration.

1.14   Scholarships

At this time, The Drone School offers need-based and merit-based financial aid scholarships to students. The max need-based scholarship is $1,900, while the max merit-based scholarship is valued at $11,000. The Quantum Coin Foundation will provide scholarships to needy students to fill gaps in financial aid.

- Merit-based Requirements:
  - 16 years or older/14+ Pre-Apprenticeship
  - 3.5 GPA
  - Scholarship Essay
  - 3 recommendations
  - 1 interview
  - Selection from Advisory Committee
- Need-based

- Out-of-school, youth ages 16+/14+ Pre-Apprenticeship
- High school dropout
- Offender
- Individual with a disability
- Homeless person
- Veteran
- Foster Child
- Substance Abuse
- Cash welfare recipient
- Pregnant or Parenting
- Long-term unemployed

2   I8I Equal Employment Opportunity Pledge

2.1   I8I Pre-Apprenticeship and National Apprenticeship Programs will not discriminate against apprenticeship applicants or apprentices based on RACE, COLOR, RELIGION, NATIONAL ORIGIN, SEX (INCLUDING PREGNANCY AND GENDER IDENTITY), SEXUAL ORIENTATION, GENETIC INFORMATION, OR BECAUSE THEY ARE AN INDIVIDUAL WITH A DISABILITY OR A PERSON 40 YEARS OLD OR OLDER.

2.2   I8I Pre-Apprenticeship and National Apprenticeship Programs will take affirmative action to provide equal opportunity in apprenticeship and will operate the apprenticeship program as required under **Title 29 of the Code of Federal Regulations, part 30**.

3   I8I Mission Statement

3.1   It is the mission of I8I to provide Americans the opportunity to access bleeding edge technologies and training in high demand, high-wage fields involving present or future machine automation.

4   Goals/Safety/Compensation/Selection/Eligibility/Registation/Evaluation/Certification

4.1   To fulfill our mission, the Pre-Apprentice and Apprenticeship Programs will use the goals below as a guide to assess our current effectiveness and to plan for the future.

4.1.1 Safety: Our top priority is to create a culture of safety in our program, to teach our apprentices safe and effective work practices, and to ensure our training facilities are safe, healthful, and free of recognized hazards.

4.1.2 School Climate: Provide our students with a safe and supportive environment that empowers them to develop advanced technical, academic, and professional skills for success as a Commercial Drone Pilot or Commercial Drone Software Developer.

4.1.3 Facilities: Maintain clean, safe, and well-equipped training facilities that meet the needs of I8I Pre-Apprenticeship and National Apprenticeship Programs.

4.1.4 Curriculum & Instruction: Teach current core content, technical skills, and standards to develop students into highly skilled professional Commercial Drone Pilots and Commercial Drone Software Developers.

4.1.5 Assessment: Measure and report student achievement and work habits based on technical vocational, and core content standards, and to use these results to improve instruction.

4.1.6 Skills: Identify and develop skills that cross all content areas of the trade, such as technical and hands on skills, critical thinking, problem solving, collaboration, work ethic, and sense of personal responsibility.

4.1.7 Literacy Practices: Identify and develop strategies to build strong content knowledge of the trade by responding to the varying demands of task, purpose, and discipline in a variety of forms.

4.1.8 Equipment & Technology: Utilize current industry standard equipment and current instructional technology tools and resources for our training programs.

4.1.9 Student Engagement: Help students develop strong, positive relationships with instructors and peers via programs that shape their intellectual, physical, professional development, and work ethic.

4.1.10 Instructional Support: Provide a continuum of support services to help all students achieve their academic and technical goals.

4.1.11 Student Recruitment and Retention: Implement recruitment and retention strategies that lead to sustained enrollment, steady student retention, and preparation for a career as a Commercial Drone Pilot and/or Commercial Drone Software Developer.

4.1.12 Staff Recruitment and Retention: Identify, recruit, develop, and support highly qualified instructors, administrators, and support staff dedicated to fulfilling the I8I's mission.

4.1.13 Provide recommended living wages for apprentices starting at $15.00/hr. - $23.95/hr. For the Commercial Drone Pilot Program and the Commercial Drone

Software Developer Program both have the following increasing wage scales: Year 1 = 77% Year 2 = 88% Year 3 = 100%. Mentor status is achieved at the end of level 3 (100%).

4.1.14 All information regarding apprenticeship openings will be furnished to the (Nebraska, Alabama, Virginia, Colorado Appnticeship regulatory bodies.

All applicants applying for apprenticeship training will be interviewed by the company designee. The interview shall cover such factors as previous work experience and related training, reason for interest in the occupation, attitude towards apprenticeship training, and education background.

Qualified applicants who meet the above minimum qualifications will be rated numerically on the basis of the following factors:

RATING SYSTEM   MAXIMUM POINTS ALLOWED

(The followings are samples that can be used. However, companies may use other items)

1. References	**15**
2. Attendance and Conduct Records from previous employment and/or school	**15**
3. Previous work experience and/or training related to the occupation	**20**
4. Interview (Interviews will be limited to objective questions that may help determine the interest and fitness of applicants for apprenticeship	**20**
5. Veteran of Military Services	**15**
6. Voluntary Services	**15**

Qualifying Score: 70   Maximum Score: 100

Selection of qualified applicants shall be in descending order of points acquired through the above rating system.

4.1.15 Applicants applying for apprenticeship training in the (name occupation (s) or trade) must be eighteen (18) years of age in the D.C., or at least (16/14 PreApp) years of age except where a higher age is required by law, and must be employed to learn an apprenticeable occupation be a high school graduate or have GED, and physically able to perform the duties of the occupation. Adequate means of transportation to on-the-job and related instruction is also required.

All selected applicants may be required to pass a current illegal drug test.

4.1.16 Infinite 8 Institute, L3C shall prepare an Apprenticeship Registration Agreement as required and provided by the NE, AL, VA, CO, and MO Registration Agencies. The Apprenticeship Agreement shall contain a clause making these standards part of the Agreement.

    A. All Agreements shall be signed by Infinite 8 Institute and/or the International Drone Federation and the apprentice and forwarded to the proper Registration Agency for registration within forty-five (45) days of consummation.

    B. Infinite 8 Institute, the Apprentice/Pre-Apprentice, and the Sponsor will receive a copy of the Registration Agreement for their records.

    C. In the event that Infinite 8 Institute is unable to fulfill its obligations under the Apprenticeship Agreement, the apprentice may be transferred to another apprenticeship sponsor under a registered program with full credit to the apprentice for satisfactory time and training earned.

    D. Infinite 8 Institute shall notify the proper Registration Agency in writing within forty-five (45) days of any transfers, modification, cancellation, suspension, or termination of the agreement, with cause for same, and of completion of the apprenticeship.

No person shall be considered a bona-fide apprentice until he/she is registered with the proper Registration Agency.

4.1.17 The progress of each apprentice's on-the-job performance and related classroom instruction shall be subject to periodic review prior to the expiration of each wage period. Should a review reveal a lack of interest or ability on the part of the apprentice to complete the program, the apprentice may not be advanced. The apprentice will be informed of any deficiency and placed on probation for a sufficient period to determine improvement or failure. If the apprentice does not demonstrate acceptable improvement after the probationary period, the Apprenticeship Agreement may be suspended or revoked. Infinite 8 Institute will notify the apprentice and the Registration Agency of final action (s) taken.

4.1.18 Upon apprentices' satisfactory completion of the requirements of apprenticeship training as established herein, Infinite 8 Institute shall certify the names of each graduating apprentice to the Registration Agency and recommend that a Certificate of Completion be awarded.

4.1.19 Infinite 8 Institute shall keep all adequate records of their apprenticeship program. These records will include, but not limited to the following: original applications of applicants applying for our apprenticeship program, selection and rejection of applicants, promotion, termination, layoffs, rates of pay, evaluation of apprentices' work and training performance and any other records pertinent to a determination of compliance with these standards, as may be required by the Registration Agency. These records will be maintained for a period of five (5) years as required and made available to the Registration Agency upon request.

(Employers or contractors applying for apprenticeship registration approval must identify a street address for maintaining apprenticeship records. Please see page number (3) of this document.)

5 Apprentices' Expectations and Obligations

5.1 Our students are active learners in meeting our program's goals of excellence. The following outlines are expectations our students should have of their training facility and its staff. It also lists the responsibilities, which our students should have toward their training facility, its staff, our membership, and our community.

5.1.1 I8I Pre-Apprentices and Apprentices are expected to abide by all the provisions in the student disciplinary policy at all times.

5.1.2 For the limited amount of time we have for every course and the importance I8I places on work ethic, apprentices are expected to work from start time to quitting time and make the most of every learning opportunity afforded to them.

5.1.3 Safety is a priority for everyone involved in the apprenticeship program. If an apprentice is aware of any recognized safety hazard or behavior that is dangerous to the general well☐being of any members of the class, it is their duty to report it the instructor immediately.

5.2 Respectful Behavior

5.2.1 It is insisted that I8I Pre-Apprentices and Apprentices always conduct themselves in a manner that respects the rights of other students and staff. These include:

5.2.2 The right to a safe, non-threatening environment;

5.2.3 The right to courtesy at all times;

5.2.4 The right to protection of private property;

5.2.5 The right to have a clean environment;

5.2.6 The right to hear only acceptable language.

6 Probationary Period

6.1 Pre-Apprentices, who successfully complete the requirements under their designated track of study (Commercial Drone Pilot, Commercial Drone Software Developer, Artificial Intelligence, Autonomous Vehicles), will be eligible for consideration of the I8I National Commercial Drone Pilot and Commercial Drone Software Developer Apprenticeships. Full credit for time spent in the Pre-

Apprenticeship Program will be granted toward completion of either I8I National Apprenticeships.

6.2   Apprentices only, who are employed under either the I8I National Apprenticeship for Commercial Drone Pilot and/or Commercial Drone Software Developers program shall be subject to a tryout or probationary period of the lesser of 1,500 hours of reasonably continuous employment or one year. Full credit for time spent in the probationary period will be granted toward completion of the apprenticeship.

6.2   During this probationary period, the termination or cancellation of the Apprenticeship Agreement shall be made by the Regional Apprenticeship Advisory Committee at the request of either party. After the probationary period, the Area Advisory Committee may cancel the agreement for due cause, such as lack of progress, lack of interest or a failure to comply with the Area Special Rules.

7   I8I Policy on Readmitted Pre-Apprentices/Apprentices:

7.1   Cancelled pre-apprentices/apprentices may be reinstated into the program upon the area office receiving a letter of recommendation from the Local Site Director.

7.1.1   Reinstated pre-apprentices/apprentices must pass a Drug Screening within 48 hours of reinstatement.

7.1.2   Reinstated pre-apprentices/apprentices shall resume the program from the period in which they were cancelled.

7.1.3   Reinstated pre-apprentices/apprentices will serve a probationary period of the lesser of 1,500 work hours or one year. During the probationary period either the pre-apprentice/apprentice or I8I may terminate the Pre-Apprentice/Apprenticeship Agreement in accordance with Section IX of the National Standards without right to appeal.

7.1.4   A pre-apprentice/apprentice may only be reinstated into the program one time under this policy.

8   Related Studies and Online Learning

8.1   Our Pre-Apprenticeship program contains (8) modules, each having a blend of online/in-person lessons, also with a combination of in-person or online examination, constituting the required studies program for I8I Pre-Apprenticeship.

8.1.1 Our Commercial Drone Pilot Apprenticeship contains (37) modules, each having a blend of online/in-person lessons, with online examinations,

constituting the required studies program for the I8I National Apprenticeship for Commercial Drone Pilots.

8.1.2 Our Commercial Drone Software Developer Apprenticeship contains (19) modules, each having a blend of online/in-person lessons, with online examinations, constituting the required studies program for the I8I National Apprenticeship for Commercial Drone Software Developers.

8.2 Pre-Apprentices/Apprentices are required to submit homework assignments, quizzes, tests and receive passing grades for each relevant module [Pre-Apprenticeship (8), CDP (37), and CDSD (19)] and complete all online/in-person coursework. The related studies are accessible in-person and/or online and Pre-Apprentices/Apprentices are required to study the related study materials and complete any unfinished coursework at home. If Pre-Apprentices/Apprentice fails a module, he/she will be required to complete the applicable related study lesson and then retest.

8.3 Pre-Apprentices/Apprentices are required to complete in-person/online Related Studies and Coursework on the following schedule:

8.3.1 Pre-Apprenticeship: All coursework and examinations for each Pre-Apprenticeship Tracks are to be completed [CDP, CDSD, AI, AV] are to be completed within 12 months of program start date.

8.3.2 Commercial Drone Pilot Apprenticeship: At least 120 hours of required coursework and tests within 12 months of indenture date. At least 240 hours of required coursework and tests are to be completed within 24 months of indenture. At least 307 hours of required coursework and tests are to be completed within 36 months of indenture.

8.3.3 Commercial Drone Software Developer: At least 184 hours of required coursework and tests within 12 months of indenture date. At least 368 hours of required coursework and tests are to be completed within 24 months of indenture. At least 504 hours of required coursework and tests are to be completed within 33 months of indenture.

8.4 I8I Policy: Pre-Apprentices are required to submit and pass a minimum of one module per quarter [3-months]. Commercial Drone Software Developer Apprentices are required to submit and pass a minimum of one module per month. Commercial Drone Pilot Apprentices are required to submit and pass a minimum of one module every six weeks. An apprentice who has met all the requirements to be promoted to their next period or graduated from the Program who has not completed the modules for their current period shall be held in their current period until completion of required Related Studies.

8.5 Any apprentice who does not complete and pass all delinquent modules within 30 days of their semiannual progress report shall be subject to disciplinary Action. (Refer to Disciplinary Action).

9   Classroom/Lab Training Requirements/Numerical Ratio

9.1   It is mandatory that all Pre-Apprentices attend the required classes which are conducted at an approved Local Training/Regional Center before becoming certificated, and/or being considered for promotion to Apprentice. Misconduct during classes or failure to attend scheduled classes without a legitimate reason (e.g. personal sickness or a death in your family) that is acceptable to the Site Directors shall result in disciplinary action (Refer to DISCIPLINARY ACTION). Rules of conduct shall be posted at the training centers.

9.1.1 Commercial Drone Pilot Apprentices are to receive a minimum of one hundred forty-four (144) hours of classroom/shop training per year, for a total of 304 hours during the program, and 5500 on-the-job (OJT) training. Commercial Drone Software Development Apprentices are to receive a minimum of one hundred forty-four (144) hours of classroom/shop training per year, for a total of 504 hours during the program, and 3300 hours of OJT. It is mandatory that all apprentices attend the required classes which are conducted at an approved Local Training/Regional Center before being promoted to Mechanic. Misconduct during classes or failure to attend scheduled classes without a legitimate reason (e.g. personal sickness or a death in your family) that is acceptable to the Site Directors shall result in disciplinary action (Refer to DISCIPLINARY ACTION). Rules of conduct shall be posted at the training centers.

9.1.2 To ensure proper training and safety, the number of apprentices may be one (1) apprentice to one (1) mentor/journey worker/technician is employed in non-construction industries.

9.2   Locally, each I8I Site Director will be advised by Instructors, Teaching Assistants, or Administration, when an apprentice attending class requires disciplinary action. The Site Director will record each incident, notify the regional board of any recommendations or immediate actions taken in consideration of gross negligence, misconduct, or in the interest of safety concerns for I8I students and/or staff. It will then be the Site Directors responsibility to impose the penalty as recommended or adjusted.

9.3   Apprentices who have not received an FAA designed Remote Pilot in Command license from an approved FAA testing center within the first 3-months of induction in the program, shall not be promoted beyond probationary status, until one of the following has been determined by the National Board.

9.3.1   Receive additional knowledge training enough to pass the required examination to qualify for referral as a qualified Remote Pilot in Command. If the apprentice has not met the requirements to be promoted beyond probationary status within the first six months of induction into the program, the apprentice will become ineligible to continue the program, and may reapply no sooner than 6-months following such a determination.

9.4   In the event that an apprentice fails a subject in classroom/shop training, he/she will be required to complete the applicable related study lesson and then retest at a regional I8I facility or other facility approved by I8I.

9.5   I8I National Apprenticeship Programs requires all apprentices must attempt the 2-hour FAA Remote Pilot Knowledge Examination within (3) months after being accepted into I8I National Apprenticeship Programs.

9.6   All Apprentices of I8I National Apprenticeship Programs must complete 100 hours of in-class training and at least 1,000 hours of OJT (4) to be promoted to journeyman.

9.7   Apprentices arriving at scheduled classroom/shop training with incomplete or delinquent online lessons and/or coursework and suspended apprentices will not be permitted to attend and will be subject to disciplinary action (refer to Student Disciplinary Policy).

10 Apprentice Work Hours Reporting

10.1 Apprentices are required to report all work hours by logging into the Infinite 8 Gateway at https://www.infinite8institute.com/Apprenticeship. Such reports shall be submitted in a timely manner, but in no event, more than seven (7) days following the last day of the month. The information required in the report shall be filled in by the apprentice including the name of the employer, activities on the job, and number of hours spent on each work activity.

10.2 Apprentices out of work during a calendar month shall submit a report for zero (0) hours stating they were out of work.

10.3 Apprentices, not a supervisor or anyone else, are responsible for completion of the Reports.

10.4 Filing an incomplete Report, failure to file a Report within seven (7) days of the end of the month and/or providing false information on the Report shall result in disciplinary action (Refer to DISCIPLINARY ACTION).

10.5 Hours reported by apprentices will be verified by the local Site Director through and reported to the local Advisory Board, who in turn, will report to the National Advisory Board local outcomes.

11 On-the-Job Training Modules

11.1 On the Job Training modules are intended to be completed on the job. However, instructors have the authority to sign off OJTs for tasks completed at the local/regional training facility under simulated work conditions, in the event

the hosting business and/or organization may not have access to the necessary equipment or resources to properly simulate apprenticeship training.

11.2   SAJAC POLICY: In addition to all other requirements, each apprentice must complete:

11.2.1 Four (4) On the Job (OJT) modules before being promoted to the second year of training and pay.

11.2.2 Two (2) additional On the Job (OJT) training modules before being promoted to the third year of training and pay.

11.2.3 And one (1) additional On the Job (OJT) training module, strictly for apprentices of the Commercial Drone Pilot, before being promoted to the third year of training and pay.

11.2.4 Apprentices who successfully complete first-year modules for the Commercial Drone Pilot Apprenticeship receive an orange customized drone pilot safety vest, while Commercial Drone Software Developer Apprentices receive engineering/scientific laboratory coats after successfully completing first-year modules.

11.3 Failure to complete the required On the Job training modules will delay promotion to journeyman until required OJT's are completed.

12 Apprenticeship Fees

12.1 Apprentices are required to pay a program fee of $25. The purpose of the payments is to offset the cost of apprentice membership in inventor clubs, membership services, such as lifelong entrepreneurial mentoring and career counseling, as well as other reasonable and related membership-based services.

12.2 Payment of the program fee is expected after two (2) months of reasonably continuous employment and required prior to attending Year☐Two training classes.

12.3 Failure to pay fees in a timely manner shall result in disciplinary action (Refer to

DISCIPLINARY ACTION).

13 Competency/Performance Evaluation

13.1   Performance Based Testing: Apprentices are required to successfully complete two (2) performance-based tests (a and b) for each of the four (4) years of training in accordance with area testing procedure.

13.2   Related Studies-Performance Base Test Procedure:

13.2.1   The Performance Base Test (PBT) procedure shall be conducted per the following protocol:

13.2.2   After completing a series of (6) or (12) Related Studies Lessons, the Area Coordinator, local coordinator or local instructor shall conduct PBT Testing at the local or area site.

13.2.3   This test will be computer generated and the testing process shall always be proctored.

13.2.4   The students are not allowed to bring any paperwork or materials into the testing area.

13.2.5   The area must be free of any materials that could be used as a reference during the test.

13.2.6   Blank scrap paper will be given out by the instructor if the student chooses to do hand calculations. This paper will be collected at the end of the test and properly discarded.

13.2.7   Calculators are allowed however; telephones shall not be used at any time.

13.2.8   The individual in charge shall register the apprentices for the testing process with the area office.

13.2.9   The student will have a maximum (2) hour time limit to complete the test.

13.2.10 The student will have the testing procedure explained to them prior to taking the test.

13.2.11 The test will only be loaded in the system for (1) attempt.

13.2.12 If the student earns a passing grade of 70% he or she will advance to the next period.

13.2.13 If the student earns less than a 70% passing grade he or she must do remedial training prior to retaking the test on a later date.

13.2.14 Should the apprentice fail the test a second time, the apprentice will be required to study and re☐test within 90 days.

13.2.15 If the apprentice fails the third attempt at the PBT, the apprentice will be cancelled from the apprenticeship program.

13.2.16 If a sponsor is unable to fulfill the obligation to the apprentice, the agreement may, with consent of the apprentice and the joint committee if one exists or of the Associate Director if there is no joint committee, be

transferred to another sponsor under a registered program and with full credit to the apprentice for satisfactory time and training earned.

14 Local Joint Referral Rules

14.1 A copy of the Local Joint Referral Rules will be provided to the Pre-Apprentice and/or Apprentice by the Local Lodge at the time Apprentice signs the apprenticeship agreement.

14.2 Apprentices shall comply with the Local Joint Referral Rules. Violations of the Referral Rules will result in disciplinary action.

14.3 I8I POLICY AND APPRENTICES WORK REFERRAL LISTS: Each apprentice will be indentured in the geographical area of the local site in which he/she applied for admission to the program. The apprentice shall be eligible to sign up for a national list of available apprentices, notifying employers and I8I Administration the Apprentices willingness to relocate for work and professional development opportunities. Referrals to job sites outside the geographical area of the local and/or regional site must come through the Site Director of the Local/Regional Site in which the apprentice is indentured. Any reasonable request made by an apprentice to work at another site will not be withheld. However, Apprentices may only request a different Regional/Local site upon initial acceptance into the I8I National Apprenticeship Programs. All Site Directors are to notify regional and national Advisory Committees when apprentices are available to travel, by circular letter, while notifying each regional/local site and the entire membership of availability of apprentices. Apprentices are to be notified of this policy and informed that failure to comply with this policy can result in discipline, and including, cancellation from the program.
   a) The transferring apprentice must be provided a transcript of related training and on-the-job learning by the committee or program sponsor:
   b) *Transfer must be within the same occupation: and*
   c) *A new apprenticeship agreement must be executed when the transfer occurs between program sponsors.*

15 Drug/Alcohol Testing

15.1 Apprentice applicants selected for indenture will be given a copy of the I8I Drug & Alcohol Policy & Procedures.

15.1.1 The Site Directors shall notify the I8I office by FAX or E-mail, the name, social security number, address, home phone number, local number, date indentured, date graduated, and date terminated of all apprentices.

15.1.2 Apprentices must have a current I8I drug screen certification to participate in any classes or training activities at the Local/Regional training facility.

15.1.3 Apprentices may be drug/alcohol tested while attending the Local/Regional Training Centers for Post☐Accident, Incident, Reasonable Suspicion, or cause.

15.1.4 All drug/alcohol screening shall be conducted in accordance with I8I Drug/Alcohol Screening Policy and Procedures.

15.1.5 Apprentices shall be drug/alcohol tested while attending Local/Regional Training Centers using an independent testing laboratory.

15.2 Post-Accident/Incident:

15.2.1 When a drug/alcohol test is required due to a Post-Accident/Incident that occurs while attending a Local Training Center, the Site Director will notify the CEO at National Office (ean@infinite8institute.com), or Regional Site Director if the CEO is unavailable, and the Site Director will notify the respective parties, with the required information, such as name, address, etc.

15.3 Cause:

15.3.1 Any indentured apprentice shall be subject to drug or alcohol testing, for cause, for any of the following reasons:

15.3.1.1   Involvement in, or causing, an incident or accident while attending class at a local/regional training center or while staying in a Hotel during school attendance which causes or could have caused injury to employees, apprentices, or other individuals, or which causes or could have caused destruction or damage to property.

15.3.1.2   Observed behavior which is unusual under the circumstances, or different from the individual's normal behavior, which indicates or could indicate impairment or drug/alcohol abuse.

15.3.1.3   Observed behavior must be witnessed by at least two [2] individuals.

15.4 Policy Changes:

All Policy changes that relate to drug/alcohol testing procedures must be reviewed and approved by the National Advisory Board to insure there is no conflict in administering the program as it exists.

15.5 Consent and Information Release Form:

15.5.1 All apprentices indentured into the program must sign the I8I Consent and Release Form at the time they sign the Apprenticeship Agreement.

15.5.2 Apprentices that refuse to sign the I8I Consent and Release Form at the time they sign the Apprenticeship Agreement shall be terminated.

I8I Drug Test Consent and Information Release Form (signed with Training Agreement)

I understand that one of the requirements for remaining indentured in the I8I National Apprenticeship Program by and through one of its area committees is to submit to alcohol and drug testing under the Drug Testing Policy of the National Program. I acknowledge having received a copy of the Drug Testing Policy of the National Program.

I further understand that failure to consent to drug testing when requested to do so will result in cancellation of my apprenticeship agreement with I8I National Apprenticeship Programs and any of its area committees.

I further understand that the drug testing will be conducted under the I8I Drug and Alcohol Policy and Procedures through an independent testing

laboratory. I acknowledge having received a copy of the Drug and Alcohol Policy and Procedures of the I8I National Apprenticeship Programs.

I authorize the independent testing laboratory to release the test results to a contact person selected by a I8I National Apprenticeship Program Administrator. I further authorize the contact person to release the test results to the National or Area coordinator. I understand that the CEO or the Regional Site Director will use the information in accordance with the drug testing policy of the I8I National Apprenticeship Programs, including the release of test results to individuals who need to know in order to carry out the drug testing policy of the National Programs, and I authorize him/her to do so.

15.6 Cost of Treatment

Cost of treatment and/or entry into a drug/alcohol rehabilitation program Shall be the sole responsibility of the apprentice. Neither I8I National Apprenticeship Programs nor any of its area committees, officers, agents, employees or representatives will be responsible for any cost of treatment or rehabilitation. However, I8I National Apprenticeship Programs reserve the right to refer apprentices to local, regional, and/or national community services.

15.7 Area Apprenticeship Rules

15.7.1 I8I Drug/Alcohol Policy, Procedures and any amendments or changes approved by the National Advisory Board is recognized as a part of the Apprenticeship Rules.

15.7.2 DRUG TESTING: Newly indentured apprentices will not be referred for employment until results of drug test are received by the Local Site Director.

15.7.3 I8I PROCEDURES FOR APPLICANTS OR APPRENTICES WHO TEST POSITIVE FOR ONE OR MORE ILLEGAL SUBSTANCES: If a non□ probationary apprentice is cleared for a re□test and the re□test is positive the apprentice is dropped form the program.

15.8 I8I POLICY 09/06/2018: DRUG TESTING (APPRENTICES) INTERPRETATION:

15.8.1 When an apprentice is rejected or terminated from a job for receiving a positive result on a contractor drug test the following is to take place immediately:

15.8.2 The Site Director is to notify (in writing/email) the CEO, or any Regional Coordinators.

15.8.3 If the apprentice test positive he/she is terminated from the program if already on probation for a prior cause.

15.8.4 If he/she is out of the probationary period they must comply with the I8I retest requirements if it is their first positive. If it is the second positive, they are immediately terminated from the program.

16 Credit Hours

16.1 Apprentices may receive up to a maximum of three thousand (3,000) hours credit toward completion of the program for the following:

16.2 Previous Related Technical Experience:

16.2.1 Apprentices may receive up to three thousand (3,000) credit hours for previous Commercial Drone Pilot and/or Commercial Drone Software Developer experience, related craft, or shop experience. These hours must be verified by I8I Regional Advisory Board and/or Regional Coordinator for Commercial Drone Pilot and/or Commercial Drone Software Development experience, proof of work with related crafts, pension statements, or verification of hours and duties on Company letterhead with a contact phone number.

16.3 Vocational/Technical Training:

16.3.1 Apprentices may receive up to one thousand hours (1,000) for Vocational-Technical school training in the computer sciences, mechanical engineering, or related trades if the training is post high school and accompanied by the student's transcript.

16.4 College Degree:

16.4.1 Apprentices may receive up to one thousand hours (1,000) for a two-year college degree.

16.4.2 Apprentices may receive an additional one thousand hours (1,000) for a four-year college degree.

16.5 Commercial Drone Technology Certifications:

16.5.1 Remote Pilot in Command FAA Certification [PIC]: 250 hours

16.8 These credit hour rules apply to all apprentices indentured to I8I National Apprenticeship Programs.

16.9 No credit hours of any kind (except for Remote FAA certifications) will be applied unless the apprentice has completed all his/her academic studies (all class-based coursework a classroom training, examinations, and required OJT modules) and has paid his/her membership fee.

16.10 No credit hours of any kind (except for Remote FAA certifications) will be applied until the apprentice is within the applicable credit hour range of accruing the requisite OJT hours unique to her/his program (e.i., five thousand and five hundred hours (5,500). For example: if the apprentice has completed his/her academic studies and has applied for seven hundred fifty (750) technical/vocational training hours, that apprentice will not receive those hours until he/she reaches four thousand seven hundred and fifty hours (4,750) for a total of six thousand hours (5,500) for the Commercial Drone Pilot Program, for example.

17 Disciplinary Action

17.1 Apprenticeship Program Violations:

17.1.1 When violations occur regarding Classroom/shop and Online Training Requirements, Monthly Hours Reporting, and Membership Fees, the Site Director or Administrative Staff at the request of the local Site Director, shall digitally or via hardcopy, mail apprentices a Red Report stating each violation or suspension, providing each apprentice written notice of any proposed adverse action including detailed specification of the cause with written notice indicating the opportunity for corrective action during the two week period, unless such a requirement is in conflict with any other section of this agreement.

17.1.2 Each offense shall result in a 30-day suspension from work.

17.1.3 The Red Report will advise that the apprentice has thirty (30) days from receipt of the report to comply with the requirements. Failure to comply within thirty (30) days will result in suspension from work.

17.1.4 The suspension will remain in effect until the requirements are met to have the suspension lifted.

17.1.5 If the requirements to have the suspension lifted are not met within thirty (30) days, the apprentice will be canceled from the program.

17.1.6 A copy of the Red Report and or suspension notice shall be sent to the Local Site Director advising of the suspension.

17.1.7 The Site Director shall have the apprentice removed from the job if employed.

17.1.8 The apprentice shall not be allowed to register on the National waiting list until the Site Director has been notified by the Regional Coordinator that the suspension has been lifted.

17.1.9 If the apprentice is on the waiting list his/her name is to be removed and not allowed to register until the Site Director has been notified by the Regional Coordinator that the suspension has been lifted.

17.1.10 Upon request of the Site Director, the Regional Coordinator, will grant a Thirty (30) day extension <u>to gainfully employed</u> apprentices to submit all the delinquent items listed on their semi☐annual progress report and avoid cancellation.

17.1.11 Apprentices that receive four (4) suspensions for violations of apprenticeship program requirements within a two (2) year period will be terminated from the program.

17.1.12 Apprentices shall be canceled for any suspension incurred during the probationary period except for suspensions for late or missing monthly job reports incurred during the semi☐ annual progress report cycle.

17.2 Payment of Membership Fee

17.2.1 Payment of the membership fee is $25 and is included in the cost-of-training for I8I National Apprentice only. Pre-Apprenticeships are not required to pay this fee.

17.3 Classroom/Lab Training:

17.3.1 Apprentices arriving at scheduled classroom/lab training with incomplete or delinquent lessons and/or coursework and suspended apprentices will not be permitted to attend and will receive an attendance violation for unexcused absence.

17.3.2 Any apprentice reported to be in violation of the I8I disciplinary policy shall be dismissed from class and suspended pending review of the Committee. Upon review of the apprentice's violation the Regional Committee will determine the appropriate disciplinary action up to and including the termination of the Apprenticeship Agreement.

17.4 Academic Honesty:

17.4.1 Pre-Apprentices/Apprentices are responsible for the honest completion and representation of their work. By placing their name on their work, students certify the originality of all work not otherwise identified by appropriate acknowledgements.

17.4.2 Cheating is a form of academic dishonesty in which an individual undermines the integrity of an assignment or exam.

17.4.3 Any student who cheats on an assignment shall receive a zero (0) for the assignment, be dismissed from class, and be suspended and/or terminated from the program.

17.5   Attendance Violations and Dismissal from Class (Local/Regional Training Center):

17.5.1 Two (2) Violations within 30 days or Three (3) Violations within one year will result in dismissal. Upon a second unexcused tardy or absence (in a 30-day period or third within one year), the apprentice will be dismissed from class, sent home at his/her own expense, and receive a mandatory 30-day suspension (if non☐probationary) or cancellation from the program if a third violation within three years, or if probationary. This decision will be up to the Site Director but may be appealed to the Regional Advisory Board.

17.5.2 A second no-show or dismissal from a scheduled training class will result in termination from the program.

17.6 Referral Rules Violations:

All apprentices are required to comply with this provision concerning the I8I National Apprenticeship Referral Rules (copy must be given to each apprentice when indentured) and a copy of which must be on file at the Regional Coordinators office. Apprentices will be suspended or terminated from the National Program for:

17.6.1 When an apprentice is disciplined for violations of this section of the National Referral Rules, the local Site Director will immediately file a report with the Regional Coordinator along with supporting documents advising of the reason(s) and what referral suspension was applied.

17.6.2 Apprentices may not refuse a work referral except for a compelling reason. Each refusal shall be so noted, and the Local Site Director will immediately file a report with the Regional Coordinator along with supporting documents advising of reason (s) for refusal.

17.6.3 An apprentice that refuses employment from two employers within a one (1) year period is cause for termination from the program. It will be the responsibility of the Site Director to immediately send a report to the Regional Coordinator's Office along with supporting documents advising of the reason (s) for the refusal (s).

17.6.4 Chronic violations of the National Referral Rules are cause for termination from the program. All reports will be filed immediately as the infractions occur. Apprentices have the right to submit a referral dispute to the Regional Committee in keeping within the Rules.

17.6.5 The Local Regional Apprenticeship Committee should refer all apprentice referral disputes back to the Local Site Director.

17.7 Drug/Alcohol Policy Violations:

17.7.1 A probationary apprentice will be automatically terminated if he/she tests positive and will not be eligible to reapply for admission to the program for a period of two years except he/she may reapply after a period of 6 months from the date of termination if he/she has completed a bona fide rehabilitation program and/or otherwise complied with the recommendation or instructions of the program administration. The Site Director Coordinator will be responsible for advising the apprentice of his/her termination and options with respect to reapplying.

17.7.2 A non-probationary apprentice who tests positive will automatically receive a thirty (30) day suspension from the apprenticeship program as well as from work and employment referral. The apprentice is required to have a negative re-test through by and independent agency before the end of the thirty (30) day suspension or be terminated from the program.

17.7.3 A non-probationary apprentice who tests positive a second time will automatically be terminated from the program.

17.7.4 Refusal to submit to drug/alcohol testing shall result in immediate termination.

17.8 Lack of Progress:

17.8.1 Apprentices reporting less than one hundred fifty (150) actual work hours during any twelve (12) month period while enrolled in the program will be canceled for lack of progress. (Does not apply to apprentices on Leave of Absence.) A waiver may be requested due to lack of available work or other extenuating circumstances and must be approved by the Site Director.

18 Notification of Terminations

18.1 All letters of terminations shall be issued by the Site Director at the request of the Regional Advisory Committee after the review and final approval of the termination. Final approval by the Advisory Committee must be approved or can be overridden by the National CEO. The termination notice to the apprentice will contain the reason(s) for the termination and the appeal procedures in case the apprentice should desire to appeal the Regional Advisory Committees/National CEOs actions.

18.2 A copy of all terminations will be sent to the current local Site Director and apprentice. Employers are also to be notified of an apprentice's termination from the program.

18.3   This apprenticeship program may be canceled upon voluntary action of Infinite 8 Institute, by requesting cancellation of the registration. This program may also be deregistered for reasonable cause by the proper regulatory body, or other relevant State Agencies, if certified by the Director, no active on-the-job learning of apprentices has occurred within one (1) year from the date of the last such training.

If, at the request of Infinite 8 Institute and/or International Drone Federation, the program is canceled or the program is deregistered for reasonable cause by the proper Registration Agency, Infinite 8 Institute shall within fifteen (15) days from the date of acknowledgement of action, notify all apprentices of the deregistration, the effective date and that the apprentices are no longer registered.

18.4   Infinite 8 Institute may submit any proposed modifications or amendments to these apprenticeship standards to the applicable Registration Agency for approval. A determination will be made on whether to approve such modifications or changes within 90 days from the date of receipt. If approved, the modification or changes will be recorded and acknowledged within 90 days of approval as an amendment to the program. Modification or changes to these standards shall not alter conditions of apprenticeship already in effect, without the consent of all parties involved.

18.5   Infinite 8 Institute shall notify the Registration Agency within two (2) weeks of written notice of any proposed adverse action including detailed specification of the cause with written notice indicating the opportunity for corrective action during the two-week period.

19 Appeal Procedures

19.1 Probationary Period Apprentices do not have appeal rights regarding Termination (See National Standards, Article IX, Probationary Period).

19.2 Except for Referral Rules related discipline, an Apprentice may appeal any imposed suspension or termination only in the following manner:

19.2.1 By written appeal to the Regional Advisory Committee mailed by registered or certified mail to the Regional Coordinator within thirty (30) days of the date of mailing of the notice of the discipline to the Apprentice. Failure to appeal in this manner shall be a waiver of any rights to appeal the discipline imposed.

19.2.2 Within fifteen (15) days of receipt of the Apprentice's written, mailed appeal, the Regional Coordinator shall mail to the Apprentice's last known address, notice of the date, time and place of a hearing before the Regional Apprenticeship Committee. The hearing shall be scheduled to coincide with the next regular area committee meeting. The hearing may be held in-person or via telephone/teleconferencing, and/or Zoom.

19.2.3 At the hearing, the Apprentice will be afforded the opportunity to refute the allegations which form the basis of the discipline appealed. The Apprentice shall

represent him/herself and is responsible for bringing any evidence or witnesses that the Apprentice deems necessary to dispute the discipline.

19.2.4 The Regional Advisory Committee shall mail a written decision to the Apprentice at the last known address within fifteen (15) days of the adjournment of the hearing.

20 US DEPARTMENT OF LABOR POLICY/Affirmative Action

20.1 No apprentice will be allowed to be signed to (2) Apprenticeship Programs simultaneously. I8I National Apprentices must therefore choose either the Commercial Drone Pilot or Commercial Drone Software Developer Apprenticeship.
20.2 Please see attached exhibit entitled, Affirmative Action Plan.

21 Leave of Absence Policy for Apprentices

The I8I National Apprenticeship Program recognizes that apprentices may need to be absent from their training or educational obligations for various reasons. These may include issues related to an apprentice's own medical condition or that of a family member. It is the position of the Program to accommodate this needed time off, assuming adherence to the leave and notification obligations in this Leave of Absence Policy ("Policy").

A request for a leave of absence must be submitted to the Site Director and must be approved by the Regional Advisory Committee. If the Advisory Committee does not meet within 30 days of the initial request, the National CEO may make a binding decision. Where the need for a leave of absence is foreseeable, the apprentice shall provide written notice at least 30 days prior to the start of the leave period. If the need for leave is the result on an emergency or other unexpected circumstance, notification shall be provided to the Site Director and Regional Advisory Committee as soon as practicable. In such circumstances, a verbal notification shortly after the onset of the leave of absence shall suffice. Should an apprentice fail to give the required notice without reasonable excuse, the Program shall be entitled to delay or deny the leave of absence request.

A request for leave shall be assessed by the Regional Advisory Committee on a case-by-case basis according to the needs of the apprentice and the impact of the apprentice's absence on the Program. In the determination of the respective Committee, the limitations on leave and notification requirements may be subject to adjustment on a case-by-case basis where necessary to reasonably accommodate an apprentice.

21.1 Basic Leave of Absence

In the interest of protecting the health and well-being of apprentices and their family members, apprentices who have completed their probationary period may be entitled to a leave of absence, not to exceed 12 weeks during any 12-consecutive month. Leave may be taken for any one, or for a combination, of the following reasons:

- For the birth of an apprentice's child, or to care for the newborn child;

- For placement with the apprentice of a child for adoption of foster care, and to care for a newly-placed child;

- To care for the apprentice's spouse, child under 18, or parent (but not in-law) with a serious health condition

- For the apprentice's own serious health condition which makes him or her unable to perform one or more of the essential functions of the on-the-job training or educational requirements.

- For any "qualifying exigency" (including attending military events, arranging for alternative childcare, addressing financial and legal arrangements, and attending counseling sessions) resulting from the fact that the apprentice's spouse, son, or parent is a military member on active duty or is on call-to-active duty status as a member of the military reserves.

For purposes of this policy, a "serious health condition" shall generally mean an absence of more than three consecutive days caused by a condition requiring treatment and which renders the individual unable to do his normal activities, or any period of incapacity for a chronic condition or one requiring inpatient care.

Where requested by the Regional Coordinator or Site Director, an apprentice seeking leave for a serious medical condition must provide, within fifteen (15) days of the request, a certification to the Regional Coordinator on behalf of the Regional Advisory Committee, supporting the need for such leave. The certification must be executed by the apprentice's health care provider or, if applicable, the health care provider of the apprentice's spouse, child, or parent. All costs for obtaining certification shall be the exclusive responsibility of the apprentice. An apprentice requesting a leave beyond one month may be asked to submit an additional certification for each thirty (30) days of absence if, in the discretion of the Regional Coordinator, it is necessary to establish grounds for continued leave from the Program.

Once it has been determined that the requested leave is for an approved reason, the Site Director at the direction of the Regional Commission, or the National CEO, will submit written notice to the apprentice of the approval and the procedures for reinstatement into the Program. If leave is not granted, the Site Director at the direction of the Regional Advisory Committee/National CEO shall provide written notice of the reasons why.

Upon a return to work at the end of a leave taken because of a serious health condition, an apprentice must provide medical certification to the Site Director and Regional Coordinator confirming that he or she is able to return to work. The fitness-for-duty certification must specifically address the health condition upon which the leave was initially granted. The employee is responsible for any costs involved in obtaining a fitness-for-duty certification. The Program shall not require any second or third opinions for a fitness-for-duty certification.

21.2 Extended Leave of Absence Policy

Where the length of an apprentice's anticipated leave of absence will exceed that provided by the FMLA, or where an apprentice has already exhausted FMLA leave, he or she may be eligible to request an additional period of job-protected medical leave as a reasonable accommodation under the Americans with Disabilities Act ("ADA"). Where requested by the Regional Coordinator, the apprentice must submit documentation from a health care provider sufficient to establish that the apprentice is disabled, the functional limitations of that disability, and that he or she is qualified for a reasonable accommodation under the ADA.

If an absence is requested as a reasonable accommodation, the apprentice must provide at least an approximation of the date anticipated for the apprentice's return to the Program. A request for a leave of absence without a reasonably-approximate return date may be denied. A request for indefinite leave with no end date may not be a reasonable accommodation, as it could cause undue hardship to the Program and prevent the apprentice from performing the essential functions of the Program, including on-the-job training and classroom education.

The request must be provided to the Site Director and the Regional Coordinator and shall be assessed by the respective Regional Advisory Committee and/or to determine whether the grounds for leave are appropriate. Among the grounds for requesting leave from the Program as a reasonable accommodation under the ADA are the following:

- Obtaining medical treatment or therapy

- Recuperation from medical treatment, therapy, or surgery

- Obtaining repairs on an assistive device

Adjustments to this Policy may be made if, in the exclusive discretion of the National Advisory Committee, they are necessary to provide a reasonable accommodation to a disabled apprentice. A request for leave may be denied if, after discussions between the Site Director, Regional Advisory Committee and/or National CEO and the apprentice, it is determined that another effective accommodation can be provided that eliminates the need for leave.

An apprentice who wishes to continue a leave of absence for a period beyond that made in his or her initial estimate shall communicate, in writing, the reasons for continuing such leave of absence as a reasonable accommodation.

21.3 Military Leave of Absence

In compliance with the Uninformed Services Employment and Reemployment Rights Act of 1994, a leave of absence for military service shall be granted for the voluntary or involuntary performance of active duty, training, military fitness examinations, funeral honors duty, and other military obligations associated with service in the uniformed services. In most cases, an apprentice is entitled to a leave of absence not to exceed five (5) years.

The apprentice shall submit reasonable notice to the Regional Coordinator detailing the military service, with start and return dates where possible. A military service order, or equivalent, must be provided. Failure to provide reasonable notice may affect your rights to return to the Program.

An apprentice returning from military service shall be reinstated to the Program at a level reflecting the experience and training the apprentice received before the onset of military service.

22 Discrimination and Harassment Policy

22.1 PURPOSE

This Policy has been adopted by the National Advisory Committee and each of the Regional Advisory Committees to:

define their policy regarding discrimination or harassment directed at, or engaged in by, any of their apprentices, to prohibit such discrimination or harassment in all its forms, and to provide a method of redress for apprentices who believe that they have been victimized by or witnessed such discrimination or harassment while apprenticing in the I8I National Apprenticeship Program and/or any of the I8I National Apprenticeship Programs.

22.2 COVERAGE

This Policy applies to all apprentices. For the purposes of this Policy, apprentices shall include all pre-apprentices, apprentices, trainees, interns and helpers in I8I, I8I, and any of the I8I National Apprenticeship Programs.

22.3 DISCRIMINATION DEFINED

Discrimination is adverse treatment of any individual based on race, color, religion, national origin, sex (including pregnancy and gender identity), sexual orientation, age, genetic information, or disability with regard to: (1) Recruitment, outreach, and selection procedures;

(2) Hiring and/or placement, upgrading, periodic advancement, promotion, demotion, transfer, layoff, termination, right of return from layoff, and rehiring; (3) Rotation among work processes; (4) Imposition of penalties or other disciplinary action; (5) Rates of pay or any other form of compensation and changes in compensation; (6) Conditions of work; (7) Hours of work and hours of training provided; (8) Job assignments; (9) Leaves of absence, sick leave, or any other leave; and (10) Any other benefit, term, condition, or privilege associated with apprenticeship.

Discrimination may involve, but is not limited to, one of the following: (1) Making decisions based on stereotypes or assumptions about the abilities, traits, or performance of individuals of a certain race, color, religion, national origin, sex (including pregnancy and gender identity), sexual orientation, age, or individuals with disabilities, or based on myths or assumptions about an individual's genetic information, or (2) Denying opportunities to a person because of marriage to, or association with, an individual of a particular race, color, religion, national
origin, sex (including pregnancy and gender identity), sexual orientation, age, genetic information or an individual with a disability.

22.4 HARASSMENT DEFINED

Harassment is a form of discrimination that violates Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act of 1967, (ADEA), the Americans with Disabilities Act of 1990, (ADA), the Pregnancy Discrimination Act, (PDA), the Genetic Information Nondiscrimination Act, (GINA) and the regulations promulgated thereunder.

Harassment is unwelcome conduct that is based on race, color, religion, national origin, sex (including pregnancy and gender identity), sexual orientation, age, genetic information, or disability. Harassment becomes unlawful where: (1) enduring the offensive conduct becomes a condition of continued participation in the apprenticeship program, or (2) the conduct is severe or pervasive enough to create a work environment that a reasonable person would consider intimidating, hostile, or abusive. Anti☐ discrimination laws also prohibit harassment against individuals in retaliation for filing a discrimination or harassment charge, testifying, or participating in any way in an investigation, proceeding, or lawsuit under these laws; or opposing employment practices that they reasonably believe discriminate against individuals, in violation of these laws.

Petty slights, annoyances, and isolated incidents (unless extremely serious) will not rise to the level of illegality. To be unlawful, the conduct must create a work environment that would be intimidating, hostile, or offensive to reasonable people.

Offensive conduct may include, but is not limited to, offensive jokes, slurs, epithets or name calling, physical assaults or threats, intimidation, ridicule or mockery, insults or put□downs, offensive objects or pictures, and interference with work performance. Harassment can occur in a variety of circumstances, including, but not limited to, the following:

The harasser can be the victim's supervisor, a supervisor in another area, a fellow apprentice, an instructor or teaching assistant, an agent of an employer, a co-worker, or a non-employee.

The victim does not have to be the person harassed but can be anyone affected by the offensive conduct.

Unlawful harassment may occur without economic injury to, or discharge of, the victim.

22.5 PROHIBITION OF DISCRIMINATION AND HARASSMENT

I8I and the I8I National Apprenticeship Programs believe that discrimination and harassment are forms of misconduct that undermine the integrity of the apprenticeship and training relationship, debilitate morale and, therefore, interfere with effective apprenticeship and training. I8I and the I8I National Apprenticeship Programs will not tolerate discrimination or harassment of any kind. I8I and the National I8I Apprenticeship Programs will not tolerate any adverse treatment of its apprentices because they reported instances of discrimination or harassment or provided information relating to an investigation into allegations of discrimination or harassment. It is the policy of I8I and the I8I National Apprenticeship Programs to prevent and promptly correct any instance of discrimination against, or harassment of or by its apprentices.

22.6 COMPLAINT PROCEDURE

Filing a Complaint

I8I and the National I8I Apprenticeship Programs cannot effectively prevent or remedy acts of discrimination or harassment without knowledge of its occurrence. Apprentices who believe they or another apprentice have been subjected to discrimination or harassment should immediately report such conduct through the Complaint Procedure described in Section V of this Policy. I8I and the National I8I Apprenticeship Programs strongly encourage anyone who believes that they suffered or witnessed discrimination or harassment to report such harassment before it becomes severe or pervasive.

Complaints of discrimination or harassment should be submitted in writing to one or more of the individuals identified in Appendix B who are responsible for overseeing I8I and the I8I National Apprenticeship Programs' commitment to equal opportunity in apprenticeship. Such complaints may be hand-delivered to any of these individuals or mailed to their address in an envelope marked "Personal." The Regional Coordinator or Site Director of each respective Area should ensure that any changes to the appointed individuals or contact information in Appendix B are communicated in a timely manner. Individuals who believe they have been subjected to or witnessed discrimination or harassment by I8I staff may also submit their grievance to the National Advisory Board, by submitting their allegations in writing, in an envelope marked "Personal," at the following address: 10040 Regency Cir, Omaha, NE 68114.

All such complaints should include the following information:

1. the identity of the complainant, including the complainant's name, address and telephone number or other means of contacting the complainant;

2. the identity of alleged offender(s);

3. the behavior that the apprentice believes constitutes discrimination or harassment, including the date(s), location(s), and the presence of any witnesses; and

4. any other information the complainant believes to be relevant or important.

In the event the complainant does not know who to contact, he or she may contact the Regional Coordinator or Site Director identified in Appendix B who shall assist the complainant in determining the proper person to contact. Please be aware of grievance procedural deadlines and follow them promptly. The National Advisory Committee responsible for processing grievances shall process such grievance in accordance with the complaint procedures in this section, and in accordance with I8I human resource policies.

In addition to filing a grievance to the National Advisory Committee, apprentices should report discrimination or harassment in connection with their employment with a signatory employer to I8I and/or the I8I National Apprenticeship Program using the complaint procedure provided in Section V of this Policy. It is the policy of I8I and the I8I National Apprenticeship Programs to undertake steps to address harassment or discriminatory actions taken by signatory employers when I8I and the I8I National Apprenticeship Programs have knowledge of such actions. Such steps include entering into written agreements with the employer setting forth reasonable procedures to ensure that employment opportunity is being granted and terminating relationships with employers who fail to remedy acts of discrimination or harassment.

22.7 Investigation of the Complaint

Immediately upon receipt of the complaint of discrimination or harassment, the individual who receives the complaint shall contact and promptly forward a copy of the complaint to the I8I CEO and National Advisory Board Chairman, and if applicable, the Site Director and/or Regional Coordinator and/or the Regional Advisory Committee.

An individual or a committee shall be appointed to conduct a prompt, thorough, and impartial investigation of the complaint and recommend remedial action, if warranted and available under the circumstances. In no event, shall the appointed investigator(s) include the alleged offender(s), nor shall the appointed investigator(s) be related to the alleged offender(s) by blood or by marriage. The investigation will include, but will not necessarily be limited to, interviews with the complainant and/or victim(s), offender(s), and witnesses.

Upon completion of the investigation, the appointed investigator or investigatory committee shall submit its findings and recommended remedial action, if any, to I8I and/or the applicable I8I National Apprenticeship Committee.

22.8 Determinations of Discrimination and/or Harassment and Corrective Action

I8I and/or the I8I National Apprenticeship Committee shall review the investigation's findings and recommendations, and (with the aid of legal counsel, if necessary): (1) make a determination as to whether discrimination or harassment has occurred; and, if so, (2) take any action it believes to be available and appropriate to correct such discrimination or harassment and to prevent its reoccurrence. I8I and/or the National Advisory Apprenticeship Committee shall issue a written determination of its findings, which shall be mailed to the complainant's address.

If I8I and/or the I8I National Advisory Committee determine from the investigation that no discrimination or harassment has occurred, and/or that I8I and/or the I8I National Advisory Committee is not the appropriate entity to remedy the alleged discrimination or harassment, the results of the investigation will be reduced to writing and the complainant shall be so notified. The investigatory file shall be closed, and no notation shall be made in the personnel files of either the complainant or the alleged offender.

Should I8I and/or the I8I National Advisory Committee determine from the investigation that discrimination or harassment has occurred, it shall, if appropriate under the circumstances, take any action it believes to be available and appropriate to correct such discrimination or harassment and to prevent its reoccurrence, including actions that may differ from the investigation's recommendations. The complainant shall be informed of the determination and the remedial actions taken against the offender. Additionally, a notation regarding the discrimination or harassment and the remedial action taken shall be placed in the offender's file.

In the event an apprentice believes he/she has been subject to discrimination or harassment on a job site or in connection with employment by a signatory employer,

he/she shall make his/her employer immediately aware and follow the employer's discrimination and harassment policy.

He/she may also file a grievance with the I8I Regional Advisory Committee. Should I8I or a I8I Regional Advisory Committee determine that a signatory employer has not properly remedied or addressed acts of discrimination or harassment, it shall address such acts with the employer, and if continuing or otherwise unremedied, take steps to remove the employer from participating in the apprenticeship program.

22.9 Appeals

If a complainant or an alleged offender feels that I8I and/or the I8I Regional Advisory Committee's determinations and/or corrective actions are incorrect, inappropriate, or otherwise not satisfactory or sufficient, he or she may appeal such determination and/or action at the next full meeting of the I8I National Advisory Committee and/or Regional Advisory Committee, by filing a written "Appeal" addressed to the I8I National Advisory Committee (10040 Regency Cir, Omaha, NE 68114) and/or Regional Advisory Committee, as appropriate. An "Appeal" must be received within 30 days of the written determination as set forth in Article V(c) of this Policy.

22.10 Confidentiality & Prohibition against Retaliation

All complaints and testimony provided by individuals during the course of an investigation into allegations of discrimination or harassment shall be kept as confidential as possible and shall be held in a file separate from other personnel and apprentice files.

It should be noted, however, that the identity of the complainant is usually revealed to the alleged offender and witnesses during the course of an investigation into alleged discrimination or harassment. Nonetheless, retaliation against any apprentice for bringing a discrimination or harassment complaint or assisting in the investigation of such a complaint is strictly prohibited. Any employee or apprentice who believes that they are a victim of or have knowledge of such retaliation should report such conduct through this Complaint Procedure. Such a complaint shall be investigated and addressed in the same manner as a discrimination or harassment complaint.

22.11 Your Right to Equal Opportunity

It is against the law for a sponsor of an apprenticeship program registered for Federal purposes to discriminate against an apprenticeship applicant or apprentice based on race, color, religion, national origin, sex, sexual orientation, age (40 years or older), genetic information, or disability. The sponsor must ensure equal opportunity with regard to all terms, conditions, and privileges associated with apprenticeship. If you think that you have been subjected to discrimination, you may file a complaint within 300 days from the date of the alleged discrimination or failure to follow the equal

opportunity standards with the U.S. Department of Labor, Office of Apprenticeship or State Apprenticeship Agency:

Alabama: Medical Forum Bldg., 950 22nd Street North, Room 648, Birmingham, AL 35203, Tel: (205) 731□1308, E□Mail: Dixon.Rowland@dol.gov, Attn: Rowland C. Dixon; Arkansas: 700 West Capitol Street, Room 3507, Little Rock, AR 72201□3204, Tel: (501) 324□5415, E□Mail: Price.Lester@dol.gov, Attn: Lester 'Lee' Price; District of Columbia: 4058 Minnesota Avenue, NE, Suite 3900, Washington, DC 20019, Tel: (202) 698□5099, Email: Lewis.Brown@dc.gov, Attn: Lewis Brown; Florida: 325 W. Gaines Street, Room 754, Tallahassee, FL 32399, Tel: (850) 245□ 0454, E□Mail: Richard.Norman@fldoe.org, Attn: Richard "Ted" Norman; Georgia: 61 Forsyth Street SW, Room 6T80, Atlanta, GA 30303, Tel: (404) 302□5897, Attn: William Kraus; Iowa: 210 Walnut Street, Room 715, Des Moines, IA 50309, Tel: (515) 284□4690, Email: Sisson.Greer@dol.gov, Attn: Greer Sisson; Kansas:1000 Southwest Jackson Street, Suite 100, Topeka, KS 66612□1354, Tel: (913) 577□5940, Email: TConey@kansascommerce.com, Attn: Theo Coney; Kentucky: 1047 U.S. Highway 127 South, Suite 4, Frankfort, KY 40601, Tel: (502) 564□3070, E□Mail: Mike.Donta@ky.gov, Attn: Mike Donta; Louisiana: P.O. Box 94094, 1001 N.23rd, Baton Rouge, LA 70802□3338, Tel: (225) 342□7819, E□Mail: KMiller@lwc.la.gov, Attn: Karen Miller; Maryland: 1100 North Eutaw Street, Baltimore, MD 21201, Tel: (410) 767□3969, E□Mail: Christopher.Maclarion@maryland.gov, Attn: Christopher MacLarion; Mississippi: Federal Building, 100 West Capitol Street, Room 771, Jackson, MS 39269, Tel: (601) 965□4346, E□Mail: Westcott.Fred@dol.gov, Attn: Woodrow Middleton; Missouri: Robert A. Young Federal Building, 1222 Spruce Street, Room 9.102E, St. Louis, MO 63103, Tel: (314) 539□2519, E□Mail: Perry.Neil@dol.gov, Attn: Neil Perry; Nebraska: 222 South 15th Street – Suite 405C, Central Park Plaza, South Tower, Omaha, NE 68102□1608, Tel: (402) 221□3281, Email: Cremeens□Risinger.D@dol.gov, Attn: Debra Cremeens□Risinger; North Carolina: 4316 Mail Service Center, Raleigh, NC 27699, Tel: (919) 814□0303, E□Mail: apprenticeshipmail@nccommerce.com, Attn: Kathryn P. Castelloes; Ohio: P.O. Box 1618, Columbus, OH 43216□1618, Tel: (614) 466□9498, E□Mail: MacieA@odjfs.state.oh.us, Attn: Andy Maciejewski; Oklahoma: 215 Dean A McGee Avenue, Suite 346, Oklahoma City, OK 73102, Tel: (405) 231□4338, E□Mail: Walton.Shannan.L@dol.gov, Attn: Shannan L. Walton; South Carolina: 1835 Assembly Street, Room 838, Columbia, SC 29201, Tel: (803) 765□5547, Email: Vaughan.Charles@dol.gov, Attn: Charles Vaughan; Tennessee: Airport Executive Plaza, 1321 Murfreesboro Road, Suite 541, Nashville, TN 37217, Tel: (615) 781□5318, E□Mail: Brown.Nat@dol.gov, Attn: Nathaniel Brown; Texas: 300 East 8th Street, Suite 914, Austin, TX 78701, Tel: (512) 916□5435, E□Mail: Light.Dudley@dol.gov, Attn: James 'Dudley' Light; Virginia: Main Street Centre, 600 East Main Street, Ste 207, Richmond, VA 23219, Tel: (804) 225□4362, E□Mail: Patricia.Morrison@doli.virginia.gov, Attn: Trish Morrison. West Virginia: 405 Capitol Street, Suite 409, Charleston, WV 25301, Tel: (304) 347□ 5794, E□Mail: Milnes.Kenneth@dol.gov, Attn: Kenneth Milnes.You may also be able to file complaints directly with the EEOC, or State fair employment practices agency. If those offices have jurisdiction over the sponsor/employer, their contact information is listed below.

U.S. Equal Employment Opportunity Commission (EEOC), 1□800□669□4000 (toll free) or 1□800□669□6820 (toll□free TTY number for individuals with hearing impairments). EEOC field office information is available at www.eeoc.gov or in most telephone directories in the U.S. Government or Federal Government section. Additional information about EEOC, including information about charge filing, is available at www.eeoc.gov. Alabama: Alabama Department of Human Resources, Office of Equal Employment & Civil Rights, Gordon Persons Building, Suite 2104, 50 North Ripley Street, Montgomery, AL 36130, Tel: (334) 242□1550, Fax: (334) 353□1115, Email Address: oeecr@dhr.alabama.gov, Website: http://dhr.alabama.gov; Arkansas: N/A; Delaware: Delaware Human Relations Division, Carvel Building, 820 N. French Street, Wilmington, DE 19801, Tel: (302) 577□8277, Fax: (302) 577□3996, Email: jobs@state.de.us, Website: http://statehumanrelations.delaware.gov; District of Columbia: District of Columbia, Office of Human Rights, 441 4th Street NW, Suite 570N, Washington DC, 20001, Tel: (202) 727□4559, TTY, 711, Fax: (202) 727□9589, Email: ohr.intake@dc.gov, Website: https://ohr.dc.gov/; Florida: Florida Commission on Human Relations, 4075 Esplanade Way, Suite 110, Tallahassee, FL 32399□7020, Tel: (850) 488□7082, Toll□Free: 1□800□342□8170, The Florida Relay Service Voice (statewide): 711, TDD ASCII: (800) 955□1339, TDD Baudot: (800) 955 – 8771, Fax: (850) 487□1007, E□Mail: fchrinfo@fchr.myflorida.com, Web Site: http://fchr.state.fl.us; Georgia: Georgia Commission on Equal Opportunity, 7 Martin Luther King, Jr. Drive, S.E., 3rd Floor□Suite 351, Atlanta, GA 30334, Tel: (404) 651□6458, 1□800□473□6736, Fax: (404) 656□4399, Email: rbrown@gceo.state.ga.us, Website: http://gceo.state.ga.us; Iowa: Iowa Civil Rights Commission, Grimes State Office Building, 400 East 14th Street, Des Moines, IA 50319□0201, Tel: (515) 281□4121, (800) 457□ 4416, Fax: (515) 242□5840, Website: https://icrc.iowa.gov; Kansas: Kansas Human Rights Commission, Landon State Office Building, 900 SW Jackson Street, Suite 568 South, Topeka, KS 66612□1258, Tel: (785) 296□3206, TDD: (785) 296□0245, Fax: (785) 296□0589, Website: http://www.khrc.net; Kentucky: Kentucky Commission on Human Rights, Louisville: 332 W. Broadway, Suite 1400, Louisville, KY 40202, Tel: (502) 595□4024, Toll□ free: (800) 292□5566, Fax: (502) 595□4801; Northern Kentucky: 20 West Pike St., Suite 108, Covington, KY 41011□242, Tel: (859) 292□2935, Fax: (859) 292□2938; Email: kchr.mail@ky.gov, Website: www.kchr.ky.gov; Louisiana: Louisiana Commission on Human Rights, P.O. Box 94094, Baton Rouge, LA 70804□9094, Tel: ?????(225) 342□6969, Fax: (225) 342□2063, Website: http://gov.louisiana.gov/page/lchr; Maryland: Maryland Human Rights Commission, Attn: Intake, William Donald Schaefer Tower, 6 Saint Paul Street, 9th Floor, Baltimore, MD 21202□1631, Tel: (410) 767□8600, Toll□free number: 1□800□637□6247 (Para español, marque el 2), Maryland Relay: 711, Email: mccr@maryland.gov, Website: http://mccr.maryland.gov/; Mississippi: N/A; Missouri: Missouri Commission Human Rights, 3315 W. Truman Blvd., Rm 212, P.O. Box 1129, Jefferson City, MO 65102□1129, Tel: (573) 751□3325, Toll□Free Complaint Hotline: 1□877□781□4236, Relay Missouri: 711, TDD: 1□800□735□2966, Fax: (573) 751□2905, Email: mchr@labor.mo.gov, Website: http://labor.mo.gov/mohumanrights; Nebraska: Nebraska Equal Opportunity Commission, Lincoln (Main Office): Nebraska State Office Building, 301 Centennial Mall South, 5th Floor, PO Box 94934, Lincoln, NE 68509□4934, Tel: (402) 471□2024, Toll Free: (800) 642□6112, Fax: (402) 471□4059;

Omaha: State Office Building, 1313 Farnam-on-the-Mall, Suite 318, Omaha, NE 68102-1836, Tel: (402) 595-2028, Toll Free: (800) 382-7820, Fax: (402) 595-1205; Scottsbluff: Panhandle State Office Complex, 505A Broadway, Suite 600, Scottsbluff, NE 69361-3515, Tel: (308) 632-1340, Toll Free: (800) 830-8633, Fax: (308) 632-1341; Website: www.nol.org/home/NEOC; North Carolina: N/A; Ohio: Ohio Civil Rights Commission, Central Office: Rhodes State Office Tower, 30 East Broad Street, 5th Floor, Columbus, OH 43215, Tel: (614) 466-2785, Fax: (614) 644-8776; Cincinnati-Satellite Office: Mid-Pointe Towers, 7162 Reading Road, Suite 1005, Cincinnati, OH 45237, Tel: (513) 351-2541, TTY: (937) 285-6500, Fax: (513) 351-2616; Columbus Regional Office: Rhodes State Office Tower, 30 East Broad Street, 4th Floor, Columbus, OH 43215, Tel: (614) 466-2785, TTY: (614) 752-2391, Fax: (614) 466-6250; Dayton Regional Office: 3055 Kettering Blvd, Suite 111, Dayton, OH 45439, Tel: (937) 285-6500, TTY: (937) 285-6500, Fax: (937) 285- 6606; Website: http://crc.ohio.gov/; South Carolina: South Carolina Human Affairs Commission, 1026 Sumter Street, Suite 101, Columbia, SC 29201, Tel: (803) 737-7800, Toll Free: 1-800-521-0725, Fax: (803) 737-7835, Email: information@schac.state.sc.us, Website: http://www.schac.sc.gov; Tennessee: Tennessee Human Rights Commission, 312 Rosa L Parks Ave, 23rd floor Nashville, TN 37243, Tel: (615) 741-5825, Toll Free: (800) 251-3589, Fax: (615) 253-1886 | 615-532-2197, Email: ask.thrc@tn.gov, Website: https://www.tn.gov/humanrights; Texas: Texas Workforce Commission Civil Rights Division, 101 East 15th Street, Guadalupe CRD, Austin, TX 78778-0001, Tel: (888) 452-4778, Fax: (512) 482-8465, Email: EEOIntake@twc.state.tx.us, Website: http://www.twc.state.tx.us; Virginia: Office of the Attorney General – Division of Human Rights, 202 North Ninth Street, Richmond, VA 23219, Tel: (804) 225-2292, Fax: (804) 225-3294, Email: human_rights@oag.state.va.us, Website: http://www.oag.state.va.us/programs-initiatives/human-rights; West Virginia: West Virginia Human
Rights Commission, 1321 Plaza East Room 108A, Charleston, WV 25301-1400, Tel: (304) 558-2616, Toll Free: (888) 676-5546, Fax: (304) 558-0085, Website: http://www.hrc.wv.gov.

Each complaint filed must be made in writing and include the following information:

1. Complainant's name, address and telephone number, or other means for contacting the complainant;

2. The identity of the respondent (i.e. the name, address, and telephone number of the individual or entity that the complainant alleges is responsible for the discrimination);

3. A short description of the events that the complainant believes were discriminatory, including but not limited to when the events took place, what occurred, and why the complainant believes the actions were discriminatory (for example, because of his/her race, color, religion, sex, sexual orientation, national origin, age (40 or older), genetic information, or disability);

4. The complainant's signature or the signature of the complainant's authorized representative.

5. Also note, that students may also contact the Nebraska Department of Labor, Office of Apprenticeship.

23 Policy on Impaired Apprentices at Training Centers

23.1 It is the policy of the I8I National Apprenticeship Program to protect the safety of individuals taking part in instruction at training sites by safely and efficiently removing an individual who is suspected of being under the influence of alcohol and/or drugs from the training center.

23.2 By signing the apprenticeship agreement, an apprentice agrees to be bound by the terms of this policy and shall hold harmless the I8I and the National Advisory Committee from any liability which may arise from adherence to this policy.

23.3 An apprentice suspected of being under the influence of drugs and/or alcohol while attending the training center shall be ordered immediately removed from the facility.

23.4 A minimum of two (2) witnesses shall provide written statements regarding their observations of the individual's alleged intoxication, including details of the apprentice's behavior, appearance, and/or odor. In cases where there are at least two individuals employed by the training site, witness statements shall be taken from those individuals. In locations where there is only one individual employed on site, a member of the apprenticeship class may serve as a witness in order to meet the requirement of two (2) witness statements.

23.5 A minimum of two (2) witnesses shall monitor the apprentice at all times prior to the ultimate departure or removal of the apprentice from the grounds of the training center. In cases where there are at least two individuals employed by the training site at the facility, those individuals shall be obligated to monitor the apprentice. In locations where there is only one individual employed by the training site at the facility, a member of the apprenticeship class may be used to monitor the individual to meet this requirement.

23.6 The Instructor of the training site shall notify the applicable Regional Coordinator of the events occurring at the facility and shall submit within ten (10) days a written report, including witness statements, to the Regional Coordinator for review and potential disciplinary action.

23.7 The Instructor of the training site shall make all reasonable efforts to remove the apprentice from the grounds of the facility. The Instructor may, within his or her discretion, reasonably assist to arrange transportation for the apprentice by taking any of the following actions:

23.8 The Instructor may first make attempts to contact the emergency contact indicated on the apprentice's confirmation of receipt and acknowledgment form or another responsible party to transport the apprentice from the facility.

23.9 The Instructor may arrange for a taxicab, Uber, Lyft, or other transportation to drive the apprentice to his residence or to a medical facility, at the expense of the apprentice. In no event, shall funds of the I8I, any subordinate body thereof, or a training site be used for the transportation of an impaired apprentice.

23.10 Should the distance between the training center and the apprentice's residence be determined too far so as to make transportation efforts unreasonable, the Instructor is authorized to contact local authorities to remove the apprentice from the facility.

24 I8I & TDS Accident Policy

24.1 Whenever an apprentice or journeyman is injured in or during classroom/shop training, the instructor shall see that the apprentice or journeyman receives immediate and appropriate medical treatment. In the event the injury should require the attention of a medical professional; the instructor will be provided a list of medical providers in the area that the training is being conducted.

24.2 Payment of any medical treatment for an injury to an apprentice or journeyman is first and foremost the responsibility of the injured person. However, I8I, and the local training center both carry insurance policies which provides supplemental medical coverage on all participants and journeymen participating in approved training. These policies will coordinate with or other coverage for payment of medical treatment. In some circumstances these policies may pay some. or even all, of the cost of treatment to the injured apprentice or journeyman. Lack of coverage is not an excuse for not providing appropriate medical attention to an injured apprentice or journeyman.

24.3 Whenever any injury occurs, the instructor shall:

24.3.1 See that the injured apprentice or journeyman receives immediate and appropriate medical attention.

24.3.2 Contact the I8I National Offices at info@infinite8institute.com concerning the incident as soon as possible.

24.3.3 Fill out a written accident report as soon as possible (provided by I8I and I8I Site Director).

24.3.4 Fully cooperate with I8I, the local training Site, and all insurers in reporting and investigating the matter.

Note that classes may be offered in the morning, afternoon, or evening, depending upon the availability of Pre-Apprentices/Apprentices and/or staffing at each location.

The purpose of the Pre-apprenticeship program is to provide participants and members with the opportunity to explore high-demand, high-wage industries, in a short-format, while also providing an entry-point into the I8I National Apprenticeship Programs. The objective of the program is either entrepreneurship, gainful employment, or entrance into a I8I National Apprenticeship Program.

Pre-Apprenticeship Tracks
- Commercial Drone Software Development
- Commercial Drone Piloting
- Artificial Intelligence
- Self-Driving Cars/Autonomous Vehicles

The following is a listing of courses required for all I8I National Pre-Apprentices:

- PA Module 1: Remote Pilot Certification and Flight Training - This course involves the study of small unmanned aerial systems (sUAS) for commercial pilot knowledge exam preparation and practical flight experiential training to create a new pipeline of high-quality drone pilots across America. This course, rather than being designed to merely introduce regulatory knowledge, the course will also involve a blended-learning model, involving the practical application of knowledge in the form of flight experience. The course will prepare students to sit for the FAA Knowledge Examination for a sUAS Commercial Pilot's license. The course introduces students to the field of unmanned aviation, opening the door for careers in the field of an explosive and emerging technology.
  - Week 1 - Course Introduction, Airspace, Operations, and Flight Restrictions
  - Week 2 - Weather Effects, Load Performance, Emergency Procedures, UAV Config
  - Week 3 - Crew Resource Management and Radio Communication Procedures
  - Week 4 - Determining Performance of sUAS and Effects of Drugs and Alcohol
  - Week 5 - Aeronautical Decision Making, and Airport Operations
  - Week 6 - Maintenance and Preflight Inspection Procedures, Final Examination

  Course Cost: $2,500

- PA Module 2: Intermediate Commercial Drone Technology Applied Basics - This advanced level course involves the study of small unmanned aerial systems (sUAS), specifically utilizing the DJI Mavic Pro for commercial pilot professional and entrepreneurial practice and implementation of the technology. Rather than aiming to certify participants through the acquisition of FAA Remote Pilot exam preparatory knowledge and the introduction of beginner flight techniques, this course will involve a more in depth and hands on mission-based and blended

learning model, involving the practical application of what is learned in class in the field outdoors. Course participants will be expected to have already taken the Level 1 CDPP Program, and/or passed the FAA Remote Pilot Knowledge exam prior to the start of the Level 201 CDPP Course. The course will more deeply introduces student to the field of unmanned aviation, opening the door for career professionally or entrepreneurially in the new field of an explosive and emerging technology.

- ○ Week 1 - Introduction to the Course, Career Assessments, Beginner Flight
- ○ Week 2 - Outdoor/Indoor Lab, Mavic Parts & Accessories, and Open Platforms
- ○ Week 3 - Outdoor/Indoor Lab, Maintenance, Intro to Electronic Signatures
- ○ Week 4 - Outdoor/Indoor Lab, Safety and Failsafe Features
- ○ Week 5 - Aerial Videography, Video Editing, Social Media, Industrial Applications
- ○ Week 6 - Becoming a Commercial UAS, Flight Modes, Final Presentation

Course Cost: $2,500

- PA Module 3: Intro to IoT & Embedded Systems - This is an introductory course that focuses on the future of civilization, where many more human artifacts will be seamlessly connected a cloud of services and streams of data interacting. These many interconnected devices will comprise the Internet of Things, or IoT. Furthermore, in order for these devices to become smart and independent, they must rely on embedded computing hardware that is lightweight, and yet powerful enough to run complex computational tasks with near zero latency. In anticipation of this future, we unveil our Intro to IoT & Embedded Systems Course, to fuel a society of smart homes and cities as well as intelligent factories ripe with automation. Students in this course will be introduced to the Raspberry Pi 3, in addition to the Raspbian System. Furthermore, students also will be introduced to beginner Linux coding, utilizing the Kano Operating System on the Raspberry Pi. Finally, students will be introduced to IoT, utilizing the Mozilla Firefox IoT Gateway, the Z-wave IoT communications standard, as well as Smart Light bulbs to gain a sense of the IoT ecosystem. This course is an introduction for the Commercial Drone Software Developer Track, and the beginning to a range of professional possibilities.

- ○ Week 1 - Introductions, Teams, Non-cognitive Development, Raspberry Pi, Kano
- ○ Week 2 - Proposal Conference, SBIR, Block Diagram, Kano, Linux Commands
- ○ Week 3 - Lean Canvas, Kano/Linux Commands
- ○ Week 4 - Lean Interviews, Pitch Deck: 101, Raspian, Github, Industrial IoT, Mozilla
- ○ Week 5 - White Paper 101, Bibliographies 101, Mozilla IoT Gateway, Z-wave
- ○ Week 6 - Project Checkoff Checklist to Staff, IoT Careers/Demo Day

Course Cost: $3,300

- PA Module 4: Intro to Commercial Drone Software and Simulation - This is an introductory course focusing on the prototyping of software with use on the

network and systems of Unreal Graphics Engine, Dell Alienware Developer Consoles, and the Microsoft Aerial Informatics and Robotics Platform. The purpose of the course is to provide real-life experience for software engineers to create valid use cases for drone technology, and rapidly develop the prototype for demonstration to the entrepreneurial and investor community to demonstrate the viable number of potential applications with the technology, as well as creating a local human capital pool of drone software engineers. The course will dive head first into the development of drone software applications as well as commercial viability, opening the door for careers professionally or entrepreneurially in the new field of an explosive and emerging technology.

- Week 1 - Introductions, Teams, Consoles, Abstract, Linux, and Unreal Engine
- Week 2 - Block Diagram, Funding Opportunities, Linux, Microsoft AirSim
- Week 3 - Computer Vision API's, Linux, Microsoft AirSim
- Week 4 - Lean Business Model Canvass, Interviews, Mock Demo, AirSim Build
- Week 5 - Product Demo Prep, White Paper Draft, Lean Development, Jeopardy
- Week 6 - Demo Conference, White Paper Second Draft, Hackathon, Demo-Day

Course Cost: $3,300

- PA Module 5: Engineering Unmanned Data Capturing Platforms - This is an advanced level course focused on the use of commercial drone technology as a platform for data capturing and as a portal for information technology transfer and dissemination, with the use of the Pixhaw Flight Controller, and the QGround Control Flight System. Students will also utilize ROS, the Robotic Operating System programming language. Furthermore, students will learn how Drones are an integrated part of the Internet of Things (IoT), and thus students will gain the ability to design the smart cities of the future. Additionally, students will learn about the ports, hubs, and wired connection to connect and integrate various data capturing and information technologies to streamline commercial and industrial applications. The purpose of the course is to expose students to the makeup and potential of drone-based platforms as future data hubs, information matrixes, and communication vehicles, for the purpose of creating more dynamic data streams and information processing capabilities. The course is also intended to create a local human capital pool of drone pilots and/or developers with engineering competency and the capability and skill sets to design, engineer, and maintain autonomous systems of the future.
  - Week 1 - Introduction to ROS1, Project Teams, Design Thinking, Blueprint, ROS2
  - Week 2 - Conference, Vision Position, Obstacles Sensing, ROS3
  - Week 3 - Image/Data Input, 3D Sensing, Continue Build, White Paper, Prototyping
  - Week 4 - Lean Business Model, Acceleration Module, Arm, ROS Jeopardy, Amixer
  - Week 5 - Product Demo Prep, Take-off and Land Demo
  - Week 6 - Demo Day Conference/ White Paper/Take-off Land Demo Pt. 2/D-Day

Course Cost: $3,300

- PA Module 6: Introduction to Artificial Intelligence - This introductory course involves the study of Artificial Intelligence (AI) and small unmanned aerial systems (sUAS), specifically utilizing the NVIDIA Jetson, which is specially dedicated for research and development, as well as commercial and industrial use cases. Rather than purely lecturing students on the applications and background of AI, this course will involve a more in hands-on, applied, and project-based learning approach, involving the practical application of what is learned in class for purely commercial applications. The course will more deeply introduce students to the field of machine learning, artificial intelligence, and advanced commercial drone technology, opening the door for career professionally or entrepreneurially in the new field of an explosive and emerging technology.
  - Week 1 - Introduction, Jetson, CAFFE/DIGITS workflow, Abstract, System Setup
  - Week 2 - Proposal Conference, Build from Source on Host Computer, Block Diagram
  - Week 3 - Classifying Images with Imagenet, Project Design, Live Camera Demo
  - Week 4 - Final White Paper Conference, Custom Models, Lean, Interviews
  - Week 5 - Mock Demo, ZED, White Paper Draft, Career Development Day
  - Week 6 - Demo Day Conference, Final Image Recognition, D-Day

Course Cost: $3,300

- PA Module 7: Introduction to Autonomous Vehicles - This introductory course involves the study of Land-based Autonomous Vehicles (AVs), which include self-driving cars and land-based rovers. Students specifically will utilize practical tools optimized for commercialization, such as the Raspberry Pi. In particular, students will build the Raspberry Pi Car, while also learning Machine Learning languages, such as beginner and intermediate concepts in the scientific programming language Python, which is necessary for the programming of autonomous systems. The PiCar-V is an open source robot based on the Raspberry Pi, which can also be used for advanced robotic systems with flight controllers and ground stations, with systems such as Ardupilot. Students will gain the ability to access the vehicle remotely over servers, either via web browsers or ground-station computers. Students will be able to control the camera's direction, view images in real-time, and control the system. Students will also learn about QT Creator, which is a cross-platform application framework and widget toolkit for creating classic and embedded graphical user interfaces.
  - Week 1 - Intro, Project Teams, Industry Overview, Python Intro, Reverse Lab
  - Week 2 - Project Abstract, Raspberry Pi Car Build, Variables, Expressions
  - Week 3 - Block Diagram, Funding, Pi-Car Build, Designing Python Programs

- o Week 4 - Lean Canvass, Making Choices in Python, Finalize Software Installation
- o Week 5 - Lean Model Interviews, Finalize Build
- o Week 6 - Product Demo, Demo Day Preparation and Implementation

Course Cost: $3,300

- PA Module 8: Introduction to Robotic Environments - This introductory course will develop the student's ability to manipulate virtual realities, simulated realities, architectural rendering, and 3-dimensional designs. Students specifically will work with Unreal Engine, Microsoft Visual Studio's 2015, HTC Vive Headset with Wireless Control, NVIDIA's VR Funhouse, and VR Software Developer Kit, to develop the simulated worlds. Students will also utilize 1-month of research and technical design to develop a working simulated or virtual environment as a final capstone project. Students who master these technologies, will have plenty of workforce opportunities in the fields of artificial intelligence, product design, architecture, engineering, gaming, construction, and interior design.
  - o Week 1 - Introductions, Unreal Engine Setup, New Levels, Actor Edits, Build
  - o Week 2 - Project Abstract Due, Lean Prototyping, On Your Own, Class, Assets
  - o Week 3 - Block Diagram, Funding, Custom Layout, Key Bindings, Project Settings, Property Matrix, Tools, Mesh Preview, Source
  - o Week 4 - Lean Canvass, Details Panel, Editor Testing, Main Menu Bar, Level Editor Modes, Performance Tools, and Quicksets
  - o Week 5 - Project Design, World Outliner, Level Editor, Toolbar, Editor Viewports, Assets, World Settings
  - o Week 6 - Demo Day Pre-conference, Final Draft of White Paper, D-Day

Course Cost: $3,300

The following information is provided regarding course requirements for each track of the Pre-Apprenticeship Program.

Commercial Drone Pilot Track - The Commercial Drone Pilot track introduces individuals to the art of controlling, electrically and mechanically engineering, and designing aquatic, ground-based, and aerial systems. The course requirements are as follows:

- PA Module 1: Remote Pilot Certification and Flight Training
- PA Module 2: Intermediate Commercial Drone Technology Applied Basics
- PA Module 5: Engineering Unmanned Data Capturing Platforms

Commercial Drone Software Development Track - The Commercial Drone Software Developer introduces the design and implementation of software and artificially intelligent systems, on embedded systems and accelerated computing hardware for deployment on aquatic, ground-based, and aerial systems. The course requirements are as follows:

- PA Module 3: Intro to IoT & Embedded Systems

- PA Module 4: Intro to Commercial Drone Software and Simulation
- PA Module 5: Engineering Unmanned Data Capturing Platforms
- PA Module 8: Introduction to Robotic Environments

Artificial Intelligence Track - The Artificial Intelligence track introduces individual to the design, manipulation, integration, implementation, and deployment of artificially intelligent systems on aquatic, ground-based, and aerial systems. The course requirements are as follows:

- PA Module 3: Intro to IoT & Embedded Systems
- PA Module 4: Intro to Commercial Drone Software and Simulation
- PA Module 6: Introduction to Artificial Intelligence

Autonomous Vehicles Track - The Autonomous Vehicle track introduces individuals to the technology behind autonomous vehicles, such as the Python computer language, embedded supercomputing, and the creation of simulated environments necessary to safely develop and deploy autonomous ground vehicles. The course requirements are as follows:

- PA Module 3: Intro to IoT & Embedded Systems
- PA Module 5: Engineering Unmanned Data Capturing Platform
- PA Module 7: Introduction to Autonomous Vehicles
- PA Module 8: Introduction to Robotic Environments

The following is a listing of courses required for all I8I Commercial Drone Pilot Apprentices:

The purpose of the I8I Commercial Drone Pilot Apprenticeship is to give members and participants the opportunity to go straight into employment, in the cutting-edge field of commercial drone technology. The goals and objectives of the program are entrepreneurship, and/or sustainable, and gainful employment, in an IT/STEM-related field.

Initial Aircraft Training

- CDP Module 1: Basic Indoctrination (30 hours) 101 equivalent - Students will receive in-class course guidance, test preparation and technical assistance in preparation for the FAA Remote Pilot Examination. Students will also learn videography, video editing, photography, and photo editing, as well as gaining in-door flight experience. Students will take weekly quizzes, a final exam, and must pass the FAA exam within the first 3-months of beginning the apprenticeship.
    - o Week 1 - Course introduction, Airspace, Operations, and Flight Restrictions.
    - o Week 2 - Weather Effects and Load Performance, Emergency Procedures, UAV Configuration Management.
    - o Week 3 - Crew Resource Management and Radio Communication Procedures.

- Week 4 - Determining Performance of Small Unmanned Aircraft, Physiological Effects of Drugs and Alcohol, Aeronautical Decision-Making, and Airport Operations
- Week 5 - Maintenance, Preflight Inspection Procedures, and Final Exam.

- CDP Module 2: Aircraft Ground – 201 equivalents (18 hours) - Students will work on utilizing the DJI Mavic Pro for Aerial Photography, 3D Mapping, Virtual Reality Photography and Videography. Students will also learn about various automated flight modes, camera controls, live-streaming, an operational safety in dynamic environment.
  - Week 1 - Aerial Video/Photography and Virtual Reality Video/Photography
  - Week 2 - 3D Mapping
  - Week 3 - Post production (Dropbox, Linux/Windows Editors)

- CDP Module 3: General Emergency – Emergency Search and Rescue (4 hours)
  - Week 1 - Students will study best-practices for conducting a drone rescue for a missing person in a forested or remote region. Students are to utilize the terrain they are naturally akin to in their local geographic region. Students will form teams, and they will research best-practices regarding searching for and/or retrieving missing persons.
    - https://www.cs.ox.ac.uk/files/3198/submission_waharte.pdf
    - https://www.fs.fed.us/im/directives/dughtml/fsm5000.html
    - https://www.fs.fed.us/science-technology/fire/unmanned-aircraft-systems/responsible-use
    - https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd523225.pdf

- CDP Module 4: Special Segments [BIM and Pix4D] (7 hours)
  - Week 1 - Students will explore the utilization and integration of BIM Construction Management Software and Pix4D 3D-mapping and data management software for use in industrial applications. Students will specifically learn about input, processing, the raycloud editor, volume manager, mosaic editor, index calculator, output results, and the Pix4D cloud-based platform.
    - https://pix4d.com/wp-content/uploads/2016/09/Pix4Dbim_Feature-List.pdf
    - https://pix4d.com/pix4dbim-cloud-new-tools-construction-management/ [Demo/Trial]
    - https://shop.spheredrones.com.au/blogs/product-guides/guide-to-pix4dbim
    - https://vimeo.com/255901899

- CDP Module 5: Aircraft Simulator [Unreal/DRL] (12 hours) - Students will build the Unreal Engine from source, and will connect the PIxhawk to AirSim, as well as a RC Receiver/Transmitter for Software-in-the-loop control. If these resources are not available, students may also opt to utilize the Drone Racing League simulator inside the STEAM Cloud-based platform, choosing to utilize a real RC controller, or an X-box controller is also compatible.
  - Week 1 - Hover/Land, Circles, Triangles, and Hoops.

- Week 2 - First-person Viewing/Flight Circuits
  - https://www.unrealengine.com/en-US/what-is-unreal-engine-4
  - https://store.steampowered.com/app/641780/The_Drone_Racing_League_Simulator/

- CDP Module 6: Carriage of Hazardous Materials 1.0 [Ebola Outbreak] (3.5 hours)
  - Week 1 - Medical Case Studies: Fly Zipline and Ebola Outbreak in Western Africa.
    - https://www.npr.org/sections/health-shots/2018/03/10/592059175/medical-cargo-could-be-the-gateway-for-routine-drone-deliveries
    - http://www.flyzipline.com/uploads/Zipline%202016%20Launch.pdf
    - http://apps.who.int/iris/bitstream/handle/10665/272509/SITREP-EVD-DRC-20180511.pdf?TSPD_101_R0=74cf69584458b3b2a27a4217f6c74551axD00000000000000026aa8e03fffff000000000000000000000000000005b72f35600237c8c3
    - https://ww.youtube.com/watch?v=WvZZYR_DJ4w

- CDP Module 7: Qualification [Test/Demo] (7.0 hours)
  - Part 1 - Knowledge Exam Questions
  - Part 2 - Ground Training
  - Part 3 - Team Search & Rescue
  - Part 4 - BIM/Pix4D
  - Part 5 - Simulation
  - Part 6 - Hazardous Materials
  - Part 7 - Live Flight Test

Upgrade Training
- CDP Module 8: Aircraft Ground [Recurrent] (2 hours)
  - Week 1 - General, Operating Rules, Remote Pilot Certification with a Small UAS Rating, Waivers, Airspace Classification, Airspace Operational Requirements, Airport Operations, Emergency Procedures, Aeronautical Decision-making, and Maintenance and Inspection Procedures.
  https://www.dronepilotgroundschool.com/recurrent-knowledge-test-part-107/

- CDP Module 9: Special Segments [Energy Efficiency/Infrastructure Assessments w/ Hex] (3 hours)
  - Week 1 - Best practices for energy efficiency and advanced certifications, best-practices for Bridge Inspection, and best-practices for Utility Inspection.
    - https://info.ornl.gov/sites/publications/files/pub73072.pdf
    - https://www.infraredtraining.com/view/?id=40024
    - http://rci-online.org/wp-content/uploads/2004-08-lucier.pdf
    - https://www1.eere.energy.gov/femp/pdfs/OM_6.pdf

- CDP Module 10: Qualifications [Test/Demo] (2 hours)

- Part 1 - Students will sit for a 1.5-hour practice FAA computer generated exam.
- Part 2 - Students will be tested over special segment topics, such as bridge inspection, energy efficiency, and Utility Inspection best-practices.

Recurrent Aircraft Training
- CDP Module 11: Aircraft Ground [Recurrent] (2 hours)
  - Week 1 - Waivers, Airspace Classification, and Airspace Operational Requirements. Students will review for the first half-hour and sit for their recurrent examination, which is a 1.5-hour FAA computer-generated examination.

- CDP Module 12: General Emergency (1 hour) [Tornado]
  - Week 1 - Students will study various case studies and the natural effects and impact of tornadoes. Student will then create a role-play and mock operational plan that they will then execute to assist recovery efforts after a natural disaster, such as a Tornado or Hurricane.
    - https://www.wirelessdesignmag.com/blog/2017/12/drone-swarms-will-help-us-better-detect-tornadoes-heres-how
    - http://www.brookville.k12.oh.us/userfiles/1052/my%20files/summary%20artcile%20l%20tornado-drone.pdf?id=19275
    - http://blogs.discovermagazine.com/drone360/2017/09/11/flying-drone-in-hurricane/#.W3WfjxhOnCI
    - https://abcnews.go.com/Nightline/video/responders-drones-aid-hurricane-rescues-49696932

- CDP Module 13: Special Segments [Sports & Entertainment/TV/Film Production] (5 hours)
  - Week 1 - Students will explore the regulatory parameters around entertainment and the sports industry concerning the commercial use of UAV/s. Students will also gain hand-on experience capturing film production quality footage, as well as capturing sporting and athletic events.
    - http://unesdoc.unesco.org/images/0018/001879/187966e.pdf
    - https://creativeskillset.org/assets/0002/4740/The_Film_Business_Handbook.pdf
    - https://www.youtube.com/watch?v=JWO967SRU9w
    - https://www.athleticbusiness.com/recreation-outdoor-security/understanding-the-latest-faa-drone-regulations.html

- CDP Module 14: Aircraft Flight [Octocopter] (5.5 hours)
  - Week 1 - Students will form teams to complete a single mission, which is to utilize a Yuneec H520 Hexacopter to 3D map a commercial structure of facility using either Pix4D or DroneDeploy.
    - https://pix4d.com/
    - https://www.dronedeploy.com/

- CDP Module 15: Carriage of Hazardous Materials [Railroad Oil Spill] (2 hours)

- Week 1 - Introduction, Rail Facility Information, Response Organization, Initial Response Action, Drills, Training, and Equipment Maintenance, and Federal and Regulatory Guidance Concerning the Guidance of Hazardous Materials.
  - https://www.forbes.com/sites/jamesconca/2014/04/26/pick-your-poison-for-crude-pipeline-rail-truck-or-boat/#1113dc5717ac
  - *https://ecology.wa.gov/Asset-Collections/.../Spills/...spills/Contingency-plan-template*
  - http://www.ncsl.org/research/energy/transporting-crude-oil-by-rail-state-and-federal-action.aspx
  - https://inis.iaea.org/collection/NCLCollectionStore/_Public/21/043/21043942.pdf

- CDP Module 16: Company Ground (3 hours) - Students will learn the inner-workings of industry best-practices concerning how to build an Enterprise-grade Commercial Drone Program from scratch.
  - Week 1 - Pick your Champion, Get Dedicated Support, Be Smart About Sharing, Stay Flexible, and Keeping Your Data Secure
    - https://3dr.com/blog/new-ebook-how-to-build-an-enterprise-drone-program/
    - https://drive.google.com/file/d/1RV6i6v7Mpp9cQxsA2UWtoMxtj-K20R2q/view
    - https://www.theverge.com/2018/1/11/16871848/gopro-drone-failure-3dr-dji-american-market

- CDP Module 17: Qualifications (2.5 hours)
  - Part 1 - 3D Mapping
  - Part 2 - Hazardous Materials (Railroad Oil Spills)
  - Part 3 - Corporate Drone Programs

Pilot-in-Command (PIC)/ Subsurface Intelligent Crafts and Boats (SIB)/SFAR/Prop Initial Aircraft Training [Fixed Wing]
- CDP Module 18: Aircraft Ground [Recurrent] (14 hours)
  - Week 1 - Airport Operations and Emergency Procedures
  - Week 2 - Aeronautical Decision-making, and Maintenance and Inspection Procedures.
  - Week 3 - Simulated Computer Exam, 1.5-hour Recurrent Knowledge Exam

- CDP Module 19: General Emergency [Water Emergency] Boat Sinking/Drowning Swimmer (7 hours)
  - Week 1 - Students will study best-practices for conducting a drone rescue operation at a local pool, lake, or coastal regions. Staff and students are to wear safety floatation devices, as well as work in shallow waters, under clear weather conditions. If water resources are not available, students may utilize a large open in-door space and create a mock search and rescue operation.

- o Week 2 - Students will present their findings via a PowerPoint Presentation, as well as providing a one-page blog to report their findings and lessons learned for the benefit of the entire industry.
  - https://www.npr.org/sections/thetwo-way/2018/01/18/578861178/drone-used-to-save-two-teens-caught-in-dangerous-australian-waves
  - https://www.dartdrones.com/wp-content/uploads/2018/02/Lives-Saved-2017-v2.pdf
  - https://www.youtube.com/watch?v=YMjJowZVpns
  - https://www.youtube.com/watch?v=9DnDFjuRPJg

- CDP Module 20: Special Segments [Subsurface Intelligent Crafts and Boats] (7 hours)
  - o Week 1 - Industry Overview/Ideation & Commercial Applications/Parts/Accessories
  - o Week 2 - Observation and Exploration, Wreck Discovery and Documentation, Photography and Videography, Biological Sampling and Surveying and Archeological Discovery.
    - https://ibubble.camera/features/our-prototypes/
    - https://www.amazon.com/gp/offer-listing/B07B2TVF8C/ref=dp_olp_new_mbc?ie=UTF8&condition=new
    - https://www.amazon.com/ROBOSEA-Submersible-Wireless-Underwater-Connection/dp/B074SK2F5J/ref=pd_day0_421_7?_encoding=UTF8&pd_rd_i=B074SK2F5J&pd_rd_r=J6CWVM644AXRRF47KWH6&pd_rd_w=lq4MU&pd_rd_wg=c1x27&psc=1&refRID=J6CWVM644AXRRF47KWH6
    - https://www.amazon.com/ROBOSEA-Submersible-Wireless-Underwater-Connection/dp/B074SK2F5J/ref=pd_day0_421_7?_encoding=UTF8&pd_rd_i=B074SK2F5J&pd_rd_r=J6CWVM644AXRRF47KWH6&pd_rd_w=lq4MU&pd_rd_wg=c1x27&psc=1&refRID=J6CWVM644AXRRF47KWH6
    - https://www.amazon.com/Power-Vision-Underwater-Real-Time-Streaming/dp/B0746SZR7X/ref=pd_sbs_468_1?_encoding=UTF8&pd_rd_i=B0746SZR7X&pd_rd_r=XGV9J735MEKE11D6SE4E&pd_rd_w=PbY9M&pd_rd_wg=wEBGY&psc=1&refRID=XGV9J735MEKE11D6SE4E
    - https://www.bluerobotics.com/store/rov/bluerov2/

- CDP Module 21: Aircraft Flight [Fixed Wing] (6.5 hours)
  - o Week 1 - Parts & Accessories; Motors, Servos, and Connectors; Pre-flight Checks, Pilot Configurations, Connectivity, Take-off and Piloting Modes, Photos/Videos, and Pix4D Integration.
    - https://www.parrot.com/business-solutions-uk/parrot-professional/parrot-disco-pro-ag#parrot-disco-pro-ag-details
    - https://support.pix4d.com/hc/en-us/articles/115002664983--iOS-How-to-fly-the-Parrot-Disco-Pro-AG#label1
    - *https://www.realwire.com/.../Parrot%20DiscoPro_AG_ENG_UK_DEF%20Kaizo.docx*
    - https://fccid.io/2AG6I-DISCO/User-Manual/Users-Manual-3066542

- CDP Module 22: Qualifications (3.0 hours)
  - Part 1 - Students sit for computer-generated mock FAA recurrent knowledge exam.
  - Part 2 - Students sit for examination on Intelligent Boats and Crafts, such as motors, configurations, connectivity, and pilot modes.
  - Part 3 Students take short examination concerning Fixed Wing crafts, sus motors, configurations, connectivity, and pilot modes.

PIC Air Transport (PMC)/Standard Industrial Classification
Initial Aircraft Training
- CDP Module 23: Aircraft Ground [Transport] (49.5 hours)
  - Week 1 - Amazon - Students will discuss the Presidential Memorandum concerning Commercial Drone Technology. They will also study the rules for UAS Airworthiness tests for experimental craft. They will also study Revising the Airspace Model for the Safe Integration of sUAS. Amazon - Enabling Innovation in the National Airspace. Report -the following documents: Analysis of Amazon Prime Air UAV Delivery. Amazon Prime Air Jobs. Students will analyze Amazon's current business inventory, as well as their operating costs to analyze challenges, advantages, competition, board of directors, disruptive technologies, and strategies for gaining a competitive edge in the market. Students will present their finding via a PowerPoint presentation at the end of the week. Students also will explore career opportunities at the company.
    - https://images-na.ssl-images-amazon.com/images/G/01/112715/download/Amazon_Revising_the_Airspace_Model_for_the_Safe_Integration_of_sUAS.pdf
    - https://transportation.house.gov/uploadedfiles/2017-04-04_-_cassidy_testimony.pdf
    - https://www.researchgate.net/profile/Sunghun_Jung/publication/317389269_Analysis_of_Amazon_Prime_Air_UAV_Delivery_Service/links/5938954aaca272bcd19ffe20/Analysis-of-Amazon-Prime-Air-UAV-Delivery-Service.pdf?origin=publication_detail
    - http://dronecenter.bard.edu/files/2017/09/CSD-Amazons-Drone-Patents-1.pdf
    - http://dronecenter.bard.edu/files/2017/09/CSD-Amazons-Drone-Patents-1.pdf
    - https://www.amazon.jobs/team/prime-air
    - https://obamawhitehouse.archives.gov/the-press-office/2015/02/15/presidential-memorandum-promoting-economic-competitiveness-while-safegua
    - https://www.faa.gov/documentlibrary/media/order/faa_order_8130.34d.pdf

  - Week 2 - Google - Project Wing Cheat Sheet. Students will study the business case study of Google's Project Wing to gain insights containing corporate best-practices and industry analysis. Students will further create teams to analyze Google's strategy and create alternate pivots for future innovations, presenting amongst one another concerning the future evolution of a hypothetical Google Project Wing. Students will analyze

Googles portfolio of companies, operating costs and current challenges, board of directors, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students will present their findings via PowerPoint presentation at the end of the week. Students will also explore available careers in the market.

- https://www.techrepublic.com/article/project-wing-a-cheat-sheet/
- https://www.bloomberg.com/neews/articles/2018-08-08/toddler-s-popsicle-by-air-marks-milestone-in-u-s-drone-delivery
- https://www.recode.net/2018/2/6/16965834/google-drone-project-wing-faisal-masud-amazon-alphabet
- https://x.company/careers-at-x/

o Week 3 - Students will study DHL as an industry case study. Students will gain insight into the practices and operations of DHL as they transition into the automated world of logistics and delivery. Students will analyze DHL's portfolio of companies, operating costs, current challenges, board of directors, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students will present their findings via PowerPoint presentation at the end of the week. Students also will explore career opportunities at the company (Search: Machine Learning, Data Scientist, Software, Automation, and Engineer).

- http://www.dhl.com/content/dam/downloads/g0/about_us/logistics_insights/dhl_trend_report_uav.pdf
- https://www.logistics.dhl/content/dam/dhl/global/core/documents/pdf/glo-core-trend-radar-widescreen.pdf
- https://www.9.com/channel-marketing/direct-mail/news/13056813/dhls-parcelcopter-to-become-first-drone-to-fly-on-its-own
- https://www.aircargonews.net/news/freight-forwarder/single-view/news/drone-deliveries-take-off-for-dhl.html
- http://www.dhl.com/content/dam/Local_Images/g0/New_aboutus/innovation/DHLTrendReport_Internet_of_things.pdf
- https://www.dpdhl.jobs/

o Week 4 - Students will study UPS as an industry case study. Students will gain insight into the practices and operations of UPS as they transition into the automated world of logistics and delivery. Students will analyze UPS's portfolio of companies, operating costs, current challenges, board of directors, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students also will explore career opportunities at the company. (Search: Machine Learning, Data Scientist, Software, Automation, Computer Vision and Engineer). Note: Make sure to search with no location or radius selected.

- https://sustainability.ups.com/media/2016_UPS_CSR.pdf
- https://pressroom.ups.com/assets/pdf/pressroom/infographic/UPS_drones_infographic_FINAL.pdf
- http://scet.berkeley.edu/wp-content/uploads/ConnCarProjectReport-1.pdf
- https://www.jobs-ups.com/

o Week 5 - Students will study Starship Technologies as an industry case study. Students will gain insight into the practices and operations of Starship Technologies utilizing rovers for transport and logistics. Students

will analyze the portfolio of Starship Enterprises, board of directors, operating costs, current challenges, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students also will explore career opportunities at the company.

- https://www.npr.org/sections/alltechconsidered/2017/03/23/520848983/hungry-call-your-neighborhood-delivery-robot
- http://www.aihelsinki.com/wp-content/uploads/2017/09/2017.09.27-AIHelsinki-v2-1.compressed.pdf
- http://www.eiratech.com/wp-content/uploads/2016/05/The-Robots-Are-Coming.pdf
- http://www.redwoodcity.org/business/economic-development/robot-delivery-pilot-program
- https://news.developer.nvidia.com/self-driving-delivery-robots-coming-in-2016/
- https://www.starship.xyz/
- https://www.starship.xyz/careers/

o Week 6 - Students will study Walmart as an industry case study. Students will gain insight into the practices and operations of Walmart technologies using commercial drones and similar autonomous systems for transport, logistics, and retail. Students will analyze the portfolio of Walmart, board of directors, operating costs, current challenges, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students will also explore career opportunities at the company.

- https://www.economist.com/sites/default/files/miis_ws.pdf
- https://gizmodo.com/walmart-considering-smart-carts-drone-assistants-1823991966
- https://www.bloomberg.com/news/articles/2017-08-18/wal-mart-s-amazon-war-takes-to-skies-with-floating-warehouses
- https://www.npr.org/sections/thetwo-way/2015/10/26/452012328/ready-set-drone-walmart-joins-amazon-google-in-testing-delivery-drones
- https://www.cbinsights.com/research/walmart-farming-drones-patent/
- https://www.cbinsights.com/research/walmart-home-shopping-physical-retail-patent/
- http://fortune.com/2017/03/17/walmart-drone-delivery-patent/
- https://www.zdnet.com/article/walmarts-drone-delivery-plan-includes-blockchain-tech/
- https://careers.walmart.com/corporate

o Week 7 -Students will study Waymo as an industry case study. Students will gain insight into the practices and operations of Waymo technologies using autonomous vehicles for the transport of people. Students will analyze the portfolio of Waymo, board of directors, operating costs, current challenges, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students will also explore career opportunities at the company.

- https://www.mcca.com/wp-content/uploads/2018/04/Autonomous-Vehicles.pdf
- https://www.theatlantic.com/technology/archive/2017/08/inside-waymos-secret-testing-and-simulation-facilities/537648/

- https://waymo.com/safety/
- https://www.dmv.ca.gov/portal/wcm/connect/fd443811-e883-4067-8678-2b1e94cd90da/Waymo.pdf?MOD=AJPERES
- Week 8 - Students will study Apple as an industry case study. Students will gain insight into the practices and operations of Waymo technologies using autonomous vehicles for the transport of people. Students will analyze the portfolio of Apple, board of director, operating costs, current challenges, potential disruptions, competition, and strategies for gaining a competitive edge in the market. Students will also explore career opportunities at the company.
    - https://driverless.wonderhowto.com/news/heres-apple-is-training-their-self-driving-car-engineers-0177226/
    - https://appleinsider.com/articles/18/07/18/apple-self-driving-car-fleet-grows-to-66-vehicles-in-california
    - https://www.documentcloud.org/documents/3675567-Apple-CA-DMV-Filing.html
    - https://www.macrumors.com/2017/04/28/apple-california-dmv-policy-changes/
- Week 9 - Final Presentations will consist of a 10-slide PowerPoint presentation, comparing each of the various industry players, as well as providing assessment concerning the level of innovation, strategy, and overall direction of the autonomous logistical divisions of each corporate entity.

- CDP Module 24: General Emergency [Nuclear Event] (1 hours) Disaster Plans 50s/60
    - Week 1 - Students will conduct a mock demonstration of utilizing a drone for disaster-based scenarios.
        - ? https://sustainabledevelopment.un.org/content/documents/1476marshall%20islands.pdf
        - https://www.youtube.com/watch?v=RfXULE7UtpA
        - https://www.rand.org/multimedia/audio/2015/05/05/nepal-and-preparing-for-natural-disasters.html

- CDP Module 25: Special Segments [Swarms] (7 hours)
    - Week 1 - Students will work on creating swarms of drone utilizing either Unreal Engine 4 along with Microsoft's AirSim, or students will utilize simulators in Gazeebo.
    - Week 2 - Students will utilize multiple micro-drones to manual control a swarm of drones.
        - https://arxiv.org/pdf/1804.02510.pdf
        - https://uuvsimulator.github.io/installation.html

- CDP Module 26: Aircraft Flight [in-field] (1.5 hours) [Simulator] (12.5 hours)
    - Week 1 - Students will work on their flight lines, horizontal, vertical, diagonal, reverse, 360 degrees, as well as working on advanced autonomous modes on an actual drone in the field. Second, students will

gain experience utilizing Unreal Engine and DRL as working simulators for flight control.

- https://www.unrealengine.com/en-US/what-is-unreal-engine-4
- https://store.steampowered.com/app/641780/The_Drone_Racing_League_Simulator/

- CDP Module 27: Qualifications (3 hours)
  - Part 1 - Students will be tested over corporate innovation in the commercial drone and autonomous vehicle sectors.
  - Part 2 - Students will be tested over best-practices for handling a nuclear disaster.
  - Part 3 - Students will be tested over best-practices for utilizing swarm technology.

Recurrent Air – Ornithopters/Micro-mechanical Birds and Insects
- CDP Module 28: Aircraft Ground [Recurrent] (12.0 hours)
  - Week 1 - Students will cover Weather, Airspace, Radio Communication Procedures, UAV Batteries, Load Capacity, Waivers, and Sectional Charts. Students will also go over pre-flight planning, crew resource management, and configuration management.
  - Week 2 - Students will sit for two examinations for the Recurrent FAA Pilot Examination, utilizing computer generated software during two sessions.

- CDP Module 29: General Emergency [Solar Flare/Electrical Grid Failure] (5 hours)
  - Week 1 - Students will focus on examining case studies concerning industry and government protocol concerning the occurrence of a grid black out as a result of solar activity, other acts of God, or malicious actors. Students will then consider the current best-practices and reverse engineer the protocols, taking into consideration the benefits and/or limitations of current and future autonomous systems.
    - https://www.youtube.com/watch?v=wFePXPFZbiY
    - https://ams.confex.com/ams/.../J3_1_Exploring_Range_of_Weather_Ranquist.pdf

- CDP Module 30: Aircraft Flight [Ornithopter] (9 hours)
  - Week 1 - Students will learn how to operate the Bionic Bird, and example of Ornithopters or micro-mechanical birds and/or insects. In particular, students will learn how to manipulate the digital user interface, which encompass the nest screen and settings in the application. Also, students will learn about the various modes of flight, such as the easy mode, expert mode, and various conditions for proper use. Students will also learn proper launching of the ornithopter, gliding flights, and emergency landing. Finally, students will learn about battery protection, and the proper cleaning of contact points for charging.
    - https://www.robotshop.com/media/files/pdf/manual_en.pdf
  - Week 2 - Students will learn about case studies regarding other types of Ornithopters, conducting their own research regarding what other types of ornithopters currently exist as prototypes or exist on the market.

- ▪ Example: https://www.youtube.com/watch?v=zvRxJkGuRO4

- CDP Module 31: Carriage of Hazardous Materials [Oil Spill on Trains] (1 hour)
  - o Week 1 - Students will discuss the parameters of Hazmat incidents and the carriage of hazardous materials.
    - ▪ https://ceas.uc.edu/content/dam/aero/docs/fire/Cindy%20Striley.pdf
    - ▪ https://file.scirp.org/pdf/WJET_2016101715180397.pdf

- CDP Module 32: Company Ground [Enterprise Program Creation] (3 hours)
  - o Week 1 - Students will learn about how to create and scale and enterprise-grade drone program. Additionally, students will learn how to share and disseminate data effectively among various stakeholders. Finally, students will learn how to store their data securely and effectively, utilizing local data storage solutions, as well as those that are cloud-based.
    - ▪ https://3dr.com/resources/books-guides/ebooks/build-enterprise-drone-program/?_ga=2.33717985.1373615656.1534530344-1185592741.1534265630

- CDP Module 33: Qualifications (3 hours)
  - o Part 1 - Students will be tested over ornithopters, the carriage of hazardous materials, and best-practices for the creation of enterprise-grade commercial drone programs.
  - o Part 2 - Students will sit for a computer-generated mock recurrent FAA knowledge examination.

Transport Category 2.0 – Upgrade to PIC (Ground/Air)
- CDP Module 34: Aircraft Ground [Recurrent Training/Manufacturing] (12 hours)
  - o Week 1 - Students will take two recurrent exams the first week using a computer-generated examination, and/or written examination.
  - o Week 2 - Students will research each company in the U.S. and Globally that manufacture drones, and they will split them up into specialty segmentations, and present their findings at the end of the week. Those findings will include gaps in hardware and/or services that exist in the U.S. Market, and/or other areas that are able to be commercially pursued.

- CDP Module 35: Special Segments [Autonomous Urban/Rural Delivery] (5 hours)
  - o Week 1 - Students will create a comparative presentation concerning the various ground delivery methods available for rural and urban delivery. Students also assess the market participants, consumer trends, economic reports, and industry reports. Students will study industry cases for technological adoption.
    - ▪ https://money.cnn.com/2017/10/11/technology/future/dhl-autonomous-delivery-truck/index.html
    - ▪ https://abcnews.go.com/GMA/News/video/ford-dominos-test-driving-delivery-cars-53409212?trk=organization-update-content_share-video-embed_share-article_title
    - ▪ https://www.theverge.com/2017/10/16/16486208/alphbet-google-project-wing-drone-delivery-testing-australia

- CDP Module 36: Aircraft Flight [in-field] (9 hours)
  - Week 1 - Students will study one or more of the commercial drone delivery pilot programs, such as the Google Delivery, or even the proposed Amazon Prime Air delivery, to utilize as a base. Then students will create a use case for commercial drone delivery, putting together a plan concerning how they will implement the final technology. Students will be given extremely gross utensils, such as string, straws, tape, and other inexpensive and readily available materials to build aerial drone delivery platforms.
    - https://www.recode.net/2017/3/24/15054884/amazon-prime-air-public-us-drone-delivery
    - https://www.recode.net/2016/12/20/14026396/7-eleven-drone-delivery-flirtey-first-retail-us-reno-nevada
  - Week 2 - Students will then take aerial drones out into the field, and groups of students or individuals will then test out their hypothesis concerning their prototypes and aerial delivery designs.
    - https://www.bloomberg.com/news/articles/2018-08-08/toddler-s-popsicle-by-air-marks-milestone-in-u-s-drone-delivery

- CDP Module 37: Qualification [Transport] (3 hours)
  - Part 1 - Students will be graded PASS/FAIL, while implementing their drone delivery operation in the field. Students will pass if they are able to successfully deliver their payload at the distance of 1-city block. Students will FAIL this portion of they are unable to successfully deliver their payload to the target at the designated distance. $13,933

CDP Total Classroom Hours: 304

CDP Total Cost: $11,000

The purpose of the I8I Commercial Drone Software Developer Apprenticeship is to give members and participants the opportunity to gain in-demand skills in software development, accelerated computing, artificial intelligence, and autonomous systems. The goals and objectives of the program are entrepreneurship, and/or sustainable, and gainful employment, in an IT/STEM-related field.

The following is a listing of courses required for all I8I Commercial Drone Software Developer Apprentices:

- CDSD Module 1: Part 107 Regulations/Exam (24)
  - Week 1 - Introduction, Airspace, Operations, Flight Restrictions, Weather Effects, Load Performance, Emergency Procedures, and UAV Configuration Management. Students will take quizzes 1 and 2.
  - Week 2 - Crew Resource Management, Radio Communication Procedures, Determining Performance of Small Unmanned Aircraft. Students will take quiz 3.

- Week 3 - Physiological Effects of Drugs and Alcohol, Aeronautical Decision-making and Judgement, as well as Airport Operations. Students will take quizzes 4 and 5.
  - Week 4 - Maintenance, Pre-flight Inspection Procedures, Batteries, and Miscellaneous. Students will also sit for a final practice examination, and a computer-generated practice examination.

- CDSD Module 2: Introduction to Python (24)
  - Week 1 - Introduction to Python, Python types/strings, condition statements, loops, list and dictionary comprehension, exception handling, File I/O, functions and classes. Students will utilize the workbook, Python 101 by Michael Driscoll. Instructors may also utilize the free online learning tool, SOLOLEARN, in order to also teach students basic Python Programming Concepts. SOLOLEARN provides a gamified model, while the workbook is more straight forward with enhanced explanation of concepts.
    - https://doc.lagout.org/programmation/python/python_101.pdf
    - https://www.youtube.com/watch?v=ualxVE4YOjc
  - Week 2 - CSV, configuring parsers, logging, the OS module, smtplib module and email, and subprocesses. Additionally, students will learn about the sys module, the threading module, and working with times and dates.
  - Week 3 - Students will go over tutorials, such as installing pip and easy install. Students will learn how to configure objects, parse xml and lxml, make package requests, virtual environments, pylint and pychecker, and SQLAlchemy.
  - Week 4 - Students will learn the Python egg, Python wheels, the Python package index, binary executables, and installers. Students will also undergo a final multiple-choice examination covering the materials presented over the four-week period.

- CDSD Module 3: C++ for Beginners (24)
  - Week 1 - Students will learn what is C++, Hello, World! Getting the Tools, Printing a Text, Comments, Variables, Working with Variables, More on Variables, Basic Arithmetic, Assignment and Increment Operators, and Module 1 Quiz. Students will also work on Data Types, Arrays, and Pointers, as well as conditionals and loops. Students will also utilize the SOLOLEARN Application to assist students during the learning processes. Course content also will be pulled from Accelerated C++: Practical Programming by Example, with Andrew Koenig and Barbara E. Moo.
    - https://www.sololearn.com/Play/CPlusPlus

- ▪ http://libertar.io/lab/wp-content/uploads/2017/03/Andrew-Koening-and-Barbara-E.-Moo-Accelerated-C-.pdf
  - ○ Week 2 - Students will further work learning functions, as well as classes and objects.
  - ○ Week 3 - Students will learn more about classes, as well as on inheritance & polymorphism. Students will finally work on Templates, Exceptions, and Files.
  - ○ Week 4 - Students will conduct two online challenges, and/or jeopardy and will also take a final examination covering the prior course content in summation.

- CDSD Module 4: Linux 101 (24)
  - ○ Week 1 - Students will be working out of "The Linux Command Line: A Complete Introduction" by Shotts Jr. and William E. Furthermore, students will learn the shell navigation, Exploring the System, Manipulating Files and Directories, Working with Commands, and Redirection.
    - ▪ http://www.linuxzasve.com/preuzimanje/TLCL-09.12.pdf
  - ○ Week 2 - Students will also learn Seeing the World as the Shell Sees It, Advanced Keyboard Tricks, Permissions, Processes, the Environment, and Nano/Gedit functionality.
  - ○ Week 3 - Students will work on customizing the Prompt Screen, Package Management, Storage Media, Networking, Searching for Files, and Archiving and Backing Up Files.
  - ○ Week 4 - Students will work on Storage Media and Boot Devices, Networking, Writing Shell Scripts, and Final Examinations. Students will undergo a final examination covering a summation of prior course content.

- CDSD Module 5: Drone Software Development Market Analysis/Career Counseling (24)
  - ○ Week 1 - Students will break into groups and research the top drone software companies by Revenue, Production, and Market Share into the Year 2025. Students will take the data and information and create an infographic to incorporate into a 10-slide PowerPoint presentation to be presented at the end of week 1.
    - ▪ https://infogram.com/
  - ○ Week 2 - Students will break down the commercial drone software developer market by application into the year 2025. Students will also research comparisons of the global market, vs. the U.S. market, down to their and local markets.
  - ○ Week 3 - Students will conduct research to differentiate and classify software providers of commercial drone technology by open-source vs. closed-source technology. Students also will break down the Global

Market by region (i.e., North America, China, Europe, and Japan, India, Southeast Asia, South America, and Africa).
  ○ Week 4 - Students will work together in their groups to prepare infographics for final presentation, during the last day of class. Students will also be individually interviewed and counseled concerning professional and career goals, social and academic adjustment, as well as psychological and physical well-being.

- CDSD Module 6: Machine Vision & The Nvidia Jetson TX2 (24)
  ○ Week 1 - Students will cover the following: Downloading Jetpack, Exploring Contents, and Architecture/Hardware, Booting the Jetson, Downloading ZED SDK, Video Introductions, ROS Wrapper for ZED Camera, and if student get done early they may explore the ZED Samples.
    ▪ https://docs.stereolabs.com/overview/getting-started/installation/
  ○ Week 2 - Students will split into groups and research the following topics: stereo capture, depth perception, positional tracking, and spatial mapping, as well as present other significant findings. Also, students will complete the Hello ZED Tutorial.
    ▪ https://github.com/stereolabs/zed-examples/tree/master/tutorials/tutorial%201%20-%20hello%20ZED
  ○ Week 3 - Students will split into groups and research the following video formats in detail; company and contrasting each, including 2.2k, 1080p, 720p, and WVGA. Students will note output resolution, frame rates, and field of view, detailing the meaning, benefit, and potential drawbacks of each. Students will also divide the definition of the camera settings amongst one another, research definitions, benefits, and drawbacks of each type, ensuring they also retrieve samples online to save in a folder, for display during their presentation of their collective findings at the end of class.
  ○ Week 4 - Students will explore stereolabs ZED-examples, gaining hands-on experience with camera control, depth sensing, plane detection, positional tracking, spatial mapping, and SVO recording. Students will also take a written examination once they are completed with their projects, covering the ZED camera, TX2, computer vision, accelerated computing, and video imaging concepts.
    ▪ https://github.com/stereolabs/zed-examples

- CDSD Module 7: Building Autonomous Systems with ROS (24)
  ○ Week 1 - Students will work with the ROS Robotic Projects book by Lentin Joseph. Specifically, the first week will cover the following areas: Code Architecture and Concepts [ROS Cookbook], Installing ROS and

Dependencies, Creating ROS Nodes, Building ROS Nodes, creating ROS Messages, and Creating ROS Services, and TurtleSim [Using ROS Robotics by Example] by Carol Fairchild.

- o Week 2 - Students will focus on the following areas: Installing and Launching Gazeebo [Ros by Example] and Making a Robot Fly tutorial in ROS. Students will learn how launch the Hector Quadrotor on Gazeebo.
- o Week 3 - Students once again will work with Gazeebo to Simulate MAV/drone using RotorS/Gazeebo. Students will learn how to get the MAV into hovering mode and perform linear and rotation motion. Students will learn how sensors can thus be added to enhance autonomy [Robot Operating System Cookbook] by Kumar Bipin.
- o Week 4 - Students will spend the first day studying and taking a final examination. During the next course, students will be tested practically, by their ability to build ROS and to get the turtlesim up and running during one class period. This portion is pass/fail.

- CDSD Module 8: Low-propulsion Systems & Satellite Technology (24)
  - o Week 1 - Students will spend one day reading and reviewing the text, "Propulsion Options for Very Low-Earth Orbit Micro-Satellites." Students are expected to individually complete a one-page summary by next week. Students also, will have to complete a PowerPoint Presentation concerning the various options for a Micro-Satellite.
    - https://www.researchgate.net/profile/Mirko_Leomanni/publication/309723168_Propulsion_options_for_very_low_Earth_orbit_microsatellites/links/59d3a4e3aca2721f436cd97d/Propulsion-options-for-very-low-Earth-orbit-microsatellites.pdf?origin=publication_detail
  - o Week 2 - Students will study the implications of low-orbit drones on international space law. Students will study the slide deck provided below, and present by the end of the second day concerning the topics and concepts presented therein. Students will be required to present on topics covered and relevant in a condensed 10-slide PowerPoint deck.
    - http://courtbar.org/cle/pdf/clepacket.pdf
  - o Week 3 - Students will study a use case, concerning Google X, and their Moonshot Factory, and explore their commercial endeavors in that satellite space. Students will further study cube satellites and actual costs and methods involved with sending such payloads into space. Students also will download a link to a document concerning the global satellite infrastructure, they will take turns reading aloud from the document for the remainder of the course and will be expected to finish any extra reading at home, and turn in a one-pager, individually, by the beginning of the next class.

- https://www.wired.com/story/alphabet-google-x-innovation-loon-wing-graduation/
- https://en.wikipedia.org/wiki/CubeSat
- https://www.nap.edu/read/4944/chapter/5#40
  - Week 4 - Students will study two use-cases for low-orbit drones and turn in an individually created one-paper summary contrasting both technologies. During the second day, students will take an examination concerning topics covered in each of the materials presented during this module.
    - http://pep.ijieee.org.in/journal_pdf/11-307-147938456236-43.pdf
    - https://online.ptc.org/assets/uploads/papers/ptc18/RTS16_Kim_SeongCheol.pdf

- CDSD Module 9: Space Propulsion Systems (Airforce Institute of Technology) (24)
  - Week 1 - Students will study various case-studies involving the predominant methods for space travel, and next students will narrow their studies and research into the solar-electric powered crafts NASA plans to use to carry mankind into the future. Students are to present at the end of the first week, utilizing a PowerPoint presentation of ten slides, to break down the feasibility, utility, efficiency, cost, speed, durability, safety, weight, build time, and required resources of the space-based technology. Students will also include a slide concerning how to potential make the technology better.
    - https://www.youtube.com/watch?v=EzZGPCyrpSU
    - https://www.seeker.com/space/exploration/the-future-of-deep-space-propulsion-may-soon-be-radically-altered
    - https://www.youtube.com/watch?v=iFMxSo0j01o
  - Week 2 - Students will study the nuclear method of powering space-based vehicles and low-orbit satellites. Students will discuss the methodology after watching a video, and then break into groups, and discuss possible ways to enhance the technology to achieve greater levels of efficiency. Students are to conduct further research into groups concerning the various aspects that make the technology work, as well as feasibility, utility, efficiency, cost, speed, durability, safety, weight, build time, and required resources of the space-based technology. Last, students will make recommended changes to the technology. Final findings will be presented using a 10-slide PowerPoint deck.
    - https://www.youtube.com/watch?v=CizKnuwvXXg
  - Week 3 - Students will study the Anti-matter method of powering space-based vehicles and low-orbit satellites. Students will discuss the methodology after watching the video, and then break into groups, and

discuss possible ways to enhance the technology to achieve greater levels of efficiency. Students are to conduct further research into groups concerning the various aspects that make the technology work, as well as feasibility, utility, efficiency, cost, speed, durability, safety, weight, build time, and required resources of the space-based technology. Last, students will make recommended changes to the technology. Final findings will make be presented using a 10-slide PowerPoint deck.

- https://www.youtube.com/watch?v=n2pWv-D84W0
- Week 4 - Students will study the Schwarzchild Kugelblitz Drive, which is an alternative and speculative methodology to power space-based vehicles. Students will discuss the methodology after watching the video, and then break into groups, and discuss possible ways to enhance the technology to achieve greater levels of efficiency. Students are to conduct further research into groups concerning the various aspects that make the technology work, as well as feasibility, utility, efficiency, cost, speed, durability, safety, weight, build time, and required resources of the space-based technology. Last, students will make recommended changes to the technology. Final findings will be presented using a 10-slide PowerPoint deck.
  - https://www.youtube.com/watch?v=A7YRiprQ8cU

- CDSD Module 10: Propulsion Technologies - Uninhabited Air Vehicles (Commission on Engineering and Technical Systems) (24)
  - Week 1 - Standard Aircraft Propulsion Systems - Students will conduct research concerning the inner workings of traditional aircraft propulsion systems, such as rotary, propeller, electric, gas-powered, and other models. Students will also present a 10-slide deck comparing the various technologies, while recommending feasibility based on use-cases, technological advancement and/or efficiency and reliability, cost, and available resources.
    - https://commons.erau.edu/cgi/viewcontent.cgi?article=1042&context=publication
    - https://www.nap.edu/read/9878/chapter/8#63
    - https://www.grc.nasa.gov/www/cdtb/aboutus/workshop2016/SmallUAVPropulsionReportOut-LCCPCDRoadmapWorkshop.pdf
  - Week 2 - Experimental Aircraft Propulsion Systems - Students will conduct research concerning the inner workings of traditional quad copter propulsion, as well as discover and explore experimental prototypes, concepts, and designs for future unmanned aerial vehicles. Students will present a 10-slide deck summarizing their findings and make recommendations for feasibility based on use-cases, technological advancement, and resources available.

- - - http://iopscience.iop.org/article/10.1088/1742-6596/870/1/012003/pdf
    - https://phys.org/news/2017-02-scaling-uavs.html
    - https://techxplore.com/news/2014-07-tiny-uavs-hummingbirds.html
    - http://news.mit.edu/2013/ionic-thrusters-0403
    - http://www.dtic.mil/dtic/tr/fulltext/u2/a517586.pdf
    - https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19980137599.pdf
    - https://www.youtube.com/watch?v=B-MkSivqS28
  - Week 3 - Students will research future projected use-cases for Drone Technology. They will explore concepts proposed concepts, watching two different videos, while also conducting research regarding other previously undiscovered use-cases. Students will present a 10-slide deck summarizing their findings, while making recommendations for feasibility based on use-cases, technological advancements, and resources available.
    - https://www.youtube.com/watch?v=d8uaQ1aA0Wk
    - https://www.youtube.com/watch?v=JXAgmtQlCGs
    - https://www.youtube.com/watch?v=9eUxv7nHyEl
  - Week 4 - Students will gather into teams and create a list of 10 different designs for commercial unmanned aerial vehicles that are capable of being deployed in 5-10 years' time. Students will present a 10-slide deck of each design, making sure to search out resources for the easy and clean design of objects, such as the Google Drawing Resource included in the link below:
    - https://www.google.com/drive/using-drive/#start

- CDSD Module 11: Underwater and Land-based Autonomous Systems Lab (24)
  - Week 1 - Industry Overview/Ideation & Commercial Applications/Parts/Accessories
  - Week 2 - Observation and Exploration, Wreck Discovery and Documentation, Photography and Videography, Biological Sampling and Surveying and Archeological Discovery.
    - https://ibubble.camera/features/our-prototypes/
    - https://www.amazon.com/gp/offer-listing/B07B2TVF8C/ref=dp_olp_new_mbc?ie=UTF8&condition=new
    - https://www.amazon.com/ROBOSEA-Submersible-Wireless-Underwater-Connection/dp/B074SK2F5J/ref=pd_day0_421_7?_encoding=UTF8&pd_rd_i=B074SK2F5J&pd_rd_r=J6CWVM644AXRRF47KWH6&pd_rd_w=lq4MU&pd_rd_wg=c1x27&psc=1&refRID=J6CWVM644AXRRF47KWH6
    - https://www.amazon.com/ROBOSEA-Submersible-Wireless-Underwater-Connection/dp/B074SK2F5J/ref=pd_day0_421_7?

               _encoding=UTF8&pd_rd_i=B074SK2F5J&pd_rd_r=J6CWVM644A
XRRF47KWH6&pd_rd_w=lq4MU&pd_rd_wg=c1x27&psc=1&refRID
=J6CWVM644AXRRF47KWH6

- https://www.amazon.com/Power-Vision-Underwater-Real-Time-Streaming/dp/B0746SZR7X/ref=pd_sbs_468_1?_encoding=UTF8&pd_rd_i=B0746SZR7X&pd_rd_r=XGV9J735MEKE11D6SE4E&pd_rd_w=PbY9M&pd_rd_wg=wEBGY&psc=1&refRID=XGV9J735MEKE11D6SE4E
- https://www.bluerobotics.com/store/rov/bluerov2/

- Week 3 - Students will create a comparative presentation concerning the various ground delivery methods available for rural and urban delivery. Students also assess the market participants, consumer trends, economic reports, and industry reports. Students will study industry cases for technological adoption.
  - https://money.cnn.com/2017/10/11/technology/future/dhl-autonomous-delivery-truck/index.html
  - https://abcnews.go.com/GMA/News/video/ford-dominos-test-driving-delivery-cars-53409212?trk=organization-update-content_share-video-embed_share-article_title
  - https://www.theverge.com/2017/10/16/16486208/alphbet-google-project-wing-drone-delivery-testing-australia
- Week 4 - Students will prepare a final presentation concerning their findings and original ideas for innovations in the space of autonomous vehicles and/or submersible drones for commercial purposes. Students will present a 10-slide deck, as well as take a final exam regarding summarized content from aquatic and land-based commercial drone systems.

- CDSD Module 12: Blockchain Applied Commercialization (24)
  - Week 1 - Students will focus on grasping Blockchain fundamentals, such as the Blockchain origin, short-comings, transactions, and emergence of Bitcoin. Students will also look at how Blockchain Technology works. Each student will also receive $10 worth of value to invest in a Blockchain-related cryptocurrency.
    - https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=XIM12354USEN
    - https://www.coinbase.com/
  - Week 2 - Students will work on how to Propel Business with Blockchains, and Business Use-cases. Students will also explore the Hyperledger, hosted by The Linux Foundation. This week students also will begin working on building their first Blockchain application using the following tutorial and source code:
    - https://hackernoon.com/learn-blockchains-by-building-one-117428612f46
    - https://github.com/dvf/blockchain
  - Week 3 - During this week students will continue to work on building their first Blockchain application.
  - Week 4 - During this week students will attempt to finish creating their first Blockchain application. Students will also take a final exam concerning the

elementary, intermediate, and advanced concepts concerning Blockchain technology, as well as present the conclusion of their projects concerning a personal Blockchain for commercial purposes.

- CDSD Module 13: Quantum Theory Lab (24)
  - Week 1 - Students will go through introductions and basic FAQs, as well as getting started with the Histogram representation graph. Next, students will explore the wonderful world of the Qubit, as well as researching SIngle-Qubit Gates.
    - https://www.youtube.com/watch?v=S52rxZG-zi0
    - https://quantumexperience.ng.bluemix.net/qx/tutorial?sectionId=beginners-guide&page=introduction
  - Week 2 - This week students will research Multi-Qubit Gates, and Entanglement. Students will also play the game Quantum Chess, in order to gain a conceptualization of the commercialization potential of the Quantum Computing technology.
    - https://store.steampowered.com/app/453870/Quantum_Chess/
    - http://quantumrealmgames.com/#qcrules
  - Week 3 - This week students will begin to work on creating an experiment using the IBM Quantum Composer, utilizing an actual Quantum processor
    - https://quantumexperience.ng.bluemix.net/qx/editor
    - https://github.com/Qiskit/qiskit-tutorial
    - https://github.com/Qiskit/qiskit-terra#installation
  - Week 4 - Students will continue working on and finalizing their demonstration project for the IBM Quantum Composer. Students will also take an examination regarding elementary and intermediate concepts concerning Quantum Computing Technology.

- CDSD Module 14: Deep Neural Networks Applied Basics (TensorFlow/ROS/IBM Watson) (24)
  - Week 1 - Students will once again revisit the installation of ROS. Students will work with the ROS Robotics Projects, using Image Recognition, ROS, and TensorFlow. This week students will download prerequisites, the ROS image recognition Node, Running the Image Recognition Node.
  - Week 2 - Students will use ROS Robotics Projects, to work with Object Detection and Recognition. Students will learn how to run the image recognition node. Students also will learn how to find 2d objects using packages in ROS. Students will install packages and learn how to find objects using ROS nodes for webcams.
  - Week 3 - Students will also work with IBM Watson to create Deep Neural Networks, using the Watson Editor. Students will gather into groups and will mine images from the internet regarding two items they want to compare and create a basic deep neural network by training a model. Second, students will also register for the Nvidia Developer portal, and will complete two FREE online labs, with the Nvidia Deep Learning Institute, regarding Image Classification with DIGITS, and Object Detection with DIGITS.
    - https://developer.nvidia.com/dli/online-training

- Week 4 - Students will write a - page white paper comparing the major platforms for Deep Learning, such as TensorFlow and Caffe. Students will also make a 10-slide pitch deck and will also undergo a final examination covering core concepts concerning deep learning, ROS, TensorFlow, IBM's Watson, and Nvidia DIGITS.

- CDSD Module 15: The Applied Science of IoT (24) -
  - Week 1 - Students will learn about the two leading IoT standards Z-wave vs. Zigbee. Students also will gain the opportunity to dive into Zigbee more in depth. Students will write a one-page comparative paper between Zigbee and Z-wave, which will be due at the end of the week.
    - https://www.the-ambient.com/guides/zigbee-vs-z-wave-298
    - https://learn.adafruit.com/alltheiot-transports/zigbee-z-wave
  - Week 2 - This week, students will start building the Mozilla Iot Gateway, using Zigbee Devices, such as the smart socket, and a dongle for the Zigbee IoT Standard. Students will be required to
    - https://www.samsung.com/uk/smartthings/sensors-plug-f-app-uk-v2/
    - https://www.digi.com/products/xbee-rf-solutions/boxed-rf-modems-adapteutrs/xstick
    - https://github.com/mozilla-iot
  - Week 3 - This week students are going to continue building their IoT Gateway, if they have not yet finished. Students also will also research the IoT Industry, creating a final report, in the form of a 10-slide deck, touching on the overall market, market participants, industries involved, business use-cases, hot-button issues, and noteworthy innovations. Students may also include other facts and information thought to add value to the overall presentation.
    - https://info.talend.com/rs/talend/images/WP_EN_TLD_OReilly_IOT_Market.pdf
    - https://www.gartner.com/binaries/content/assets/events/keywords/catalyst/catus8/2017_planning_guide_for_the__iot.pdf
  - Week 4 - Students will research smart cities and smart homes. Students will watch the documentary, featuring Smart Cities, during the first course of the week. Students will gather into groups and present a 10-slide deck concerning Energy Management, Transportation, Surveillance, Water Management, Structural Health, and Smart Agriculture. Students may also comment on any current trends in the Smart Homes and Smart Cities market along with noteworthy innovations. Students will also take a test concerning topics regarding the Internet of Things, Smart Homes, and Smart Cities.
    - https://www.youtube.com/watch?v=svvIHxwgmDY
    - https://www.researchgate.net/profile/Siddharth_Mehrotra2/publication/290740326_Smart_Cities_and_Smart_Homes_From_Realization_to_Reality/links/569b4af108aea1476950591a/Smart-Cities-and-Smart-Homes-From-Realization-to-Reality.pdf?origin=publication_detail

- CDSD Module 16: Swarm Technology in Motion (24)

- Week 1 - Students will work with an Underwater Simulator for autonomous systems. They will build the system with the UUV simulator and learn about how to manipulate autonomous systems and train such systems without risking life or limb in a dynamic environment. Students are to spend the first week dedicated to making the project work. If students are not able to succeed after the first week, they are still to be graded, and they also must move on to the next weeks project.
  - https://github.com/uuvsimulator/uuv_simulator
  - https://github.com/uuvsimulator/rexrov2
- Week 2 - Students will work with swarms in the Gazeebo robotic environment, to test the technology and provide a level of reference for students who have not seen nor experienced swarm technology before. Swarms in Gazeebo
  - https://github.com/nevinvalsaraj/swarm-gazebo-simulator
- Week 3 - Students will work with swarm technology in Microsoft AirSim, learning about how the inner workings of the disruptive technology. If the students and/or class do not complete the project within the first week, they are to be graded and move on.
  - https://github.com/saihv/AirSim
  - https://github.com/Microsoft/AirSim/blob/master/docs/settings.md#image-capture-settings
  - https://github.com/Microsoft/AirSim/blob/master/docs/settings.md#image-capture-settings
- Week 4 - Students will learn how to control a group of swarms using off-the-shelf components to control a group of drones exhibiting swarm behavior.

- CDSD Module 17: Masternodes and Decentralized Systems (24)
  - Week 1 - Students will learn the definition of a security under the Securities Exchange Act of 1933. Students will also explore case studies of Masternodes, such as PacCoin and others. Students will further dive into Masternodes by definition, Block Rewards, Private$PAC, Instant$PAC, the X11 Algorithm vs. Others, and Proof-of-Service. Students will also pic a Masternode to begin following as a favorite pick.
    - https://issuu.com/infinite8institute/docs/we_farm_nodes_-_masternode_white_pa
    - https://masternodes.online/
  - Week 2 - Students will further study Masternodes, such as the Staked PAC, General Rules for Property Transactions, Capital Gains, Long-term Capital Gains, Money Laundering Overview, Primary Criminal Culpability, Secondary Criminal Liability, and Virtual Private Networks. Students also will debate the legality of Masternodes, PACCoin, Bitcoin, Bitcoin Cash, Ethereum, and LiteCoin.
  - Week 3 - Students will finish up their reading, and will study Legal Precedent, National Security Implications, as well as Social and Economic Impact.
  - Week 4 - Students will actually go through the online steps of setting up a mock masternode. Students will not actually set up a masternode, however, students will learn a great deal by learning how to set up an

actual masternode. Students will also look at the various processes for setting up Masternodes in at least three other currencies, of which students are to research. Students will present at the end of the week concerning the best-practices and steps for setting up the vast majority of masternodes across digital currencies.

- https://medium.com/@DarbyOGill_/masternodes-for-beginners-6c697119bc31

- CDSD Module 18: Cybersecurity and Embedded Systems (24 hours)
  - Week 1 - Students will be introduced to the area of Cybersecurity. Students will watch an interview with John McAfee, who founded the first cybersecurity company in American in the late 80's. Students will further break into groups and present on the top 10 hacks of all time. Students will break into groups and conduct research, later condensing all research into a 10-slide deck to be presented before the end of the last course for the week.
    - https://www.youtube.com/watch?v=RyjBmR3W09I
    - https://www.lifewire.com/the-greatest-computer-hacks-4060530
    - https://www.youtube.com/watch?v=4ginaEM2LfU
    - https://www.youtube.com/watch?v=yp7min0TOiY
  - Week 2 - Students will spend this week doing hands-on projects. Specifically, students will work with the Raspberry Pi 3, learning how to access a network using ssh, how to explore the network, conduct an overview of the network, how to monitor the airspace, and how to knock other visitors off the network. Students will also learn best-practices of utilizing security features on embedded systems.
    - https://makezine.com/2017/09/07/secure-your-raspberry-pi-against-attackers/
    - http://web-algarve.com/books/Raspberry%20Pi/Raspberry%20Pi%20for%20Secret%20Agents.pdf
  - Week 3 - Students will spend the week working in groups and researching the exact capabilities, specifications, advantages, and market analysis of ARM-based chips. Students will explore the impact and reach in the mobile and embedded systems space of the ARM-based architecture. At the end of the week, students will present on core topics discussed and covered concerning ARM architecture in the form of a 10-slide deck. Students will also include the issues with the ARM architecture.
    - https://www.youtube.com/watch?v=7LqPJGnBPMM
    - https://www.theguardian.com/technology/2018/jan/04/meltdown-spectre-worst-cpu-bugs-ever-found-affect-computers-intel-processors-security-flaw
    - https://www.itprotoday.com/patch-management/evolving-arm-processors-aim-avoid-amd-and-intel-security-issues
  - Week 4 - Students will learn how to keep their data secret with encryption, by creating a vault within a file [Supplied Reading Material]. Students will then get together in groups and create a list of Cybersecurity best-practices for embedded systems, not only the pi, but overall. The presentation will consist of a 10-slide deck. Students also will be tested over basic cyber security concepts that have been taught and those that have been applied.

- CDSD Module 19: Drone Lab (48)
  - Week 1 - We will conduct introductions, and briefly network toward the beginning of class, and provide some background concerning course expectations. Participants will pick teams of 1-3 individuals. A single person project will require approval of the lecturer. Each student will create a one-page description of their project and research topic, as well as creating a strategic action plan for accomplishing the creation of a functional prototype within the 8-week timeframe. Students also will make a list of supplies they will need. Supplied are to be provided by the institution and may not be devices brought from outside of the existing facilities.
  - Week 2 - We will begin discussing ideas concerning the implementation of User Experience (UX) design. Students will also complete a one-page abstract concerning how they plan to incorporate the UX design principles into the overall project implementation process and procedures. Students will then be able to manage technology-based projects with a user-centric design.
    - http://www.tirop.com/up/ux-design-for-startups-marcin-treder.pdf
  - Week 3 - Course participants will review, with a mentor, major components and overall design approach. Students will create a block diagram around their concept, for summarization. Also, staff will discuss with students, potential funding sources to assist in the final development of a prototypical use case for the development, and/or simulation of projects. Furthermore, students also will learn the fundamentals to User Interface or UI Design.
    - http://helplena.co/textbooks/semester8/eguid.pdf
  - Week 4 - Students will work with instructors during the first half of class concerning their project topic, providing expert assistance, guidance toward relevant resources, and mentoring concerning commercialization potential, and technical assistance. Additionally, students will learn about the Lean Six Sigma procedures for Process and Project Management, as it applies to IT-based projects. Students will also make a plan as to how they will apply to principles of Lean Six Sigma to development and implementation of their final prototype design. Students will present a 10-slide deck concerning the Lean Process and its integration into their project by the end of class this week.
    - https://www-935.ibm.com/services/us/gbs/bus/pdf/g510-6331-01-leansixsigma.pdf
  - Week 5 - Students will learn details concerning the origination, growth, and future of the Internet-of-Things (IoT) industry, as well as how it applies to their own design concept. Students will work together and study the materials in groups, and present at the end of the week concerning how these use cases and projections into the IoT field may or may not have an impact/effect on their industry.
    - https://www.researchgate.net/profile/Vijay_Kalyani/publication/2815 55458_IoT_%27Machine_to_Machine %27_Application_A_Future_Vision/links/55ed97ae08ae3e1218481 e34/IoT-Machine-to-Machine-Application-A-Future-Vision.pdf

- o Week 6 - Course participants must submit an outline of their research paper. Students will learn the history of Design Thinking, as well as how Design Thinking has been applied to many technology-related problems, such as the design of Apple's first mouse. Students will then discuss how concepts and principles of design thinking may be integrated into their final prototype.
    - https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf
- o Week 7 - Students will work with staff to create a check list of deliverables. The groups will cover three areas, minimum goals, complexity, and lab process or flow. Students will also be expected to submit a first draft of the White Paper by the end of the week. The White Paper must be at least 5-7 pages, 12pt. font, and split column. Students will also learn how to construct high quality research citations, as well as learning common pitfalls of scientific research and writing.
    - https://ocw.mit.edu/courses/biological-engineering/20-109-laboratory-fundamentals-in-biological-engineering-fall-2007/assignments/sci_writing_guid.pdf
- o Week 8 - Students will demonstrate any products/services they have created as prototypes. Students will also be expected to provide a live presentation, in addition to the presentation of a final white paper. Each team will follow-up with staff and/or mentors within 1-week of the final Demo Day to provide course feed-back, grading feed-back, and assistance regarding the next phase of commercialization.

CDSD Total Classroom Hours: 504

CDSD Total Cost: $9,000

26 Attendance Policy (Classroom/Lab Training)

Regular attendance is an essential practice that students must continually demonstrate at work and at the training facility. Students need to attend all classes to which they are scheduled, and absences should be rare. Students who attend regularly will appreciate the need to be a reliable member of the Commercial Drone Technology workforce, and it will give them every opportunity to get the fullest academic and technical experience from the training classes provided.

To that end, I8I National Apprenticeship's attendance policy places high expectations for attendance.

26.1 UNEXCUSED TARDY, EARLY LEAVE OR ABSENCE

I8I and the I8I National Apprenticeships are responsible for educating our students in behaviors that will ensure their success on the job. One of the most important behaviors is punctuality, especially at your place of employment. I8I recognizes that continual student tardiness and/or early dismissals only deprive them of a full educational experience. An employer will not accept habitual tardiness or leaving early, neither does the apprenticeship program.

26.1.1 First Violation:

Apprentices arriving late to scheduled training at the Local/Regional Training Site will be recorded as being absent and will not be allowed to attend class for the entire day. The apprentice must call the Training Site no later than 9:30 a.m. if unable to attend class. Late apprentices as well as absent apprentices will not receive per diem for the day or credit for the day's hours.

26.1.2 Second Violation within 30 days or third violation within one year:

Upon a second unexcused tardy or absence (in a 30-day period or third within one year), the apprentice will be dismissed from class, sent home at his/her own expense, and receive a mandatory 30-day suspension and/or cancellation from the program. In addition, a second no-show to a scheduled training class will result in termination from the program. Non-apprentices are to be dismissed from class and sent home at their own expense.

27.2 EXCUSED TARDY, EARLY LEAVE, OR ABSENCE

27.2.1 Must be approved by the Lead Instructor or Site Director in advance. The decision of determining whether an absence is excused or unexcused will be determined on a day-to-day basis depending on the circumstances.

Examples of excused absences include:

Doctor/Medical Health Professional Visits: A Doctor's note must be submitted to the instructor within 3 days of the absence. Notes not turned in within this timeline will not be accepted and the absences will be deemed unexcused.

Funeral

Court Appearance

27.2.2 Incarceration, dismissal from class, or suspension are not acceptable reasons for an absence to be excused.

27.2.3 Each excused absence must be accompanied by written documentation. Violation of the attendance policy can lead to termination from the program by the Regional Advisory Committee.

27.3 Students participating in the I8I National Apprenticeship Programs, are expected to warn family members, and take care of personal responsibilities prior to participation.

27.4 All absences (excused or unexcused) must be made up at a recognized Local/Regional Training Site. The Apprentice must check with his/her Local Site to schedule makeups for missed time.

28 Medical Screening Policy (Classroom/Lab Training)

28.1 It is a requirement that all students complete a medical information form before being allowed to attend Classroom or Lab Training. This screening is required to assure the Local Site Manager and I8I that a student is not taking prescribed prescription drugs that could impair the individual's performance or make him/her a danger to themselves or the people around them while operating heavy equipment. A medical condition may also qualify students for additional assistance by way of State and/or Federal workforce assistance programs. Additionally, medical conditions are necessary to accommodate each apprentice appropriately, based on career recommendations, and occupational qualifications, and Federal licensing requirements.

28.1.1 Should the student answer "YES" that they are on prescribed drugs then they must supply a document from their health care provider stating, without naming the drugs, that they are able to perform the tasks required by the given Classroom/Lab Training curriculum according to the drugs side effects or they will not be allowed to attend class and will be sent home.

28.1.2 If any student refuses to fill out the Medical Screening form or falsify the form or are found to be on prescription drugs through random or required drug testing after having responded negatively to the prescription drug question, I8I will evaluate each occurrence on a case by case basis.

29 Regulations for all Classes

1. All students must have a current drug screening prior to participation in any classroom or shop training. Students without a current drug screening are prohibited from any I8I National Apprenticeship training or evaluation.

2. All students are required to keep their work area in good order, free of trash and safety hazards.

3. Harassment will not be tolerated. (See Sexual Harassment Policy.)

4. Proper attire in accordance with the dress code must be worn at all times while at the training facility.

5. The use of tobacco products, including electronic cigarettes, is only permitted in designated areas.

6. Any student involved in violence and/or is noncompliant will be subject to appropriate disciplinary action.

7. Students are not permitted in the Local Site administrative and lobby areas without permission from the instructor.

8. Students are prohibited from opening files and/or file cabinets as they may contain personal and confidential information.

9. Room thermostats are not to be adjusted except by authorized personnel.

10. No littering in the training center or on the property.

11. Food or drinks are allowed only in designated areas.

12. No eating in the Lab area.

13. Phones and printers are for staff use only, permission must be requested prior to using.

14. Cell phone use is only permitted during breaks and lunch.

15. Water coolers are for drinking water "Not to wash hands, spit in or wash tobacco products down".

16. Do not attempt to operate equipment unless authorized by the instructor.

17. No personal equipment/tools are to be used.

18. Destruction of property and equipment will not be tolerated at the training site or hotel/motel. Students in violation of hotel policy are to be immediately dismissed from class and sent home at their own expense.

19.

20. Do not play or tamper with the fire extinguisher, first aid box or the lights.

21. Gambling of any type is not permitted.

22. Drugs and alcohol are prohibited (including before class and during lunch). Any student determined to be under the influence of, or in possession of alcohol or drugs while at the training facility will be subject to disciplinary action.

23. Reference books may be checked out while attending the training site with the instructor's permission and must be returned at the end of the class.

Any loss or destruction of books will be charged to the student at the cost of replacement.

24.   Students will receive one (1) 10-minute break every two hours.

25.   No one is allowed to leave the training center during class hours without permission.

26.   Lunch time is at the discretion of the instructor. All students are required to be in their designated area at the start time determined by the instructor.

30 Dress Code

30.1 Appropriate dress is a matter of safety and reflects positively on the program. Students should consider the training center their place of employment and dress accordingly. I8I National Apprentices are to be neat, well groomed, and always respectful of both themselves and others. Employers and owner representatives often visit our training facilities. What they see may affect employment opportunities for our entire membership.

30.1.1 Students found to be non-compliant with the training center's dress code will receive a violation report, be dismissed from class that day, and be required to make up the missed day at their own expense. Continued non☐compliance will result in further disciplinary action.

30.1.2 Clothing and accessories containing messages which display violence, drugs, illegal behavior, sexually explicit messages, or vulgarity are prohibited.

30.1.3 Long hair must be kept up as to not pose a safety hazard.

30.1.4 Jewelry which may pose a safety hazard is not to be worn during Classroom or Hands-On Operations.

30.1.5 Proper Attire:

Durable shoes or boots, no athletic, running, tennis, open-toed, open-backed, or high heel shoes or sandals.

Long pants made from cotton or another non-flammable material.

Shirt with sleeves made from cotton or other non-flammable material (no nylon or polyester etc.).

Safety glasses are to be worn when flying prototypes.

Ripped Jeans.

Safety vests when in the field.

31 Suggested Work Processes

Please refer to Registered Apprenticeship Standards Documentation on page A2-A11.

These standards of apprenticeship are hereby adopted, and the program will be operated in accordance with the Equal Employment Opportunity Act during Apprenticeship and Training.

_____   _____
Signature of Apprentice   **Date**

_____   _____
Signature of Sponsor   **Date**

_____
Title

Program registered as incorporating the basic standards recommended by the local authorized Apprenticeship Registration Agency.

_____   _____
Signature of I8I Official   **Date**