



# CMAS

CONFÉDÉRATION MONDIALE  
DES ACTIVITÉS SUBAQUATIQUES

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WORLD UNDERWATER FEDERATION

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## **Underwater Navigation**

**Speciality Course**

**Version 200/00**

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# I. STANDARDS & REQUIREMENTS

## 1 Course classification (Type & Level)

The UNDERWATER NAVIGATION course is considered as a BASIC level speciality course. That means that the required minimum entry certificate is CMAS \* diver or equivalent.

## 2 Aims & Objectives of course

- 2.1 To interest and introduce divers in a safe and competent way to planing, preparing and performing for Underwater Navigation techniques and diving under close supervision.
- 2.2 To familiarise interested divers with the skills, techniques and possible problems for this type of diving.
- 2.3 To serve as a prerequisite for higher-level speciality courses.
- 2.4 To form another important link in the chain of continuous training and education within the CMAS system.

## 3 Entry requirements

- 3.1 student's minimum age: 15 years
- 3.2 certification level: ONE star CMAS or equivalent
- 3.3 min. number of dives: 15 (at least of these performed within 2 weeks prior to the course)
- 3.4 other: medical approval for diving. not older than 1 year

## 4 Maximum students/instructor ratios

- 4.1 excellent visibility (tropical waters) 6 / 1
- 4.2 normal visibility (inland waters) 3 / 1
- 4.3 poor visibility (any area) 1 / 1 (also for assistants)

NOTE. Assistants may used on a 2 : 1 base (2 additional students per 1 assistant) under conditions as mentioned under § 1 and 2

## 5 Instructor / assistants requirements

### 5.1 Inructor course director:

- 5.1.1. certificate level
  - National Federation/CMAS \*\* instructor
- 5.1.2. proof of experience
  - instructor must be in active teaching status as required by his National Federation
  - must be of proven ability and practical experience - medical approval for diving not older than 1 year
  - must have assisted another instructor on at least 1 course before conducting their own course
  - must have submitted his own course outline which has been approved the Federation Technical Committee or must use a standard outline proposed by Federation itself
  - must have approved and valid training in medical 1st aid and accident management by a recognized training organisation

### 5.2 Assistants:

- 5.2.1. generally
  - as required to the satisfaction of the course director. medical approval for diving not older than 1 year
- 5.2.2. certificate level
  - must held at least National Federation level = CMAS \*\* diver certificate or equivalent
- 5.2.3. proof of experience
  - participated himself successfully at a UNDER WATER NAVIGATION course, and EQUIPMENT SPECIALITY course
  - have attended at least once this course as an inactive observer" (without any tasks and responsibilities) to become familiar with the relevant procedures
  - have at least 80 logged dives overall
  - have attended a DIVE LEADERSHIP SPECIALITY course (or equivalent training) is mandatory (as for all supervisory tasks)
  - must have approved and valid training in medical 1st aid and accident management by a recognized training organisation

## 6 Special course requirements

### 6.1 Course approval

Approval by national (or regional) committee (or by the national/regional training manager) required for the FIRST course of this type by this instructor

### 6.2 Facilities

- 6.2.1. classroom
  - adequate classroom, according to the needs of course and students
- 6.2.2. water
  - confined open water area (sheltered area); no area with current, beach easily accessible from land AND from water (no heavy surf zone)

### **6.3 Diving equipment**

- 6.3.1. diving flag
- 6.3.2. adequate thermal protection
- 6.3.3. otherwise scuba diving equipment
- 6.3.4. instructors and assistants **MUST** be equipped with alternative air source (2 regulators; at least octopus system) This requirements applies, of course, only to speciality courses with open water lessons
- 6.3.5. it is strongly recommended that in waters with temperatures of less 10° deg. C and depths deeper than 20m, all involved instructors, assistants and participants should carry TWO completed INDEPENDENT regulator systems
- 6.3.6. during any kind of scuba diving activities, ALL involved instructors, assistants and participants **MUST** carry some form of buoyancy device (BC, ABLJ) with power inflator (direct feed)
- 6.3.7. ALL involved instructors, assistants and participants **MUST** be equipped with pressure gauges

### **6.4 Other equipment/material**

- 6.4.1. ev. buoy(s), markers for entry / exit
- 6.4.2. emergency medical kit with oxygen
- 6.4.3. communications ( phone, walky-talky ) nearby
- 6.4.4. corresponding recognition material ( C-card, badge, wall certificate )

### **6.5 Other restrictions**

- 6.5.1. entry / exit must be from land, at the same place, clearly marked and well visible from water
- 6.5.2. drift dives are prohibited during training
- 6.5.3. minimum duration of one dive is 20 minutes
- 6.5.4. duration must be restricted to a maximum of 1/2 hour in fresh water and to 1 hour in tropical water
- 6.5.5. depth limits according to certificate level of each participant (as a maximum under best conditions) and according to local circumstances; however 20m should never be exceeded during this course.
- 6.5.6. NOTE: dive duration must be planned so as not to reach the reserve (normally 40-50bar)
- 6.5.7. all diving is made within the non-decompression limits of officially used tables or dive computers, adequate for the dive site (altitude)

### **6.6 Supervision**

- 6.6.1. during the complete course, at least one authorised course director (instructor as outlined above) must always be present
- 6.6.2. classroom lectures may be delegated to a qualified assistant who performs the lesson under supervision by the course director
- 6.6.3. during practical underwater training, a course director must be either in the water with the students, or in a cover boat, or land as close as possible
- 6.6.4. during practical training underwater, the course director must always be present in the water and as close as possible to the site of activity.
- 6.6.5. under no circumstances are students allowed to be unattended in the water without supervision. A qualified assistant may perform such supervisory tasks.

### **6.7 Emergencies**

- 6.7.1. detailed emergency plan for the chosen site must be made and explained to all staff ,and participants
- 6.7.2. at least one trained staff member, familiar with the dive site, first aid and relevant equipment must remain on land or boat for coordination, supervision and emergencies

## **7 Student performance objectives**

By the end of the course, students should be able to:

- 7.1 explain and demonstrate proper planning, preparation and techniques underwater navigation activities and dives
- 7.2 identify and explain possible problems and hazards associated with underwater navigation activities and dives and their prevention
- 7.3 explain and demonstrate the correct use, handling and care of special underwater navigation equipment in recreational diving
- 7.4 pass successfully all oral and/or written forms of evaluations
- 7.5 demonstrate underwater navigation techniques while diving
- 7.6 perform proper buoyancy control while diving
- 7.7 demonstrate the correct use of the buddy system before, during and after underwater navigation activities
- 7.8 perform all required exercises and assessments as requested without stress and pass successfully all forms of evaluation

## 8 Minimum course duration

8.1 recommended number of sessions 6 (cheek dive NOT included)

8.2 minimum duration:

8.2.1. classroom two 01:30h sessions

8.2.2. confined open water one 03:00h session

8.2.3. open water two 03:00h sessions (cheek-dive NOT included)

8.3 minimum number of dives : 3 (cheek-dive NOT included)

**Note:** Normally, no more than 2 dives should be made per day, being the surface interval between the 1 st and the 2nd dive at least 2 hours

## 9 Quality control / assurance

CMAS strongly recommends and encourage all federations to use an adequate system for quality control and assurance. A system in widespread use and proven effectiveness is to send questionnaires to the students, followed by analysis of the feedback.

Questionable cases should be further investigated and measures taken to avoid similar situations in the future.

# II. TRAINING PROGRAMME

## 1 Course schedule

1.1 recommended number- of sessions. 6 (overall)

1.2 minimum duration:

1.2.1. classroom : 03:00 hrs (2 sessions)

1.2.2. confined open water : 03:00 hrs (1 session)

1.2.3. open water : 06:00 hrs (2 sessions)

1.3 minimum number of dives: 3 (cheek-dive NOT included)

1.4 lessons & topics (brief overview):

a) theory

TH1: course administration; general introduction to underwater navigation; natural navigation; instruments navigation; courses (trajects) types

TH2: site relocation; charts; bearings; diving planing; buddy system; problems, hazards and prevention; emergency planning; accident managements

b) practical

PR1: (sheltered open water): site underwater navigation; pre-diving equipment and buddy checks; communications; signals; basic navigation techniques; use of material; training natural navigation

PR2/PR3: (open water): site underwater navigation, review of experiences from last dive; gain of confidence; basic navigations techniques; courses types training; communications; signals; buddy techniques

1.5 recommended schedule

1.5.1. theory/ session of approx. 01:30hrs each during week (e.g. on two evenings)

1.5.2. practical

➤ 1 session of approx. 3 hrs on confined open water on one weekend

➤ 2 sessions of approx. 3 hrs each on open water, on 2 successive days (e.g. weekend) which gives best results or scattered during week according to students' desire

✓ day 1: dive #1 (session PR 1)

✓ day 2: dive #2 (session PR2)

✓ day 3: dive #3 (plus ev. an additional dive for a weak student; session PR3)

➤ - certification

1.6 support material for students:

1.6.1. used during classroom sessions: handout

1.6.2. used for home study: as. above (a list with further recommended literature may be given to the students)

1.7 support material for instructor:

1.7.1. text as developed by his federation

1.7.2. other recommended literature

1.7.3. own / federation supplied video / slides

1.7.4. "real" equipment used for underwater navigation

## 2 Minimum course content (syllabus)

### 2.1 THEORY LESSONS (Classroom)

#### 2.1.1. TH1 (Classroom; approx. 01:30hrs.)

##### a) Introduction, course administration

##### b) Topics:

- maintopic 1 general introduction to underwater navigation (catching students attention)
  - ✓ subtopic 1.1 student's expectations
  - ✓ subtopic 1.2 objectives of course ; what is special with this type of activity
- maintopic 2 natural navigation
  - ✓ subtopic 2.1 using natural navigation aids  
natural references: ripples, bottom contours, life patterns, depth, light
  - ✓ subtopic 2.2 distance evaluation  
tank pressure (use of depth gauge)  
advancing time (watch)  
number of fin's strokes (cycles of movement of fins)  
arm spans
  - ✓ subtopic 2.3 speed evaluation  
on surface; underwater  
Note: importance of current
- maintopic 3 instruments navigation
  - ✓ subtopic 3.1 geographic coordinates
  - ✓ subtopic 3.2 true, magnetic and compass north; variation and deviation
  - ✓ subtopic 3.3 action of ferrous metals on compass readings; cautions to have
  - ✓ subtopic 3.4 construction, characteristics of underwater compass types
  - ✓ subtopic 3.5 correct methods of holding and use the compass
- maintopic 4 courses (trajectories) type
  - ✓ subtopic 4.1 go and back course
  - ✓ subtopic 4.2 square course
  - ✓ subtopic 4.3 rectangular course
  - ✓ subtopic 4.4 triangular course

##### c) Training aids used:

- text as developed by federation / diving school / OCC
- other recommended literature
- own / federation supplied video / slides
- "real" equipment used for underwater navigation

#### 2.1.2. TH2 (Classroom; approx. 01:30hrs.)

##### a) Topics:

- maintopic 1 site relocation
  - ✓ subtopic 1.1 chart reading; true azimuth / magnetic azimuth
  - ✓ subtopic 1.2 visual bearings, use of markers, buoys
  - ✓ subtopic 1.3 site relocation with a "fix"
- maintopic 2 dive planing and preparation including all relevant safety conditions
  - ✓ subtopic 2.1 site evaluation and selection
  - ✓ subtopic 2.2 special dive procedures
- maintopic 3 the buddy system
  - ✓ subtopic 3.1 equipment check
  - ✓ subtopic 3.2 regular buddy checks underwater
  - ✓ subtopic 3.3 air supply checks
  - ✓ subtopic 3.4 communications
- maintopic 4 problems and hazards / prevention
  - ✓ subtopic 4.1 fear and panic, breathing rate
  - ✓ subtopic 4.2 lost of orientation
  - ✓ subtopic 4.3 low-air situation
  - ✓ subtopic 4.4 buoyancy control
  - ✓ subtopic 4.5 reduced visibility
- maintopic 5 emergency planning
  - ✓ (what should be included in the plan, etc.)

- **maintopic 6 accident management**
  - ✓ **subtopic 6.1 types of accidents**
  - ✓ **subtopic 6.2 prevention, countermeasures**
  - ✓ **subtopic 6.3 1st. aid on site**
  - ✓ **subtopic 6.4 calling for help**
  - ✓ **subtopic 6.5 other actions**
- ✓ **maintopic 7 site orientation for open water dives**
- ✓ **subtopic 7.1 specific assignments: students carefully review, check and adjust their equipment for practical session**

**b) Training aids used:**

- - text as developed by federation / diving school / OCC
- - other recommended literature
- - own / federation supplied video / slides
- - "real" equipment used for underwater navigation

**2.2 PRACTICAL LESSONS (Confined and open water)**

**2.2.1. PR1(open water, dive #1; approx. 03:00 hrs)**

**Note:** This dive should take place in sheltered open water area (no current, no heavy surf zone)

- 2.2.1.1. site underwater navigation, review of important points from theory session
- 2.2.1.2. pre-diving equipment & buddy checks, student dive objectives
- 2.2.1.3. open water dive #1, objectives:
  - analysis of different environmental conditions
  - equipment familiarization
  - communications, signals
  - training distances and speed evaluations
  - basic navigation techniques
  - natural underwater navigation
  - buddy techniques
- 2.2.1.4. special material
  - diving flags, spare equipment
  - ropes, buoys, markers
  - 1st aid equipment
  - food, refreshments (and material for barbecue)
- 2.2.1.5. post-dive review (debriefing)
  - review of conditions and observations
  - discussion of any problem
  - tips and hints for solving these problems
  - logbook entries
  - stow equipment
  - refreshments
  - (other)
- 2.2.1.6. pre-information on next dive site location (if not the same) and equipment needs for further dive #2 and special assignments (if any)
 

***This formal part of the event can be followed by social gathering (e.g. barbecue)***
- 2.2.1.7. training aids used: (none specifically)
- 2.2.1.8. safety measures:
  - 1st aid equipment easily accessible, position known to everyone
  - position of nearby communications (e.g. payphone, etc.)
  - detailed emergency plan explained, laid down on paper and positioned near emergency equipment
  - thorough briefing of staff
  - "divemaster" on land or boat for complete duration; controls entries and exits of all dive teams (book-keeping)
  - thorough buddy check before entry (supervised)

## **2.2.2. PR2 (open water, dive #2 approx. 03:00 hrs)**

- 2.2.2.1. site underwater navigation, review of experiences from dive #1
- 2.2.2.2. pre-diving briefing, equipment & buddy checks, student dive objective and dive plan presentation
- 2.2.2.3. open water dive #2, objectives:
  - generally: gain confidence
  - basic navigation techniques
  - training courses 1st. and 2nd. type
  - enhanced self-confidence and sense of accomplishment
  - communications, signals
  - buddy techniques
- 2.2.2.4. special material:
  - same as with dive #1
- 2.2.2.5. post-dive review (debriefing):
  - review of conditions and observations
  - discussion of any problem
  - tips and hints for solving these problems
  - logbook entries
  - entry training records
  - stow equipment
  - refreshments
- 2.2.2.6. pre-information on next dive site: location (if not the same) and equipment needs for further dive #3 and special assignments (if any)  
***This formal part of the event can be followed by social gathering (e.g. barbecue)***
- 2.2.2.7. training aids used:
  - none specifically
- 2.2.2.8. safety measures:
  - same as with dive #1

## **2.2.3. PR3 (open water, dive #3; approx. 03:00 hrs)**

- 2.2.3.1. site underwater navigation, review of experiences from dive #2
- 2.2.3.2. pre-diving briefing, equipment & buddy checks, student dive objective and dive plan presentation
- 2.2.3.3. open water dive #3, objectives:
  - generally: gain confidence
  - basic navigation techniques
  - training courses 3st. and 4th. type
  - enhanced self-confidence and sense of accomplishment
  - communications, signals
  - buddy techniques
- 2.2.3.4. special material:
  - same as with dive #1
- 2.2.3.5. post-dive review (debriefing):
  - review of conditions and observations
  - discussion of any problem
  - tips and hints for solving these problems
  - logbook entries
  - entry training records
  - stow equipment
  - refreshments
- 2.2.3.6. pre-information on next dive site:
  - none  
***This formal part of the event can be followed by social gathering (e.g. barbecue)***
- 2.2.3.7. training aids used:
  - none specifically
- 2.2.3.8. safety measures:
  - same as with dive #1

## **2.2.4. at END of course (after PR3)**

- administrative work
- distribution of recognition material in appropriate manner
- social gathering, promotion of other speciality courses



### **3 Knowledge review & skills assessment**

#### **3.1 theoretical knowledge:**

An assessment may be made in written or in oral form at end of TH2, but is not mandatory.

If made in written form a multiple choice QUIZ should be used. The wording "examination" should be avoided.

#### **3.2 practical skills:**

3.2.1. at start of Course:

If there is any reasonable doubt about the student's entry-skill, a check-out dive may be purred PRIOR to the course.

3.2.2. during course : no formal test required; see below

3.2.3. at end of course : no formal test required; see below

Comments for b) and c):

The 2nd and 3rd dive may be used to observe and eventually assess the behaviour and the competence of the student without telling this to him. In case of unsatisfactory performance, the student should be melted to follow the next UNDERWATER NAVIGATION course and to improve his skills in the mentioned area (or an extra 4th training dive may may be offered).

### **4 Issuing of recognition material**

May be given to the students at end of lesson #3 (PR3) or at a separate meeting. Only students who have attended the whole course (and/or successfully passed any required assessment / evaluation) may receive the corresponding recognition material:

- C-CARD
- BADGE(CHEVRON)
- WALL CERTIFICATE