

## **5. Freediver**

### **5.1 Introduction**

This is the entry-level certification course for individuals wishing to learn the fundamentals of proper breath hold diving for the purpose of increasing underwater awareness and enjoyment. An introduction to open water Freediving skills and techniques to depths no deeper than 20 metre/66 Feet are practiced with the program also encompassing static and dynamic apnea as introductory or stand-alone disciplines.

A pool only certification may be issued to those not wishing to participate in open water training.

### **5.2 Course Objectives**

The objective of this course is to train individuals in the benefits, skills, techniques and safety and problem management for entry level Freediving to a depth of 20 metre/66 Feet, with basic level static apnea development of 1:30 minutes at a minimum and an optional dynamic apnea development of 25 metre/82 Feet.

### **5.3 Program Prerequisites**

1. Minimum age of 10 for Junior Freediver or 16 years for Freediver.
2. Competent swimming skills.
3. PFI Snorkeler or equivalent skill level.

### **5.4 Required Student Equipment**

1. Mask, Fins, Snorkel.
2. Exposure protection appropriate for local environment.
3. Weight belt and weights appropriate for local environment.
4. Timing device (preferred freediving computer or depth gauge).

### **5.5 Support Materials**

#### **Student Materials:**

1. *PFI Medical Statement.*

2. *PFI Liability and Assumption of Risk Form.*
3. *PFI Freediver Manual or eLearning.*

**Instructor Materials:**

1. *PFI Freediver Instructor Manual*
2. *PFI Freediver Instructor Guide*

## **5.6 Qualification of Graduates**

1. Upon successful completion of this course, graduates may engage in buddy supported freediving activities appropriate for the environment without direct supervision of an instructor to depths no greater than 20 metre /66 Feet.
2. Upon successful completion of this course, graduates are qualified to enroll in the Freediver Coaching, Intermediate Freediver, Open line Diving and Specialty Freediver programs.
3. Divers may be certified with a Freediver-Pool Only certification after successfully completing all knowledge Development and Confined Water training sessions. There is no open water training necessary for this level of certification and divers at this level are not certified for any open water activities.

## **5.7 Who May Teach**

This course may be taught by any active PFI Freediver Instructor. The PFI Freediver Instructor may use active status PFI Assistant Instructors to increase student ratios.

## **5.8 Student to Instructor Ratio**

**Classroom:**

1. Unlimited, so long as adequate facilities, supplies and time are provided to ensure comprehensive and complete learning.

**Confined Water:**

1. A maximum of eight students to one PFI Freediver Instructor (8:1).
2. A maximum of twelve students to one PFI Freediver Instructor (12:1 max) with the use of active status PFI Assistant Freediver Instructors.

**Open Water:**

1. A maximum of six students to one PFI Freediver Instructor (6:1).

2. A maximum of ten students to one PFI Freediver Instructor (10:1 max) with the use of active status PFI Assistant Freediver Instructors.

## **5.9 Course Structure and Duration**

### **General Execution:**

1. No more than 2 in-water sessions per day.
2. Training sessions must be completed during daylight hours, or under conditions that simulate daylight conditions.
3. All skills are to be briefed, practiced, evaluated, and debriefed by the PFI Freediver Instructor or PFI Assistant Freediver Instructor.
4. During all skills, students will act in a buddy team (buddy A – diver, buddy B – safety) during all skills to promote team freediving.

### **Confined Water Execution:**

1. Students must complete a minimum of 1 confined water session with 2 recommended.
2. Maximum confined water training session of 10 Metre/33 Feet for confined water skills, 20 Metre/66 Feet for open water skills for Freediver Deep Pool Only certification.
3. Students should, where applicable, treat the confined water as an 'open water environment' and employ all protocols consistent with open water freediving.

### **Open Water Execution:**

1. Students must complete a minimum of 1 open water session with two recommended.
2. Training depth must be between 10 to 20 Metre/33 to 66 Feet; the maximum depth may not exceed 20 Metre/66 Feet.

### **Course Structure:**

1. PFI Allows Instructors to structure courses according to the number of students participating and their skill level.

### **Duration:**

1. The suggested number of total course training hours is 16.

## **5.10 Administrative Requirements**

1. Collect the course fees from all the students.
2. Ensure the students have the required equipment.
3. Communicate the schedule to the students.

4. Have the students complete:
  - a. *PFI General Liability and Express Assumption of Risk Form*
  - b. *PFI Medical History Form*

### **5.11 Knowledge Development Overview**

Instructors may use any additional text or materials that they feel help present these topics.

**The following topics must be covered during this course:**

1. Introduction:
  - a. Participant and Staff Introductions.
  - b. Course Overview.
  - c. Paperwork and Prerequisites.
  - d. Equipment Requirements Check.
  - e. Classroom, Confined and Open Water Protocols and Conduct.
  - f. Safety/Supervision Practices.
2. History of Freediving.
3. Safety & Problem Management:
  - a. Freediving supervision:
    - i. Direct Supervision.
    - ii. One buddy up and one down.
  - b. Safety for depth freediving:
    - i. Being prepared.
    - ii. Remain close enough to PROTECT THE AIRWAY!
    - iii. Time your buddy's dive.
    - iv. Know which direction they are heading while under.
    - v. Rule of 9's.
  - c. Safety and signals for static apnea:
    - i. Signal Agreement.
    - ii. Proper Signaling.
    - iii. Two strikes rule.
    - iv. Air release (loss of airway control).

- v. Target time and signals.
- vi. Exiting a static apnea
- vii. Loss of Motor Control (LMC)/Blackout (BO).
- d. Safety for dynamic (optional):
  - i. Safety Positioning.
  - ii. Watch body style.
  - iii. Loss of airway control.
  - iv. Loss of Motor Control (LMC) /Blackout (BO).
- e. Loss of Motor Control (LMC) and Blackout:
  - i. Depth Hypoxia vs. Apnea Hypoxia.
  - ii. Near Blackout, LMC, and Samba.
  - iii. Assisting an LMC at the Surface.
  - iv. Blackouts.
  - v. Assisting Blackouts at the surface.
  - vi. Responding to Bailouts and Blackout below surface.
- f. Buddy separation:
  - i. At the surface.
  - ii. Underwater.
- 4. Breathing:
  - a. Respiratory muscles:
    - i. Diaphragm.
    - ii. Intercostals.
    - iii. Subclavian (scalene).
  - b. Correct breathing cycles:
    - i. Normal ventilations.
    - ii. Ventilations.
    - iii. Purging.
    - iv. Peak Inhalation.
    - v. Recovery breathing.
  - c. Recovery breathing:

- i. What is Recovery Breathing:
  - 1. Six most important breaths.
  - 2. Upper chest.
  - 3. Gas exchange and maintains cerebral blood circulation.
  - 4. Cleansing VS Hook breaths; 6Cleans VS 3Hook + 3 Cleans.
- ii. Static/Dynamic recovery breaths:
  - 1. Cleansing breaths.
- iii. Constant Ballast recovery breaths:
  - 1. Hook breaths; held for 3 seconds at full inhalation.
- d. Anxiety stimulus:
  - i. Causes.
    - 1. Physical Stress.
    - 2. Physiological Stress.
    - 3. Psychological Stress.
  - ii. Stress Reduction.
- 5. Equipment for Freediving:
  - a. Masks:
    - i. Volume.
    - ii. Fit.
    - iii. Materials and types.
    - iv. Maintenance.
  - b. Fins:
    - i. Blade length.
    - ii. Materials and types.
    - iii. Maintenance.
  - c. Snorkels:
    - i. Features.
    - ii. Placement.
    - iii. Submersion protocol.
    - iv. Maintenance.

- d. Exposure protection.
- e. Wetsuits.
  - i. Features.
  - ii. Materials and types.
  - iii. Maintenance.
- f. Hoods:
  - i. Materials and types.
  - ii. Equalizing.
- g. Gloves:
  - i. Features.
  - ii. Materials and types.
- h. Socks:
  - i. Features.
  - ii. Materials and types.
- i. Timing devices:
  - i. Waterproof Timers:
    - 1. Features of watches.
    - 2. Features of freediving computers.
- j. Weight systems:
  - i. Materials and Types.
  - ii. Weights.
  - iii. Placement.
  - iv. Buckles.
  - v. Accessories and maintenance.
- k. Buoyancy systems:
  - i. Snorkeling vests features and types.
- l. Lines, flags and floats:
  - i. Diver Below Flag.
  - ii. Alpha Flag.
  - iii. Floats & Lines.

- m. Accessory freediving equipment:
    - i. Freediving knives and placement.
    - ii. Lights and markers.
    - iii. Goodie bags and stringers.
  - n. In-Water Environment:
    - i. Local aquatic animal and plant life.
    - ii. Local environmental conditions:
      - 1. Water type.
      - 2. Temperature and thermoclines.
      - 3. Visibility.
      - 4. Wind, waves and currents.
      - 5. How to assess and plan accordingly.
    - iii. Local freediving procedures:
      - 1. Boat/shore freediving.
      - 2. In-water procedures.
      - 3. Entry/exit procedures.
6. Physics & Physiology of Freediving:
- a. Pressure & volume changes:
    - i. Boyle's Law and its effects on a Freediver.
    - ii. Pressure and Body Air Spaces:
      - 1. Pressure on rigid air space:
        - a. Sinuses.
        - b. Ears.
      - 2. Pressure on semi-rigid airspaces:
        - a. Lungs.
        - b. Stomach/gastrointestinal.
    - iii. Pressure and Equipment Air Spaces:
      - 1. Mask and goggles.
      - 2. Wetsuit compression.
  - b. Equalization Techniques – body:

- i. Equalizing Ears & Sinuses.
- ii. Three methods of Equalizing and most preferred:
  - 1. Frenzel.
  - 2. Valsalva.
  - 3. Swallowing, Yawning, Jaw Thrust.
  - 4. Frequency.
  - 5. Losing air during equalization.
- iii. Equalizing Issues:
  - 1. Ears vs sinuses.
  - 2. "Noisy" ears and unequal equalizing.
- iv. Masks:
  - 1. Frequency.
  - 2. Recapturing air upon ascent.
- c. Pressure Related Injuries – barotrauma:
  - i. Barotitis Media:
    - 1. Symptoms.
    - 2. Causes.
    - 3. Treatment.
  - ii. Sinus Squeeze:
    - 1. Symptoms.
    - 2. Causes.
    - 3. Treatment.
  - iii. Perforated Eardrum:
    - 1. Symptoms.
    - 2. Causes.
    - 3. Treatment.
  - iv. Reverse Block:
    - 1. Symptoms.
    - 2. Causes.
    - 3. Treatment.

- v. Mask Squeeze:
  - 1. Symptoms.
  - 2. Causes.
  - 3. Treatment.
- d. Buoyancy:
  - i. Archimedes Principle.
  - ii. Three States of Buoyancy:
    - 1. Positive – Safety/technique.
    - 2. Neutral – 10 metre/33 Feet.
    - 3. Negative – Safety/technique.
  - iii. Things that effect buoyancy:
    - 1. Lung volume.
    - 2. Wetsuits.
    - 3. Weights.
    - 4. Body type.
    - 5. Salt vs fresh.
  - iv. Buoyancy Checks:
    - 1. Surface 'collar bone' rule of thumb.
    - 2. Slight positive at 5 metre/16 Feet.
    - 3. Neutral at 10 metre/33 Feet.
- e. Types & causes of blackouts:
  - i. Insufficient oxygen to the brain to support higher function.
  - ii. Recovery Blackout:
    - 1. 90% - Critical hypoxia or Pulmonary Dump.
    - 2. Insufficient recovery breathing.
    - 3. Blood pressure disruption.
  - iii. Ascent Blackout:
    - 1. 10% (9% & 0.9%) – Critical hypoxia or 'Vacuum Effect'.
    - 2. Rapid lung volume expansion and rapid drop in partial pressures.
- 7. Aquatic adaptations:

- a. Bradycardia.
  - b. Splenic contractions.
  - c. Blood shunt (peripheral constriction).
8. In-Water Training Exercises:
- a. Confined Water Skills & Techniques.
  - b. Open Water Skills & Techniques.
  - c. Communications.

## **5.12 Confined Water**

**To be certified as a PFI Freediver students must demonstrate the following skills to the satisfaction of the PFI Instructor:**

1. Watermanship and Stamina (May be completed in open water. If done in open water, must be completed prior to any other open water skills).
  - a. Distance swim of 200 Metre nonstop using any stroke without the use of swimming aids (mask or swim goggles may be used), or 300 Metre nonstop using mask, snorkel, and fins.
  - b. Tread water for 10 minutes without flotation.

**Note:** If an exposure suit is worn for any of the above skills, the wearer must be neutrally buoyant at the surface.

2. Snorkel breathing:
  - a. Swim continuously at the surface without a mask for a minimum of 25 minutes without removing the face from the water while breathing continuously through the snorkel.
3. Open Water Freedive Simulation:
  - a. Breathe up.
  - b. Descent with proper head position.
  - c. Equalizing at the surface and on the way down to the bottom of the pool.
  - d. Relaxed bottom kicking for 10 seconds.
  - e. Ascent with proper head position.
  - f. Drop arms at 10 metre/33 Feet (simulated depth) and shallower.
4. Assist with a simulated surface LMC as a safety:
  - a. Physically support the Freediver.

- b. Keep one hand on the chest above the waterline but below the chin.
  - c. Speak calmly to encourage the Freediver to breathe.
5. Respond to a simulated blackout at the surface:
- a. Protect airway with "head sandwich".
  - b. Place Freediver on their back into the "dosey-doe" position.
  - c. Remove their mask.
  - d. Blow, Tap, Talk 3 times.
6. Assist with a simulated underwater blackout:
- a. Recognize Freediver underwater signaling for assistance.
  - b. Freedive, take control of the Freediver asking for assistance.
  - c. Recognize blackout before surfacing.
  - d. Protect the airway with a "head sandwich".
  - e. Place Freediver on their back into the "dosey-doe" position.
  - f. Remove their mask.
  - g. Blow, Tap, Talk 3 times.
  - h. 2 simulated rescue breaths.
7. Static and Dynamic Apnea:
- a. Static apnea:
    - i. As a breath-holder student must complete a minimum of 4 consecutive static breath-holds.
      - 1. 1st session:
        - a. Vent – hold ratio:
          - i. 1 minute – 1 minute.
          - ii. 3 minutes – 2 minutes.
          - iii. 3 minutes - 2:30 minutes.
          - iv. 4 minutes – 3 minutes.
      - 2. 2nd session (optional):
        - a. Vent – hold ratio:
          - i. 3 minutes – 2 minutes.
          - ii. 4 minutes – 3 minutes.

- iii. 5 minutes – 4 minutes.
- ii. Complete a minimum 1:30 minute static apnea, not exceeding 4:00 minutes, without any hypoxic symptoms.
- iii. As a safety student must complete:
  - 1. Buddy supervision.
  - 2. Timing and safety signals.
  - 3. Recovery breathing and support assistance.
- b. Dynamic apnea (optional):
  - i. As a breath-holder student must complete a minimum of 3 dynamic performances.
    - 1. Vent – distance ratio:
      - a. 1 minute – 25 metre/82 Feet.
      - b. 2 minutes – 25 metre/82 Feet + turn.
      - c. 2 minutes – 50 metre/82 Feet.
    - 2. Streamlining and kicks appropriate for dynamic.
    - 3. Complete a minimum 25 metre/82 Feet dynamic apnea, not exceeding 75 metre/246 Feet, without any hypoxic symptoms.
    - 4. As a safety student must complete:
      - a. Surface safety with floatation.
      - b. Recovery breathing and surface support assistance.

### **5.13 Open Water**

**To be certified as a PFI Freediver a student must demonstrate the following skills to the satisfaction of the PFI Freediver Instructor as follows:**

- 1. Open Water Training Sessions:
  - a. A minimum of one (1) open water session must be completed with two (2) recommended.
- 2. Weighting and Buoyancy:
  - a. Establish positive buoyancy at approximately 5 metre/16 Feet after 1st level exhalation without sculling, finning, treading, or pushing off plate.
  - b. Establish neutral buoyancy at approximately 10 metre/33 Feet with peak inhalation without sculling, finning, treading, or pushing off plate.

3. Fin Use:
  - a. Introduce proper kick cycles determinations to landmark depths:
    - i. Landmark 10 metre/33 Feet kick cycles.
    - ii. Landmark 15 metre/50 Feet and 20 metre/66 Feet kick cycles (optional).
  - b. Dolphin kick (optional).
4. Free Immersion Warm-up Dives:
  - a. Complete a minimum of four (4) free immersion style freedives as a warm-up.
  - b. Reach a minimum of 10 metre/33 Feet without barotrauma or hypoxic symptoms:
    - i. Breathe up properly.
    - ii. Remove snorkel.
    - iii. Descend using double or single leg descents.
    - iv. Ensure proper head position.
5. Complete six constant ballast dives:
  - a. Reach a minimum of 10 metre/33 Feet without barotrauma or hypoxic symptoms.
    - i. Surface breathing and preparation.
    - ii. Remove snorkel.
    - iii. Double leg, or single leg raised entry.
6. Demonstrate proper descent procedures:
  - a. Stay within arm's reach of the descent line.
  - b. Face line during descent.
  - c. Maintain proper head neutral position.
  - d. Equalize frequently with arm tucked.
  - e. Descend at approximately 1 metre/3 Feet a second.
  - f. Practice kick-cycle speed and depth determination.
  - g. Utilize line for an effective bottom turn.
7. Demonstrate proper ascent procedures:
  - a. Double raised hands if flexibility and comfort allow.
  - b. Drop arms at 10 metre – 5 metre/33 Feet – 16 Feet.

- c. Recapture expanding air from mask if possible.
- d. 2 metre/6 Feet exhalation prior to surfacing
- e. Proper recovery breathing.

## **5.14 Graduation Requirements**

### **In order to successfully complete the course students must:**

1. Successfully complete all the knowledge development, confined water, and open water training sessions. Open water training is not necessary for Pool Only certification.
2. Demonstrate mature and sound judgment concerning planning and execution.
3. Achieve a passing score of 80% on the final exam and show 100% knowledge comprehension.
4. Complete the following skills:
  - a. Equipment:
    - i. Prepare equipment with minimal assistance.
    - ii. Buddy check all equipment.
  - b. Entry and exit:
    - i. Enter water with techniques appropriate for the environment.
    - ii. Signal buddy/shore/boat.
    - iii. Exit water with techniques appropriate for the environment.
  - c. Proper weighting and buoyancy:
    - i. Test for approximate neutral buoyancy at surface by floating upright at collar bone without sculling, finning, or treading.
    - ii. After buoyancy has been established – either collarbone for pool only, or 10 metre/33 Feet during open water for Freediver, perform a first level exhalation at the surface - If the student sinks – they are over weighted.
  - d. Snorkel Use:
    - i. Successfully clear and blast the snorkel without removing the head from the water.
  - e. Proper fin use:
    - i. Flutter kick at the surface.
    - ii. Maintain a stationary position with sculling.

- f. Descent and Ascent Procedures:
  - i. Surface breathing and preparation.
  - ii. Remove snorkel prior to entry.
  - iii. Demonstrate a double leg raised entry or a single leg raised entry in the order of:
    - 1. Bend.
    - 2. Leg(s).
    - 3. Pull.
    - 4. Kick.
  - iv. Demonstrate proper ascent procedures:
    - 1. Head in neutral position.
    - 2. Recapturing expanding air in the mask if possible.
    - 3. Exhale at approximately 2 metre/7 Feet.
    - 4. Proper recovery breathing.
  - v. During descents and ascents – the students’ head position must remain neutral.
- g. Self-emergency Ascent Procedures:
  - i. Flooded mask ascent:
    - 1. Fully flood at depth.
      - a. Pool only – deep end of pool.
      - b. Freediver – at 5 metre /16 Feet
    - 2. Remain at depth for approximately 10 seconds before ascending.
    - 3. Ascent and recovery breathe in a controlled manner.
  - ii. Remove weight belt and ascend:
    - 1. Remove weight belt at depth:
      - a. Pool only – deep end of pool.
      - b. Freediver – minimum 5 metre/16 Feet.
    - 2. Ascend holding belt low at their side with buckle end down.
    - 3. Perform proper recovery breathing.
    - 4. Replace weight belt at the surface with right hand release.

- h. Recovery Breathing:
  - i. Proper exhalation from 2 metre/6 Feet.
  - ii. Position both hands on float/side of pool.
  - iii. Show proper 3 hook and 3 cleansing breaths on upper half of lung volume.
  - iv. Hook breaths are held for a full 3 seconds.
- i. Safety & Problem Management:
  - i. Assist with recovery breathing as a safety:
    - 1. Be 2 metre/7 Feet to 3 metre/10 Feet to the side of the Freediver.
    - 2. Use audio coaching when necessary.
    - 3. Remain attentive and vigilant for a minimum of 30 seconds after the Freediver has surfaced.
  - ii. Respond to a simulated surface LMC as a Safety:
    - 1. Physically support the Freediver.
    - 2. Keep one hand parallel to the water, above the water, but below the chin.
    - 3. Speak calmly to encourage the Freediver to breathe.
    - 4. Maintain control until the Freediver regains control.
  - iii. Respond to a simulated blackout at the surface:
    - 1. Place the Freediver on their back with the airway protected using a "head sandwich".
    - 2. Securely support the Freediver's head with a "dosey-doe".
    - 3. Blow, tap, talk 3 times.
    - 4. Maintain control until the Freediver regains control.
  - iv. Assist with a simulated underwater blackout no deeper than 5 metre/16 Feet:
    - 1. Recognize signal for assistance.
    - 2. Physically support the Freediver.
    - 3. Ensure proper hand placement.
    - 4. Recognize blackout before the surface.
    - 5. Protect the airway with a "head sandwich".

6. Perform surface blackout procedures through 2 rescue breaths once the student has ascended with the blacked out Freediver.

**Instructors Must:**

1. Submit certifications to PFI Headquarters within 7 days of course completion date for processing.