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**COURSE – BSC(H) COMPUTER SCIENCE**

**ROLL NO- 20/49005**

**UNIT-I PHYSICAL FITNESS**

**1.1 Introduction**

Physical fitness is one of the core preconditions of health. We cannot imagine a person to be healthy without being physically fit. Physical fitness, therefore needs to be appreciated in full measure. The common perception of physical fitness is the absence of ailment.

**1.2 Physical Fitness and its Importance**

• improves the functioning of heart and lungs by increasing the availability of oxygen to all tissues and organs in the body system

• improves muscle tone

• promotes the development of good posture, proportionate figure, and thereby positive body image and physical appearance

• ensures quick recovery after injury and illness

• decreases the risk of cardio-vascular disease; (like Heart attact, Asthma etc.)

• reduces and controls undesirable body fat. When the individual does excercise, takes proper diet that also fulfils nutritional requirement, it helps maintain ideal body weight;

• increases energy level of a person

• improves the mood by reducing depression and anxiety

• postpones fatigue and reduces recovery time after vigorous activity.

**1.3 Components of Health Related Fitness**

**Cardio-respiratory endurance** reflects the ability of the body’s circulatory and respiratory systems to supply fuel during sustained physical activity. To improve your cardio-respiratory endurance, try activities that keep your heart rate elevated at a safe level for a sustained length of time such as walking, running, jogging, swimming, bicycling etc.

**Muscular Strength** is the amount of force applied on muscle or muscle groups, is able to exert for one maximal effort (contraction).The key to making your muscles stronger is working them against resistance, whether that be from weights or gravity

**Muscular Endurance** is the ability of a muscle or muscle group to exert force against a submaximal load for a given length of time (or number of repetition) before fatiguing to the point of failure.

**Body Composition** refers to the proportion of team body mass to body fat, it includes amount of muscle, fat, bone, and other vital parts of the body. Body composition is important to be considered for health and managing the body fat.

**Flexibility** is the range of motion around a joint. Good flexibility in the joints can help prevent injuries through all stages of life. If you want to improve your flexibility, try yoga, gymnastics and basic stretching exercise programme.

**1.4. Components of Skill-related Fitness**

**Agility** is the ability to change and control the direction and position of the body while maintaining a constant, rapid motion. For example changing directions to hit a tennis ball.

**Balance** is the ability to control or stabilise the body when a person is standing still or moving. For example, handstand in gymnastics.

**Coordination** is the ability to use the senses together with body parts during movement. For example, dribbling a basketball. Using hands and eyes together is called hand-eye coordination.

**Speed** is the ability to move your body or parts of your body swiftly. Many sports rely on speed to gain advantage over opponents. For example, a Basketball player making a fast break to perform a lay-up, a tennis player moving forward to get to a drop shot, a football player running the defense to receive a pass.

**Power** is the ability to move the body parts swiftly while applying the maximum force of the muscles. Power is a combination of both speed and muscular strength. For example, volleyball players lifting up to the net and lifting their bodies high into the air.

**Reaction Time** is the ability to reach or respond quickly to what you hear, see or feel. For example, an athlete quickly coming off the blocks early in a swimming or track event, or stealing a base in baseball.

**1.5 Activities for Developing Physical Fitness**

The type of activities that may be useful to different aspects of fitness are aerobic and anaerobic.

These are as follow:

1. **Aerobic Activity Aerobic Exercise**: any physical activity that requires increased oxygen is an Aerobic exercise. Aerobic activity or exercise is therefore the same as cardiovascular exercise as it -

• increases cardiac capacity

• strengthens the heart and lungs

Aerobic activities develop the cardio-respiratory endurance of an individual. The different types of aerobic activities are aerobic dance, skipping, walking, long distance running, swimming, etc.

1. **Anaerobic Activity** The term Anaerobic means “without oxygen”. Anaerobic exercise is a high intensity activity for a short period of time. It relies on energy sources that are stored in the muscles of individuals.

This kind of activity is responsible for developing speed. This form of activity benefits the bones, i.e. their thickness increases. The different types of anaerobic activities are weight lifting, sprint races, jumping, mountain climbing, rafting etc.

1. **All Team Games** **and Individual Sports** All major games and individual sports require a certain level of fitness components like strength, speed, agility, flexibility and endurance for successful participation.

**Warming Up and Cooling Down**

Warming up is usually performed before participating in any games and sports and physical activities.

It is important to keep oneself free from injury, pain and how to avoid fatigue. While warming up prepares your body for intense exercise, whereas cooling down helps bring it back to near normal after rigorous activity.

**Warming Up:** Muscle stiffness is thought to be directly related to muscle injury and therefore, the warming up should be aimed at reducing muscle stiffness. Warming up should consist of a gradual increase in physical activity for individuals for increasing joint mobility, stretching and various ways of sports related activities.

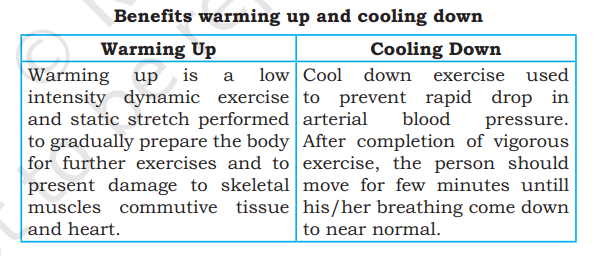
• One should warm-up aproximate 8-12 minutes or per specific requirements which include running, stretching of wrists, elbows, shoulders, neck, trunk, hip, knees, ankles joints.

**Cooling Down:** Once you are through with the workout and you reach the end of the game, it is equally important to ensure that the body cools down.

Cooling down should ideally consist of:

• five to ten minute walk or light jog as it cools down the body temperature and relaxes the muscles.

• about ten minutes of static stretching exercises that include chest stretch, biceps stretch, hamstring stretch, calf stretch, hip and thigh stretch, front of trunk stretch and quadriceps stretch. Each stretch should not take more than 10 to 30 seconds.



**1.6 The Principles of Training: The key things to incorporate and consider**

In order to get the most out of your training, you need to apply these key principles of training – overload, specificity, reversibility and variation.

**Overload**

In order to progress and improve our fitness, we have to put our bodies under additional stress. Applying this training principle will cause long-term adaptations, enabling our bodies to work more efficiently to cope with a higher level of performance the next time we train.

Overloading can be achieved by following the acronym **FITT**:

* **Frequency**: Increasing the number of times you train per week or the number of reps you perform.
* **Intensity**: Increasing the difficulty of the exercise you do. For example, running at 12 km/h instead of 10 or increasing the weight you are squatting with.
* **Time**: Increasing the length of time that you are training for. For example, cycling for 45 minutes instead of 30.
* **Type**: Increase the difficulty of the training you are doing. For example progress from walking to [running](https://castore.com/collections/activity-running), from accessory to free weights.

**Specificity**

This principle relates to the type of training that you do. It should be specific to you and your chosen sport. You should train the energy system which you use predominantly (e.g. a runner and weight lifter will require different processes), and the fitness and skill components most important to your sport, for example, agility, balance or muscular endurance. You should also test the components which are important in your sport to see your strengths and weaknesses, such as imbalances, speed, power, posture etc.

So this principle means you should consider what key conditioning you can work on, in order to boost your performance.

**Reversibility**

You can lose what you've gained if it's not maintained. If you stop training then the improvements you have made will be reversed. So if you do not train for a period of time, or reduce the amount you are training, you may not be able to resume training to the same level as before, so it’s important to build the body back up progressively until you reach that level again.

You want to be careful with overtraining though. It is a very common problem when you don’t get enough rest during your training schedule, overdoing workouts to a point where it is having adverse effects on your results and progress. This should not be confused with overload, which is the planned exposure to an increased workload and the right amount of rest in-between. Without the correct amount of rest, you will suffer from overtraining and your body won’t be able to correctly and safely perform the movements you need it to.

**Variance**

Try to vary your training, to keep you interested and to give your body (and the muscles you’re using) a different challenge. This can be by switching up the movements to circuits in your usual training, or doing something else entirely. Many athletes will take part in a completely different sport in-between their main season to keep their fitness up whilst still having a rest!

Experts recommend that training programs should limit periods of complete inactivity to no more than two to three weeks. Prolonged periods of inactivity should be avoided, and your training programme should incorporate some form of "maintenance" training where an extended break is desired.