

## 4. Freediver

### 4.1 Introduction

This is the entry-level certification course is 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 20m / 66' 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. This is the first level to introduce a coaching specific program for additional experience and skill refinement.

### 4.2 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 20m / 66 ft, with basic level static apnea development of 1:30 at a minimum and an optional dynamic apnea development of 25m / 82 ft.

### 4.3 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

### 4.4 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)

### 4.5 Support Materials

#### Student materials

1. *PFI Medical Statement*
2. *PFI Liability and Assumption of Risk form*
3. *PFI Freediver Manual*

### Instructor materials

1. *PFI Freediver* Instructor Manual
2. PFI Freediver Skill Guidelines

## 4.6 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 meters/66 ft.
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.

## 4.7 Who May Teach

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

## 4.8 Student to Instructor Ratio

### Classroom

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

### Confined Water

1. A maximum of 8 students to one PFI Freediver Instructor (8:1). Or maximum of 16 students to one PFI Freediver Instructor (16:1) with the use of 1 active status PFI Assistant Freediver Instructor max.

### Open Water

1. A maximum of 6 students to one PFI Freediver Instructor (6:1). Or a maximum of 12 students to one PFI Freediver Instructor (12:1) with the use of 1 active status PFI Assistant Freediver Instructor.

## 4.9 Depth Restrictions

### Open Water

1. Maximum open water depth of 20 meters / 66 ft.

### Confined Water

1. Maximum confined water depth of 10 meters / 33 ft.

## 4.10 Recommended Course Minimums

### Classroom

1. 6.0 Hours

### Confined Water

1. 5.0 Hours

### Open Water

1. 5.0 Hours

## 4.11 Knowledge Development Overview

The following topics must be covered during the course. Instructors may use additional texts or materials they feel help present these topics.

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 buddies 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 equalizing
    - 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
      - a. Symptoms
      - b. Causes
      - c. 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 – 10m / 33ft
    - 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 5m/16ft
    - 3. Neutral at 10m/33ft
- 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



## 4.12 Confined Water

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

1. Watermanship & Stamina
  - a. 200-meter continuous swim without aids
    - i. Mask or goggles can be used
    - ii. If using a wetsuit, the diver must be neutrally buoyant
  - b. Tread water for 10 minutes without floatation
2. Equipment
  - a. Prepare equipment with minimal assistance
  - b. Buddy check all equipment
3. Entry
  - a. Enter with technique appropriate for the environment
  - b. Signal buddy
4. Snorkel Use
  - a. Snorkel clearing
    - i. Successfully blast clear the snorkel without lifting the head 5 consecutive times with one breath through the snorkel between each clear.
  - b. Snorkel breathing
    - i. Swim continuously at the surface without a mask for a minimum of 25m without removing face from the water while breathing continuously through the snorkel.
5. Proper Fin Use
  - a. Flutter kick at surface for at least one minute.
  - b. Maintain a stationary position with sculling technique
  - c. Demonstrate upright finning technique
    - i. 6 strong kick cycles that bring the body to approximately chest level
    - ii. 6 soft kick cycles that bring the body to approximately collarbone level
  - d. Dolphin kick (optional)
6. Proper Weighting and Buoyancy
  - a. Remove and replace weight belt using a righthanded quick release.
  - b. Test for neutral buoyancy at surface by floating at collar bone level without sculling, finning, or treading is a requirement. *If the student's airway is submerged after a first level exhalation, then they are over-weighted.*
  - c. Equalization Equalize ears, sinuses and mask

7. Descent Procedures
  - a. Surface breathing and preparation
  - b. Remove snorkel before entry
  - c. Demonstrate a double leg raised descent in the order of:
    - i. Bend
    - ii. Leg
    - iii. Pull
    - iv. Kick
    - v. Student must demonstrate proper head position during all descents.
  - d. Demonstrate a single raised leg descent in the order of:
    - i. Bend
    - ii. Legs
    - iii. Pull
    - iv. Kick
  - e. Student must demonstrate proper head position during all descents.
8. Ascent Procedures
  - a. Student must demonstrate proper head position during all ascents.
  - b. Perform proper recovery breathing.
9. Self-Emergency Ascent Procedures
  - a. Flooded mask ascent
    - i. Full flood in shallow water
    - ii. Full flood at depth
  - b. Weight belt removal and ascent
10. 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 sec
  - e. Ascent with proper head position
  - f. Drop arms at 10m (simulated depth) and shallower
11. Emergency Rescue & Problem Management
  - a. Assist with recovery breathing as a safety
    - i. Be no farther than an arm's length away from the freediver
    - ii. Use visual and audio coaching
    - iii. Remain attentive and vigilant a minimum of 30 seconds after the freediver has surfaced.

- b. Assist with a simulated surface LMC as a safety
    - i. Physically support the freediver
    - ii. Keep one hand on the chest above the waterline but below the chin.
    - iii. Speak calmly to encourage the freediver to breathe.
  - c. Respond to a simulated blackout at the surface
    - i. Protect airway with “head sandwich”
    - ii. Place freediver on their back into the “dosey-doe” position
    - iii. Remove their mask
    - iv. Blow, Tap, Talk 3 times
  - d. Assist with a simulated underwater blackout
    - i. Recognize freediver underwater signaling for assistance
    - ii. Freedive, take control of the freediver asking for assistance
    - iii. Recognize blackout before surfacing
    - iv. Protect the airway with a “head sandwich”
    - v. Place freediver on their back into the “dosey-doe” position
    - vi. Remove their mask
    - vii. Blow, Tap, Talk 3 times
    - viii. 2 simulated rescue breaths
12. 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. 1min - 1min
          - ii. 3min - 2min
          - iii. 3min - 2:30min
          - iv. 4min – 3min
        - 2. 2nd session (optional)
          - a. Vent – hold ratio:
            - i. 3min – 2min; 4min – 3min, 5min – 4min
      - ii. Complete a minimum 1:30 static apnea, not exceeding 4:00, 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. 1min – 25m
      - b. 2min – 25m + turn
      - c. 2min – 50m
    - 2. Streamlining and kicks appropriate for dynamic
    - 3. Complete a minimum 25m dynamic apnea, not exceeding 75m, without any hypoxic symptoms
    - 4. As a safety student must complete:
      - a. Surface safety with floatation
      - b. Recovery breathing and surface support assistance

## 4.13 Open Water

The following open water skills are to be briefed, evaluated, practiced and debriefed by the PFI Freediver Instructor and/or certified active PFI Assistant Freediver Instructor as outlined in the General Standards and Procedures section.

■ During all skills students will act in a buddy team, surface safety and breath holder.

To be certified as a PFI Freediver a student must demonstrate the following skills to the satisfaction of the PFI 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. Equipment
  - a. Prepare equipment with minimal assistance
  - b. Buddy check all equipment
  - c. Entry Procedure most appropriate for local environment
- 3. Snorkel airway control
- 4. Recovery Breathing and Coaching
  - a. Perform proper recovery breathing.
  - b. Assist with recovery breathing as a safety and:
    - i. Be no further than an arm's length away from the freediver
    - ii. Use visual and audio coaching
    - iii. Remain attentive and vigilant a minimum of 30 seconds after the freediver has surfaced.

5. Weighting and Buoyancy
  - a. Weight belt removal and replacement at surface (select best local option)
  - b. Neutral buoyancy test at surface
  - c. Establish positive buoyancy at approximately 5m / 16ft even after first level exhalation without sculling, finning, treading, or pushing off plate.
  - d. Establish neutral buoyancy at approximately 10m / 33ft without sculling, finning, treading, or pushing off plate.
  - e. Test positive buoyancy at surface by not sinking after 1st level exhalation.
6. Fin Use
  - a. Flutter kick at surface and during depth dives
  - b. Use fin sculling to maintain a stationary position.
  - c. Demonstrate proper kick cycles determinations to landmark depths:
    - i. Landmark 10m / 33ft hard kick cycles
    - ii. Maximum 20m / 66ft soft kick cycles
  - d. Dolphin kick (optional)
7. Equalize Ears, Sinuses and Mask
8. 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 10m / 33ft by:
    - i. Breathe up properly.
    - ii. Remove snorkel
    - iii. Descend using double or single leg descents.
    - iv. Ensure proper head position.
    - v. Remove snorkel on descent.
9. Self-Emergency Ascent Procedures
  - a. Flooded mask ascent from 5m / 16ft
    - i. Flood at depth
      1. Full flood at 5m / 16ft of depth
      2. Remain flooded for 10sec at depth before ascent
      3. Controlled ascent and recovery breathing

- b. Remove weight belt and ascend.
    - i. Ascend with proper depth recovery breathing and buddy assistance
    - ii. Replace weight belt at surface using right hand release.
  - c. Complete six target constant ballast dives
    - i. Reach a minimum depth of 10m / 33ft using:
      - 1. Surface breathing and preparation
      - 2. Remove snorkel
      - 3. Double leg raised descent or single leg raised descent
10. Demonstrate proper descent procedures
- a. Stay within arm's reach of descent line
  - b. Face line during descent
  - c. Maintain proper head neutral position
  - d. Equalize frequently with arm tucked
  - e. Descend at approximately 1m / 3ft a second
  - f. Practice kick-cycle speed and depth determination
  - g. Utilize line for an effective bottom turn
11. Demonstrate proper ascent procedures
- a. Double raised hand
  - b. Drop arms at 10m – 5m / 33ft – 16ft
  - c. Recapture expanding air from mask if possible
  - d. 2m/6ft exhalation prior to surfacing
  - e. Proper recovery breathing
12. Emergency Rescue & Problem Management
- a. Assist with a simulated surface LMC as a safety
    - i. Physically support the freediver
    - ii. Keep one hand on the chest above the waterline but below the chin.
    - iii. Speak calmly to encourage the freediver to breathe.
  - b. Respond to a simulated blackout at the surface
    - i. Place the freediver on their back with the airway protected with 'head sandwich'.
    - ii. Securely support their head and body with a "dosey-doe".
    - iii. Blow, Tap, Talk 3 times.

- c. Assist with a simulated underwater blackout no deeper than 5m/16ft.
  - i. Recognize signal for assistance
  - ii. Physically support the freediver
  - iii. Ensure proper hand placement.
  - iv. Recognize blackout before the surface
  - v. Protect the airway with a “head sandwich”
  - vi. Perform surface blackout procedures through 2 simulated rescue breaths

## 4.14 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 whole knowledge comprehension.

### **Instructors must:**

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