“GRAVITY DEFIED INTRO” COURSE BASIC CLIMBING COURSE

MODULE I

Equipment

- Rope. Materials. DIN standards for UIAA-approved equipment. Classification according to stretch capacity (elongation). Dynamic Ropes. Single Rope. Double Rope (1/2). Twin Rope (OO). Multitype/Triple Rope. Approval. Semi-static Rope. Type A and B. Static Rope. Length. Maintenance and Replacement.

- Pelvic harnesses. EN 12277, UIAA 105 and fall arrest EN 361, EN 358 and EN813 approvals (Type D) Type “C”. Single without buckle, with buckle included. Sport Climbing. Traditional Climbing and Mountaineering (Multipurpose). Canyoning, Caving, Vertical Work and Rescue.

- Chest harness. Harness Placement and Connection Protocols for the Waist Harness. Classic Chest Harness (Figure 8 or Suspenders). Chest Harness for Caving. Children's Chest Harness. Industrial/Vertical Work Chest Harness. Chest Harness for Rescue and Stretchers.

- Helmet. Design, Construction, Materials, and Certifications (CE EN12492 or UIAA106). Rigid Shell Helmets (Canyoning, Caving). Lightweight Expanded Foam Helmets (Sport Climbing). Hybrid Helmets (Traditional Climbing/Mountaineering).

- Climbing Shoes. Design, Vibram XS Edge/XS Grip 2 Performance Certification, and EN ISO 20347 Standard. According to their Shape

(Symmetry and Curvature). Symmetrical (Neutral). Asymmetrical. Concave or Claw (Aggressive). According to their Rigidity. Rigid and Soft. According to the Closure System. Slippers (elastic closure), Velcro, Cords,

- Carabiners. Their uses as the link in the entire safety chain. Maintenance, Marking, and Removal due to wear. Specific approval according to EN 12275. Classification by their shape and closure system. According to their Shape and Geometry. Symmetrical, Oval, D-shaped, Asymmetrical (Offset D), Pear-shaped (HMS) for securing with the dynamic knot (HMS) or basket-type devices (reverso/atc), K-type (Climbing/Via Ferrata), X-type (Oval), T-type (Terminating/Directional). Classification according to the Gate (Opening): Straight Gate, Curved Gate, Wire Gate. Classification by Safety System (Locking Mechanism): Non-Locking. Manual (Threaded). Automatic (2 or 3 movements), twist and open.

- Maillons. For semi-permanent connections. Abandonment (Emergency rappel). Caving for connecting the chest ascender (Croll). Fixed installations. Joining mesh and chains. According to their shape and uses: Oval (Standard). D-shaped. Triangular (Delta). Semicircular (Half-Moon). Large Opening. Standards and approvals. A maillon for human use must comply with EN12275 as a connector for mountaineering/climbing and EN362 for industrial use or work at height. Marking of resistance, WLL (working load limit), and breaking strength in kN.

- Quickdraws. Definition, function, and structure. Types of Quickdraws according to their use: Sport Climbing, Traditional Climbing or Mountaineering, and Extendable (Triple-Length) Quickdraws. Sling materials and uses: Polyamide (Nylon), Dyneema (Polyethylene). Safety certifications for slings: EN 566. EN 12275 for

carabiners and mandatory CE and UIAA markings on the sling label and engraved on the carabiners. Critical safety rules: Gate position, the "string" or anchor, and rope direction.

- Cords. By definition, ropes of reduced diameter. Critical rules of use: Cord loop closure knots, double fisherman's hitch. If the cord is Dyneema, a triple fisherman's hitch is mandatory. Friction (heat = breakage). Always use a carabiner. Lifespan, Maintenance, and Replacement. Self-locking knots for cords. Machard (or Klemheist) knot. Double-Block Machard knot. Prusik knot. Golden Rules for these knots. The Diameter Rule. Combing the knot. Be careful with Dyneema (nylon or polyamide is better).

- The Figure Eight or Descender. Types, uses, materials, and certifications. Types of Figure Eight. Classic (Round), With Ears, Square, Mini Figure Eight. Main Uses: Rappelling (Descent), Belaying, Canyoning, Caving, Vertical Work. Critical Safety Rules: Rope Twisting, Locking, Heat. Materials. Aluminum (Duralumin/Zicral, Stainless Steel. Certifications: EN 15151-2, UIAA 129, CE Marking for (EU).)

- Braking Devices. Types, uses, materials, and certifications. Grigri (mechanical). Petzl Grigri cam-assisted automatic braking device works with almost any locking carabiner (preferably round profile), EN 15151-1 (Cam-locking devices). Smart (geometric): Mammut Smart 2.0 for assisted braking, EN 15151-2 (Manual braking devices), very sensitive to the carabiner; recommended for use with its specific carabiner (Smart HMS) or one of similar geometry.

- Nuts or Stoppers. Definition as passive cams. Types, uses, materials, and certifications.Types of Nuts: Stoppers, Micro Nuts, Hexcentrics, Tricams. Techniques for use: Direction of pull, Placement, Extraction (nut puller, metal rod with hook). Materials:

Head (the nut): Aluminum, Brass/Bronze, Steel. Cable: Galvanized or stainless steel. EN 12270: European standard, Strength marked in kN.

- Friends (SLCD). Definition as spring-loaded cam devices. Types of Friends: Single-axis, Double-axis (with a much greater expansion range), Micro-friends, Offsets (Asymmetrical), Big Bros. Main Uses: Protection in traditional climbing, Setting up belay stations, Aid climbing. Materials: Aluminum cams, steel cable shank (body), rigid shank (rarely used now), Dyneema or nylon webbing sewn to secure the carabiner. Safety Certifications: EN 12276: EU standard for friction devices, UIAA 125: International standard for embedding devices. Strength marked in kN. Critical Safety Rules. The "Three-Finger Rule," loading direction, maintenance by washing with water and lubricating with dry graphite or silicone oil.

- Chemical anchors. Uses and applications. Soft or degraded rock, marine or very humid environments, re-equipping. Advantages. Extreme durability, no mechanical stress, multidirectional, aesthetics and comfort. Disadvantages. Slow and messy installation. Requires carrying a blower, brushes, a resin gun (which is heavy), and spare nozzles. Waiting time (from 30 minutes to 24 hours). Zero margin for error. Price includes tensioner and resin. Critical installation protocol: Extreme cleanliness, mixing, and positioning. Approvals and materials: UIAA 123 / EN 959 standard, specific certification for rock anchors. Anchor material: 316L (A4) stainless steel, the standard for most areas; titanium or PLX (HCR), mandatory if installing near the sea to prevent stress corrosion cracking (SCC). Curing times: It is vital to respect the waiting time indicated by the manufacturer before anyone hangs from it.

- Parabolts. Mechanical expansion anchors. Standard option due to their speed and low cost. Choose the model according to the rock and weather. Types according to their design and expansion. Single expansion, the most common in sport climbing. Double expansion, ideal for softer rock; Retrievable, designed for aid climbing or temporary protection. Materials (Key to safety). Do not mix materials (such as stainless-steel plate with zinc-plated steel parabolts) to avoid galvanic corrosion, which destroys the anchor. Depending on the application. Zinc-plated steel, Stainless Steel (A2/304), High-strength Stainless Steel (A4/316L), PLX/HCR. Uses and Standard Sizes: M10 x 70-90 mm for hard limestone or granite; M12 x 100-120 mm used in belay stations, high-traffic areas, or somewhat less durable rock. Tightening torque. For a standard M10 parabolt from brands like Fixe, the tightening torque is usually around 35 Nm. Critical approval according to EN 959 standard or UIAA 123 certification. Anchor withstands tensile forces (>13kN) and shear forces (>9kN). Installation Protocols: Location and Drilling, Search for solid rock, Perpendicularity, Depth. Cleaning, Blowing and Brushing. Anchor Placement. Pre-assembly, Hammering, Tightening, Socket wrench, fixed or torque wrench (ideally 35-45 Nm), Rule of thumb: quarter or half turn. Orientation: eye of the plate faces downwards (in the direction of the fall). Mistakes to avoid: Overtightening, Using worn drill bits, Mixing metals (zinc-plated steel with stainless steel) can cause galvanic corrosion.

- Pits (Pitons). These are secure anchors that are hammered into cracks. Types by shape: Universal: These have a 45º angled head and are suitable for vertical and horizontal cracks. V-Convex or "Bugs": Ideal for wide cracks or soft rock; their spring-like shape causes them to expand when struck. Extra-flat (Laminates): For

millimeter-sized cracks. U (Grills): For very wide and deep cracks. Materials and uses: Soft Steel: Hard Steel (Chromium Molybdenum). Plates (Rings). These are the interface between the bolt and the carabiner. Types and uses: Standard, With Ring, Wide-flange. Materials and applications: Zinc-plated Steel, Stainless Steel (316L), PLX/Titanium. Certifications (Safety). CE marking for Europe EN 959 / UIAA 123 (Rock Anchors). For bolt hangers, they must withstand at least 25 kN shear and 15 kN pull-out. For pitons EN 569 (Pitons), they are divided into two categories: Class S (Safety), the strongest (>12 kN); and Class P (Progression), only for artificial progression (they withstand little more than body weight). Usage summary. Use pitons if the crack is so narrow or blind that nothing else will fit. Always use bolt hangers in combination with a parabolt or chemical anchor of the same material to prevent galvanic corrosion.

MODULE II

- Top Rape Belaying with Pulleys. Techniques and materials. Required materials: Single dynamic rope, type 1, with a length twice the height of the route. EN 12277 certified harness, Safety carabiner, preferably triple-locking or automatic,Top anchor with solid points (parabolts or chemical anchors) connected by chain or sling with locking carabiners. Webbing or cord loops, or a belay device, using a loop with a knot called a "Lark's Head". Belaying technique using the "V" or "Five-Stage" method. Retrieve. With the "strong" (guiding) hand, pull the rope coming from the climber downwards while the belay hand (the one below) moves upwards. Lock. The belay hand moves quickly downwards under the device (braking position). Slide: Without releasing the brake rope, slide the

hand upwards (close to the device) to prepare for the next cycle. Constant attention: There should be no sag in the rope. If the climber sits down, the belay must be locked immediately. Critical Safety Techniques. The Partner Check before anyone leaves the ground. The belayer checks the climber's knot, and the climber checks that the belay device is properly set and the carabiner is closed. Belayer position: should be close to the wall (but not directly below to avoid being pulled down by the climber) so that, in case of a fall, the jerk does not throw them towards the wall. Communication. Use clear commands: "Ready?", "Coming," "Get on" (tighten the rope), "Bring me down." Safety knot at the end: if the rope is short enough for the height of the route, always tie a safety knot at the end of the rope (on the ground) to prevent it from slipping through the belay device if the climber lowers too far. System certifications. Rope: EN 892 (Dynamic). BrakeEN15151-1 (Mechanical) or EN 15151-2 (Manual). Anchor, the belay station at the top must withstand at least 22 kN. Common mistake. In top rope, too much slack can cause the climber to hit ledges or the ground if they are near the start. The rope should always be under light tension.

- Drill bits. Golden Rule: The drill bit diameter must exactly match the diameter of the bolt (unlike chemical anchors, where the hole is usually 2 mm larger than the anchor). Types of Drill Bits (SDS-Plus) and Uses: 2-flute (Standard), 3 or 4-flute (Phillips Head). Brands like Hilti (TE-CX) or Bosch (SDS-Plus-7X). Drill bit length for standard bolts (70-90 mm). Tips for knowing when to discard the drill bit: It usually lasts between 15 and 30 holes in granite or hard limestone before losing accuracy. Drills and Features: Brands like Hilti, Bosch Professional (GSR/GBH), or Makita are the most reliable.

- Lark's Head Knot. An anchor knot used to secure a sling or cord to an object (ring, another sling, or post). Tying techniques vary depending on the situation. For an open knot, fold a sling in half, pass it around the object, and then insert the two loose ends through the folded loop. For a closed knot (such as a fixed anchor point), pass one end of the sling through the object and then through the loop formed. Main Uses. Joining slings is the standard way to attach a sling from an anchor or multi-chain to the ventral ring of a harness. Attaching safety cords to tools, cameras, etc., to prevent them from falling. Mountaineering and Traditional Climbing. Used to "choke" a nut or cam that has protruded too far into a crack, or to sling over rock bridges and small trees. In some rescue maneuvers, it is used to temporarily fix pulleys or connectors. Knowledge of the critical advantages and disadvantages: Strength reduction and Instability.

- Dynamic Knot or HMS: Defined as a friction knot that allows belaying or rappelling without the need for a mechanical device. Tying Techniques: In its two basic forms, there are two main ways to tie it: One-handed (in the air) and Tying by hand. Main Uses. Emergency belaying, impromptu rappelling, heavy loads, dynamic belaying. Critical Equipment: Mandatory use of an HMS carabiner. Manual or automatic locking with a locking carabiner. Advantages and Disadvantages. Advantages: It requires no extra equipment (just a carabiner), works with ropes of any diameter, and is bidirectional. Disadvantages: It twists the rope, tends to twist the rope a lot (creating kinks), causes rope-to-rope friction, and generates a lot of heat. If the rappel is very long, it can wear out the sheath. Accidental unlocking is a risk if the knot rubs against the gate of the screw-gate carabiner, which could open it (therefore, it is recommended that the belay rope be on the opposite side of the

gate). Certifications: The knot itself is not standardized, but the carabiner used must comply with EN 12275 Type H. Golden Rule of Safety: When belaying with a dynamic knot, the hand holding the belay should never release the rope. To lock it statically (keeping your hands free), it must be combined with an escape knot.

Passing the rope through intermediate anchors. Conventional rope-passing methods. Clipping the anchor with a carabiner or quickdraw. Passing the rope through.

- Rope handling. Possibilities for reducing friction. How to position the rope relative to the body while leading a climb.

- Belaying in different situations. Belaying from the ground. Setting up the anchor. Belaying from the anchor. Belaying on the descent.

MODULE III

- Rappelling. Definition: a controlled descent maneuver using friction on a fixed rope.

- Standard System: Belay device (Reverso/ATC) + Machard or Prusik. This is the method used on 90% of walls. A belay device (such as a basket) is used. The self-locking knot (safety knot) is attached to a 6-7mm cord, making a Machard or Prusik knot below the descender, and secured to the harness's ventral ring. The rappel is extended with a quickdraw or anchor sling to separate the descender from the harness. This moves the device away from the face and provides space for the self-locking knot.

- The Figure Eight. Classic but less common. Very common in canyoning because it allows rappelling with muddy ropes or ropes of different diameters. Disadvantages: It twists the ropes a lot

(creates loops), reduces the braking capacity of a modern belay device, and the rope can easily form an accidental lark's head knot if not managed properly.

- Assisted Braking Systems (Grigri). Very practical in sport climbing for quickly descending a route. Single rope length. Do not rappel with a double rope (normal on long routes) using a standard Grigri. A specific technique for locking the other rope is required if done with a double rope; only experts should use this technique.

- Emergency Systems (Without equipment). Dynamic Knot (UIAA) with a pear-shaped carabiner (HMS) and the rope itself. It slows the rope considerably but twists it a lot (number one survival tool).

- Heart Knot. If HMS carabiners are unavailable. Use two symmetrical or "D" type carabiners. It works by constricting the rope between the two carabiners. It is a unidirectional system (only slows the rope in one direction) and very stable. Safety Protocol (Checklist). Knots at the ends of the ropes: ALWAYS tie a knot at each end of the rope.

END OF COURSE