

# CEDARVILLE UNIVERSITY

## Strength Training for Busy People

If you don't have time to read this document, let alone set aside time to work out, then this program is for you.

### A. WHY?

**Why Strength Train?** The primary purpose of strength training, or strength exercise, is to improve muscle function. It will help you develop stronger bones, tendons, and ligaments, enabling you to perform better in all physical activities. Strength training reduces your risk of low back pain, illnesses such as diabetes and degenerative problems such as osteoporosis. It also helps you reach and maintain a proper body composition by boosting your resting metabolism and thereby burning more calories throughout the day, even at rest.

### B. HOW?

**The Nautilus ExpressWay program** has been designed using research performed by Dr. Wayne Westcott and Rita LaRosa Loud, along with their staff at the South Shore YMCA in Quincy, MA. In an effort to make exercise more appealing to those who are truly in need of its tremendous benefits, Dr. Westcott set out to prove that strength gains can come with minimal time and commitment. The number one complaint and excuse for discontinuing a strength training, or exercise regimen, is TIME. As you will find in this handbook, Dr. Westcott and his colleagues were able to prove that significant changes can occur in a person's musculature and strength with a program lasting 24 minutes, two to three times a week.



**The GOALS of this Orientation are to:**

1. Introduce our University family to our new strength training machines.
2. Explain to our University family how to begin a safe, time efficient and effective strength training program.
3. Encourage our University family to begin and maintain strength training as part of an overall exercise program.

**RESEARCH OVERVIEW:**

Over the past several years, Dr. Wayne Westcott and his colleagues have conducted several research studies with adults, seniors, and children consistent with the American College of Sports Medicine exercise guidelines. With every study, Dr. Westcott has continued to uncover protocols that deliver results to the masses. In every program, the participants experienced excellent gains in muscle strength and impressive improvements in body composition. On average, the adult exercisers in these particular studies relating to **The Nautilus ExpressWay** increased their muscle strength by over 40 percent, added about two and one half pounds of muscle, and lost about four and one half pounds of fat over an eight week training period. (Table 1 details the findings from the study with 1,132 young, middle-age, and older adults.)

The results from the shortened programs are at least as good as those attained using other exercise protocols, indicating that **a basic and brief strength training program can be highly effective**. Perhaps just as important, participants have been please with both the exercise process and the training product, with over 90 percent continuing their strength workouts after completing the program.

**Table 1**

Results of 8 week basic exercise program including 24 minutes of strength training (12 Nautilus machines) and 24 minutes of endurance training (treadmill walking or stationary cycling) with 1132 participants.

|                         | <b>Weight<br/>(lbs)</b> | <b>% Fat<br/>(%)</b> | <b>Fat<br/>(lbs)</b> | <b>Lean<br/>(lbs)</b> | <b>BP<br/>(mm Hg)</b> |
|-------------------------|-------------------------|----------------------|----------------------|-----------------------|-----------------------|
| <b>Men (383)</b>        | - 2.7                   | - 2.7                | - 6.4                | 3.7                   | - 4.5                 |
| <b>Women (749)</b>      | - 1.8                   | - 1.8                | - 3.4                | 1.7                   | - 3.9                 |
| <b>21-40 yrs. (238)</b> | - 2.6                   | - 2.3                | - 4.9                | 2.3                   | - 3.9                 |
| <b>41-60 yrs. (553)</b> | - 2.0                   | - 2.1                | - 4.4                | 2.3                   | - 2.5                 |
| <b>61-80 yrs. (341)</b> | - 1.7                   | - 2.0                | - 4.1                | 2.4                   | - 5.0                 |
| <b>Total (1,132)</b>    | - 2.0                   | - 2.1                | - 4.4                | 2.4                   | - 3.6                 |

Westcott, W., and Guy, J. 1996. A physical evolution: Sedentary adults see marked improvements in as little as two days a week. IDEA Today, 14 (9): 58-65.

## **BASIC STRENGTH TRAINING PROGRAM:**

Participants performed one set of each exercise, with a weight load that could be lifted between 8 and 12 repetitions. Each repetition was performed at a moderate movement speed (about 6 seconds) and through a full movement range. When 12 repetitions were able to be completed in proper form, the weight load was increased by a small amount (5 percent or less). The participants chose to train either two or three days per week depending on personal preference. The studies have shown almost 90 percent as much benefit from twice-a-week training as three-day-a-week training (see Table 2).

The basic training program used is relatively time efficient, depending of course on the recovery period between exercises. Assuming about a minute to perform each exercise and about a minute between exercises, the Nautilus ExpressWay workout requires only 24 minutes for completion.

**Table 2**

Body composition changes following 8 weeks of training 2 or 3 days per week (1132 participants)

|                       | Weight (lbs) | % Fat (%) | FAT (lbs) | Lean (lbs) | BP (mm Hg) |
|-----------------------|--------------|-----------|-----------|------------|------------|
| 2 Days per week (416) | - 1.8        | - 2.0     | - 4.0     | 2.2        | - 5.1      |
| 3 Days per week (716) | - 2.1        | - 2.2     | - 4.6     | 2.5        | - 3.4      |

## **20 SECOND STRETCHING BETWEEN EXERCISES:**

The flexibility component of the program generally consisted of interspersing stretching exercises with the Nautilus machines. The participants experienced excellent results by performing a 20-second stretch for the muscle group just worked. For example, the leg extension exercise was followed by a 20-second static stretch for the hamstrings muscles.

The research has shown that adding stretching exercises to The Nautilus ExpressWay workout may have dual benefits, enhancing both joint flexibility and strength development. As shown in Table 4, the participants who did static stretches following the Nautilus exercise had greater increases in hamstrings flexibility (2.4 vs. 1.5 inches) and strength (16.4 vs. 19.5 lbs.) than the participants who did Nautilus exercises only. Because the participants typically took a 1-minute break between Nautilus machines, the 20-second stretches did not lengthen the overall workout duration.

**Table 3:**

Changes in hamstrings stretch and strength resulting from 10 weeks of Nautilus exercise or Nautilus and stretching exercise (76 participants).

| Parameter                | Nautilus Exercise (n=36) | Nautilus + Stretching (n=40) |
|--------------------------|--------------------------|------------------------------|
| Qsit and Reach Test      | + 1.5 in.                | + 2.4 in.                    |
| 10 Rep Max Leg Curl Test | + 16.4 lbs               | + 19.5 lbs.                  |

## NAUTILUS GUIDELINES:

### 1. FREQUENCY

**Train two to three days per week on an every-other-day schedule.** Taking back-to-back strength training workouts is counterproductive because the muscles do not have sufficient recovery or building time. Two training days per week produce about 90% as much strength and muscle gain as three weekly workouts.

### 2. DURATION

**Train with one set of 8 to 12 repetitions on each machine.** At 6 seconds per repetition a set of strength exercises should take about 50-70 seconds. When the proper weightload is used, this provides excellent stimulus for strength gains. The **ExpressWay Circuit** should take approximately 25-30 minutes to complete once you know what adjustments and weight you need for each machine. Until then, it could take 45 minutes or so to complete the circuit.

### 3. INTENSITY

The weightload should be heavy enough to fatigue the target muscle group with **8-12 repetitions**.

### 4. SPEED

Perform all movements slowly, approximately 6 seconds per repetition. **Take two seconds to lift the weightload, and take four seconds to lower the weightload.** Slow training increases the strength building stimulus and reduces the risk of injury.

### 5. RANGE

**Perform all exercises through a full range of pain-free joint movement.** Full-range training ensures greater muscle effort, joint flexibility, and performance power.

### 6. PROGRESSION

**Gradually increase muscle stress** by adding approximately **5%** more weight whenever you complete 12 repetitions in good form. Progressive resistance is the key to continued strength development.

### 7. CONTINUITY

Proceed from machine to machine in order and in a timely manner. This works the muscles from larger to smaller groups, and provides better overall training effect.

### 8. MAINTAIN REGULAR WORKOUTS

**Consistency** is perhaps the most important variable in developing and maintaining physical fitness. Two or three non-consecutive workout sessions per week on a regular basis are recommended for maximizing muscular fitness.

## ADDITIONAL WORKOUT GUIDELINES:

### 1. DISCONTINUE WORKOUT IN THE EVENT OF ILLNESS OR INJURY.

Be alert to signals that your body is undergoing too much stress. You should not feel sharp pain when working out. If you do, stop right away and find out what is causing the pain. Give your body time to recover and rebuild. You should also stop if you feel faint or experience chest pain.

### 2. WEAR SPECIFICALLY DESIGNED ATHLETIC SHOES AND LIGHTWEIGHT (but modest) EXERCISE CLOTHING.

Wearing properly designed athletic shoes reduces the risk of injury due to slipping or improper transfer of forces. Wearing lightweight exercise clothing reduces the chance of overheating and enhances performance levels.

### 3. DRINK PLENTY OF WATER BEFORE, DURING AND AFTER EXERCISE.

Because our muscles are almost 80 percent water, it is essential to be well hydrated. Try and **drink 8 to 12 glasses of water every day** for best strength and training results.

### 4. EAT NUTRITIONALLY SOUND MEALS AND SNACKS.

Proper eating complements the exercise program in terms of lower body weight, lower percentage of body fat, lower levels of cholesterol and triglycerides, lower blood pressure, and fewer gastrointestinal problems. **Include plenty of whole grains, vegetables and fruits into your diet every single day.**

### 5. PROPER WARM UP AND COOL DOWN PERIODS ARE IMPORTANT.

Prepare the body for moderate to intense workouts by jumping on a cardio machine for **5-10 minutes** (or more) at about 60-70 percent of maximum heart rate.

### 6. BREATHING

Don't forget to breathe! Breathe continuously while performing strength exercise. **Never hold your breath.** As a general guideline, exhale during the lifting movements and inhale during the lowering movements.

### 7. EXERCISE INSTRUCTIONS

Instructions on how to use each piece of equipment is listed on each machine. It is very important that you read these carefully before using the equipment. Make sure that you learn how to properly align your body according to the points identified in the instructions.




## C. WHERE?


The Cedarville University Fitness Center offers over 2000 square feet of Nautilus Free Weights in the Free Weight Room as well as two separate lines of Nautilus Selectorized Strength Training Machines. The first line is called 2ST, which stands for Super Smooth Technology. It is the line on the north side of the facility adjacent to the Exercise Studio. This is the line which is designated for the ExpressWay Program. The second line is called NITRO and is located on the south side of the facility adjacent to the free weight room.

### So which line should you use?

1. Both lines work under the same principle of using cams to vary the resistance throughout each exercise.
2. Both lines are strong and very well built.
3. The 2ST line include:
  - a) Larger footprints
  - b) Gas assisted seat adjustments (over manual ratchet adjustments) - these are cool!!!
  - c) One pound weight increments (over 5 & 10 pounds)
4. The NITRO line is Nautilus' newer line and includes a couple of bio-mechanical advances.
5. The following machines are very close to the same in both lines:

| <br><b>2ST Line</b> | <b>NITRO Line</b> |
|---|-------------------|
| Leg Press   | Leg Press         |
| Vertical Chest  | Vertical Chest    |
| Leg Extension   | Leg Extension     |
| Low Back  | Low Back          |
| Abdominal   | Abdominal         |

6. The following machines are similar exercises and still work the same muscles or muscle groups:

| <b>2ST Line</b> | <b>NITRO Line</b>  |
|-----------------|--|
| Seated Leg Curl | <br>Prone Leg Curl |

|                         |                       |
|-------------------------|-----------------------|
| Super Pullover          | Lat Pulldown          |
| Preacher Curl           | Bicep Curl            |
| <b>Tricep Extension</b> | <b>Seated Dip</b>     |
| <b>Compound Row</b>     | <b>Compound Row</b>   |
| <b>Lateral Raise</b>    | <b>Overhead Press</b> |

7. These machines are unique to each line:

| <b>2ST Line</b>       | <b>NITRO Line</b>            |
|-----------------------|------------------------------|
| <b>Torso Rotation</b> | <b>Pec Fly</b>               |
| <b>4-Way Neck</b>     | <b>Hip Abductor/Adductor</b> |
|                       | <b>Incline Press</b>         |
|                       | <b>Overhead Press</b>        |
|                       | <b>Gravitron</b>             |

8. Guidelines on which line to use?

a) **2ST Line:**

This line is a great choice for those who desire a good solid, time efficient, whole body workout. Special populations that should at least start on the 2ST line would include 1) beginners, 2) seniors, or 3) anyone who is rehabilitating an injury (mostly because of the one pound increments). These machines are easy to use and adjust, very smooth and provide a great workout to increase both muscular strength and muscular endurance.

b) **NITRO LINE:**

This line might be a better choice for those looking for a little more upper body workout, since there are more machines in this line that work those muscle groups. Because of the way the two lines are set up, it would be the better line to choose for multi-set lifting and moving around to different machines outside of the circular circuit (the arrangement of the machines in a circle and numbered 1-15). It would also be the better line to choose for those primarily using the free weight room and wishing to supplement their workout by adding a limited number of machines.

c) The BEST workout for many might be a combination of the two lines - working out one day a week on the 2ST line and working out on another day in the same week on the NITRO line.

**References:** The information in this orientation guide was used by permission by Nautilus.

1. Westcott, Wayne, 2003 *Building Strength & Stamina*, by Wayne Westcott and Nautilus Human Performance Systems.
2. *Nautilus Expressway Handbook*, The Fitness Academy, the Educational Division of the Nautilus Health and Fitness Group.
3. *Nautilus Instructor Training Program Handbook*, The Fitness Academy, the Educational Division of the Nautilus Health and Fitness Group.

4. [www.nautilus.com](http://www.nautilus.com)

**For more information about our strength training equipment, please contact:**

**Mark Mathews  
Director of Recreational Activities  
Cedarville University**





The 2ST Line has been set up as an ExpressWay Circuit. Those people who are doing the circuit (one set on each of the machines in numerical order - clockwise) have priority on the machines over those who are not doing the circuit.

| <b>Weight Training Table with Nautilus 2ST</b> |                         |   |  |   |
|--|-------------------------|---|--|---|
| #  | Exercise                | Joint Action                                    | Prime Mover Muscles  | Technique Tips  |
| 1  | <b>Leg Press</b>        | Hip & knee extension                            | Hamstrings, gluteals, quadriceps   | Limit knee flexion to 90 degrees  |
| 2  | <b>Vertical Chest</b>   | Shoulder horizontal flexion and elbow extension | Pectoralis major, anterior deltoid, triceps                                    | Press handles forward until elbows are almost fully extended.                 |
| 3  | <b>Leg Extension</b>    | Knee extension                                  | Quadriceps   | Keep back against seat  |
| 4  | <b>Seated Leg Curl</b>  | Knee flexion                                    | Hamstrings   | Keep legs straight & chin on pad  |
| 5  | <b>Super Pullover</b>   | Shoulder extension                              | Latissimus dorsi, teres major  | Pull down with elbows, not the hands  |
| 6  | <b>Preacher Curl</b>    | Elbow flexion                                   | Biceps   | Do not bring hands all the way up is there is strain on the elbows or wrists. |
| 7  | <b>Tricep Extension</b> | Elbow extension                                 | Triceps  | Try and keep elbows on the pad  |
| 8  | <b>Compound Row</b>     | Shoulder extension and elbow flexion            | Latissimus dorsi, teres major, posterior deltoid, rhomboids, trapezius, biceps | Maintain erect posture  |
| 9  | <b>Low Back</b>         | Trunk extension                                 | Erector spinae   | Secure both seat belts across thighs.   |
| 10   | <b>Lateral Raise</b>    | Shoulder abduction                              | Deltoids   | Lift movement pads to the horizontal position                                 |
| 11   | <b>Abdominal</b>        | Trunk flexion                                   | Rectus abdominis and hip flexors   | Press down with the elbows, not pull down with hands                          |
| 12   | <b>Torso Rotation</b>   | Trunk rotation                                  | External obliques and internal obliques  | Maintain good erect posture and go slow and under control.                    |
| 13   | <b>4-Way Neck</b>       | Neck flexion, extension & lateral flexion       | Sternocleidomastoid, upper trapezius, levator scapulae                         | Maintain good erect posture and don't use too much weight.                    |



The NITRO line has not been reserved for ExpressWay workouts although this line works very well using the ExpressWay principles.

## Weight Training Table with Nautilus NITRO

| #  | Exercise                                 | Joint Action                                    | Prime Mover Muscles  | Technique Tips  |
|----|--|---|--|---|
| 1  | <b>Leg Press</b>                         | Hip & knee extension                            | Hamstrings, gluteals, quadriceps   | Limit knee flexion to 90 degrees  |
| 2  | <b>Prone Leg Curl</b>                    | Knee flexion                                    | Hamstrings   | Keep legs straight & chin on pad  |
| 3  | <b>Leg Extension</b>                     | Knee extension                                  | Quadriceps   | Keep back against seat  |
| 4  | <b>Vertical Chest</b>                    | Shoulder horizontal flexion and elbow extension | Pectoralis major, anterior deltoid, triceps                                    | Press handles forward until elbows are almost fully extended.                     |
| 5  | <b>Lat Pulldown</b>                      | Shoulder extension and elbow flexion            | Latissimus dorsi, teres major, biceps  | Maintain erect posture  |
| 6  | <b>Pec Fly</b>                           | Shoulder diagonal flexion                       | Pectoralis major, anterior deltoid   | Keep back against seat  |
| 7  | <b>Compound Row</b>                      | Shoulder extension and elbow flexion            | Latissimus dorsi, teres major, posterior deltoid, rhomboids, trapezius, biceps | Maintain erect posture  |
| 8  | <b>Overhead Press</b>                    | Shoulder abduction and elbow extension          | Deltoids and triceps   | Press handles forward until elbows are almost fully extended.                     |
| 9  | <b>Bicep Curl</b>                        | Elbow flexion                                   | Biceps   | It is not necessary to fully extend elbow between repetitions.                    |
| 10 | <b>Seated Dip</b>                        | Shoulder flexion and triceps extension          | Pectoralis major, anterior deltoid, tricep                                     | Use seat belts. Press handles downward until the elbows are almost fully extended |
| 11 | <b>Low Back</b>                          | Trunk extension                                 | Erector spinae   | Secure both seat belts across thighs.   |
| 12 | <b>Hip Abductor/Adductor</b>             | Hip abductors & adductors                       | Hip abductors & adductors  | Keep back against seat.   |
| 13 | <b>Incline Press</b>                     | Shoulder horizontal flexion and elbow extension | Pectoralis major, anterior deltoids, triceps                                   | Press handles upward until the elbows are almost fully extended                   |
| 14 | <b>Abdominal</b>                         | Trunk flexion                                   | Rectus abdominis and hip flexors   | Press down with the elbows, not pull down with hands                              |
| 15 | <b>Gravitrone (Wt. Assisted Chin-up)</b> | Shoulder extension and elbow flexion            | Latissimus dorsi, teres major, biceps  | Always enter and exit knee platform in top position.                              |







