

NAME OF THE COURSE: PHYSICAL ACTIVITY HEALTH AND WELLNESS
COURSE CODE- PE5D03

Module I: Concepts of physical education and fitness

Definition, aim, objectives and importance of physical education-Physical fitness components –speed, strength, endurance, flexibility and coordinative abilities-Types of physical fitness- Health related physical fitness, Performance related physical fitness and Cosmetic fitness-Fitness balance

DEFINITION, AIM, OBJECTIVES AND IMPORTANCE OF PHYSICAL EDUCATION

Modern man, in comparison to primitive man, is poorer and inferior with regard to physical powers and skill. No doubt, machines have done and can do much of human work and yet the assumption that the basic existence of man is physical, and cannot be ruled out, for man there is nothing more beautiful and valuable than his physique. Later on, we shall see that the proper use of body is essentially necessary if humans wish to grow and develop to their optimum level. This is why today's education is not merely a vast sea of mental acrobatics but also a source of physical activity that leads to all-round perfection of an individual. Modern thinkers in education now a days emphasis that the best individual is the one who is physically fit, mentally sound and sharp, emotionally balanced and socially well adjusted. It has become a fact that we need a well planned curriculum of physical education experiences and deserves much consideration.

Physical Education is a way of education through physical activity and related experiences and its subject matter is primarily ways of behaving. The capable and intelligent leadership during play periods can guide and help children to develop desirable way of behaving towards their team mates, opponents, officials, spectators and in regard to the solution of problems that arise during games and intelligent decision based on reason rather than on prejudices and emotions. Kothari Commission opined, "Physical education contributes not only to the physical fitness but also to physical efficiency, mental alertness and the development of certain qualities like perseverance, team spirit, leadership, discipline tolerance, obedience to rules, and moderation in victory and balance in defeat". However, physical education is complete educative process and not mere exercise; it has a legitimate claim for inclusion in the general scheme of education.

Definitions of Physical Education

Physical education is an integral part of the total educational process and has as its aim the development physically, mentally, emotionally, and socially fit citizens through the medium of physical activities which have been selected with view to realizing these outcomes.

Charles A. Bucher

Physical Education is education through physical activities for the development of total personality of the child and its fulfilment and perfection in body, mind and spirit.

J P Thomas

Physical education is that part of education which takes place through activities, which involves the motor mechanism of human body which results in an individual's formulating behavior patterns.

Jackson R. Sharman

Central Advisory Board of physical Education and Recreation defines Physical education as an education through physical activities for the development of total personality of the child to its fullness and perfection in body, mind and spirit.

AIME OF PHYSICAL EDUCATION

Like general education, to develop human personality in its totality with well planned activity programmes is the main aims of physical education. It also aimed at the all round development of human personality of an individual or it includes physical mental social emotional and moral aspect to make an individual a good citizen who is able to make contribution in the process of nation in one's own way. Thus physical education means at making an individual physically fit mentally alert emotionally balanced socially well adjusted morally true and spiritually uplifted.

Education has been defined as change, modification or an adjustment on the part of student as a result of experiences. These leads to some ends and when ends are sought they become goals and the most remote goals are referred as aims. The aim of Physical Education is the wholesome development of human personality or complete living. According to J.E. Williams the aim of Physical Education is to provide skilled leadership, adequate facilities and ample time for the individual and the groups to participate in activities that are physically wholesome, mentally stimulating and socially sound.

According to National Plan of Physical Education and Recreation. "The aim of Physical Education must, be to make every child physically, mentally and emotionally fit and also to develop in him such personal and social qualities as will help him to live happily with others and build him up as a good citizen." Physical Education aims to provide children and young people with learning experiences that enable them to develop: the knowledge, motivation and competence to live a physically active life; physically, morally, intellectually and socially within an educational context where pupils are valued and cared for. To summarise, the aim of Physical Education must be to make every child physically, mentally and emotionally fit and also to live happily with others and build him up as a good citizen.

Objectives of Physical Education

Objectives are certain definite steps which lead towards aim. The term 'objectives' is in general sense used to describe aims, purpose and outcomes that are desired from participating in the Physical Education programmes. Physical Education Association's Committee on objectives listed physical fitness, mental health and efficiency, social-moral character, emotional expression and control, and appreciations as the desired objectives. In 1950, these were restated by the profession; to develop and to maintain maximum physical efficiency, to develop useful skills, to conduct oneself in socially useful ways, and to enjoy wholesome recreation.

The American Association for Health, Physical Education and Recreation stated five major objectives:

1. To help children move in a skilful and effective manner in all the selected activities in which they engage, in the physical education program, and also in those situation that they will experience during their lifetime.
2. To develop an understanding, and appreciation of movement in children and youth so that their lives will become more meaningful propulsive, and productive.
3. To develop an understanding and appreciation of certain scientific principles concerned with movement that relate to such factors as time, space, force, and mass-energy relationships.
4. To develop through the medium of games and sports better interpersonal relationships.
5. To develop the various organic systems of the body so they will respond in a healthful way to the increased demands placed on them.

IMPORTANCE OF PHYSICAL EDUCATION

Physical education which is commonly a part of the curriculum includes training and maintaining one's physical body through educational means. Physical education is also about sharpening overall cognitive abilities and motor skills via athletics, exercise and various other physical activities. Physical education considers the child as a united whole of mental, social, moral, and physical qualities and provides for the optimum development of all these through the physical activities. Here are some of the benefits that highlight the importance of physical education.

Physical growth and development - Physical activity must be learned; hence there is a need for thinking on the part of the intellectual mechanism, with a resulting acquisition of knowledge. Physical activities are essential for the development of a child's scientific insight, intelligence and superior type of reflective thinking.

Intellectual development - Physical activities are essential for the development of a child's

scientific insight, intelligence and superior type of reflective thinking.

Emotional development –Physical education provides opportunities to control emotions. The give and take of games and sports offer scope for both emotional release and the controlling of the emotions.

Social adjustment - Physical activities provide opportunity of interaction between participants and others in varied situations enabling them to learn social qualities like sportsmanship, co-operation, honesty, friendship, courtesy, self discipline, and respect for authority which promote social adjustment of an individual.

Personal adjustment - Physical education gives a full and worth- while experience to the individual which help him to realize fullest self- expression and highest satisfaction from the results of his action, and thereby facilitates his personal adjustment in life.

Character development – Group effort, loyalty to the team and strong ties is present in play and physical activities. They provide a valuable contribution to the development of good moral character.

Physical fitness – Physical education through exercise and knowledge about one's body and its requirements contribute immensely to physical fitness. Regular exercise improves our physical efficiently, sense of well-being and appearance.

Mental development - The learning of skills, game, rules, techniques and strategies, and judgment making equip an individual to interpret new situations effectively. Physical education programme also make an individual aware regarding the importance of sanitation, health and hygienic, prevention of disease, balanced diet and health habits thereby improving the mental development.

Worthy use of leisure time - It develops amongst the individu-al's wholesome attitudes towards play and physical activi-ties and cultivates recreational activities and hobbies which help them to use the leisure time in worthwhile way.

PHYSICAL FITNESS COMPONENTS

SPEED, STRENGTH, ENDURANCE, FLEXIBILITY AND COORDINATIVE ABILITIES

Physical fitness refers to the ability to carry out daily task without being obviously tired. People who are fit have energy not only to complete every day work, but also to participate in planned and un planned activities outside the house and work place.

Physical fitness is the ability to perform moderate to vigour level of physical activity without undue fatigue and the capacity of maintaining such ability throughout life

ACMS

The physical fitness components are:-

SPEED:- speed is the quickness of movement of limb whether it is the legs of a runner or the arms of the shot putter . It can be defined as the ability to make rapid movement in the shortest possible time.

STRENGTH:- strength is the ability to overcome resistance or to act against resistance it is the maximum force that can be developed within a muscle or a group of muscles during a single muscular contraction.

Three types of strength are there:-

Maximum Strength- the greatest force that can be possible in a single maximum contraction.

Explosive Strength- the ability to overcome resistance with fast contraction.

Strength Endurance- the ability to express force many times over.

ENDURANCE:- is the ability to do physical movement with a desired quality and speed under condition of fatigue. Long Distance running, swimming are the examples of endurance activity. Aerobic endurance, An-aerobic endurance, Speed Endurance, strength endurance are different type of endurance.

FLEXIBILITY:- can be defined as the "ability to execute movements with greater amplitude or range"

"it is the ability to perform a joint action through a range of movement"

COORDINATIVE ABILITIES:- is the ability to integrate speed ,strength, endurance and flexibility so that efficient movement are achieved.

TYPES OF PHYSICAL FITNESS

There are three types of physical fitness

- 1) Health related physical fitness
- 2) Performance/skill related physical fitness and
- 3) Cosmetic fitness

HEALTH RELATED PHYSICAL FITNESS

Health-related fitness refers to the fitness which enables the person to remain both physically and psychologically strong enough to lead a healthy life without any diseases such as coronary heart disease, obesity or any other disorders. Health-related physical fitness deals with or is the fitness related to some aspect of health. Health related fitness focuses on optimum health and prevents the onset of disease and problems associated with inactivity. This type of physical fitness is primarily influenced by an individual's exercise habits; thus, it is a dynamic state and may change. Maintaining an appropriate level of health related fitness allows a person to meet emergencies, reduce the risk of disease and injury, work efficiently and participate and enjoy sports, recreation, leisure. There are five components in health related physical fitness; 1) Cardiovascular endurance 2) Muscular strength 3) Muscular endurance 4) Flexibility and 5) Body composition.

1) CARDIO - RESPIRATORY FITNESS

It is the ability of the heart and lungs to work together to provide the needed oxygen and fuel to the body during sustained workloads. Cardio respiratory fitness or Cardio-vascular fitness refers to the integrated functional capacity of the heart, lungs, vascular system, and skeletal muscles to utilize oxygen to expend energy. Examples would be jogging, cycling and swimming.

Assessment: Cardiovascular endurance is assessed by the Cooper 12 minute Run test.

Cooper 12 minute Run test

The test is based on the high correlation between the distance someone can run (or walk) in 12 minutes and their VO_2 max value (capacity to utilise oxygen while exercising). In this test the person run or walk in a running track as far as possible in a 12 minute period. Cones may be placed at various distances to enable measuring of the distance. The participant shall be allowed for a short warm up of 10 to 15 minute before performing the testing. After the completion of the running for 12 minutes the total distance covered is recorded in meters. The result is then compared with the norms and recommendations for the age and gender with the following table.

2) MUSCULAR STRENGTH

It is the amount of force a muscle can produce. Muscular strength is necessary in almost all sports events. When muscles are used regularly, they become strong and facilitate to do things like push, pull, jump, twist, turn, and bend. Having muscular strength can keep you from being easily fatigued. Examples of activities involving muscular strength are bench press, leg press or bicep curl.

Assessment: The muscular strength is measured using Grip dynamometer.



3) MUSCULAR ENDURANCE

It is the ability of the muscles to perform continuously without fatigue. When you have muscular endurance, your muscles are able to perform repeated movements for long periods of time without become tired. Many daily activities as well as sports activities require muscular endurance. Examples would be cycling, step machines and swimming. Curl up or sit up test is a commonly used test of muscular endurance.



Curl up test/sit up test

The curl up test measures muscular endurance of the abdominals and hip-flexors. The subject lies on a cushioned, flat surface with knees flexed, usually at 90 degrees. The hands may be placed by the side of the head,. The subject raises the trunk in a smooth motion, keeping the arms in position, curling up as head move toward the knees and then

the trunk is lowered back to the floor to the starting position completing one curl up.

Scoring: The completion of one complete curl up (up and back) counts as one. The total number of correctly performed sit ups that were performed in one minute is recorded.

4) FLEXIBILITY

Flexibility is the ability of each joint to move through the available range of motion for a specific joint. Quality of life is enhanced by improving and maintaining a good range of motion in the joints. Loss of flexibility can be a predisposing factor for physical issues such as pain syndromes or balance disorders. Exercise including stretching often helps improve flexibility. Flexibility of an individual depends upon joint structure, ligaments, tendons, muscles, skin, tissue injury, fat (or adipose) tissue, body temperature, age and gender. The sit and reach test is most often used to test flexibility.



Sit and Reach Test

The sit and reach test is a common measure of flexibility, and specifically measures the flexibility of the lower back and hamstring muscles.

Procedure: This test involves sitting barefoot on the floor with legs stretched out straight ahead. The soles of the feet are placed flat against the sit and reach box. With the palms facing downwards, and the hands on top of each other or side by side, the subject reaches forward along the measuring line. This is the starting position. Then, stretches the hands forward as much as possible and holds that position for at one-two seconds while the distance between starting point and final stretched point is recorded.

Scoring: The score is recorded to the nearest centimeter or half inch as the distance reached by the hand using zero at the level of the feet.

5) BODY COMPOSITION

Body composition is a term used to describe the different components that, when taken together, make up a person's body weight. The human body is composed of a variety of different tissue types including lean tissues (muscle, bone, and organs) that are metabolically active, and fat (adipose) tissue that is not. In other words body composition is the amount of fat mass compared to lean body mass. Essential fat is the level below which physical and physiological health would be negatively affected. Controversy exists as to whether a particular body fat percentage is better for one's health; athletic performance may also be affected. The leanest athletes typically compete at levels of about 6–13% for men or 14–20% for women. Bodybuilders may compete at ranges even lower than these levels.

Assessment: Underwater weighing is considered the most accurate way for body fat measurement, however because of the size and expense of the equipment needed very few places are set up to do this kind of measurement. There are other tests for measuring the amount of body fat or body composition, which are based on body dimensions; examples are Body Mass Index (BMI), Waist to Hip Ratio and skinfold method.

Body mass index (BMI)

The Body Mass Index (BMI) is used to assess the weight of body relative to the height. BMI is defined as weight in kilograms divided by height in meters squared (kg/m^2). Body mass index is closely related to body fat percentage and is much easier to measure. Therefore, it is used by many primary care providers to identify obesity. Equation for calculating BMI;

$$\text{BMI (kg/m}^2\text{)} = \frac{\text{Weight in kg}}{\text{Height in m squared}}$$

BMI values are age-independent and the same for both sexes. The greater the BMI, the greater the fat level. BMI value above 30 is classified as obese.

Waist/hip-ratios (WHR)

The Waist Hip Ratio is calculated by dividing the waist circumference by hip circumference. The circumference of the waist is measured at the narrowest part

between the rib cage while circumference of hip is measured at the widest part of hip. Scientists have enough evidence that a ratio higher than 1.0 for men and 0.9 for women are associated with high risks of getting diabetes and cardiovascular morbidity.

$$\text{WHR} = \frac{\text{Waist circumference}}{\text{Hip circumference}}$$

The table below gives general guidelines for acceptable levels for hip to waist ratio.

	Excellent	Good	Average	Below average	Poor
Male	< 0.85	0.85 - 0.90	0.90 - 0.95	0.95 - 1.00	> 1.00
Female	< 0.75	0.75 - 0.80	0.80 - 0.85	0.85 - 0.90	> 0.90

Percent body fat from Skinfold Measurements

There are many equations available for converting skinfold measurement into a percent body fat measure. In one method body density is calculated from skinfold measure, the value of which is then inserted into another formula to calculate PBF.

SKILL /PERFORMANCE RELATED PHYSICAL FITNESS

The components of skill related physical fitness refers to those aspects of fitness which form the basis for successful sports activity participation. There are six components 1) Speed 2) Strength 3) Coordinative Abilities 4) Power 5) Endurance 6) Agility

- 1) SPEED
- 2) STRENGTH

There are 3 types of strength;

a) Maximum Strength

It is the greatest force the neuromuscular system is capable of exerting in a single maximum voluntary contraction. Maximal strength is the amount of force that can be generated from one, all out effort, regardless of time or bodyweight. It is an important factor in sports where great resistance has to be overcome or controlled (e.g. weight lifting).

Maximal strength can be assessed by using Hand Grip Dynamometer test.

b) Explosive Strength

Explosive strength is the ability of the neuromuscular system to overcome resistance with a high speed of contraction. In other words, it is the amount of force that can be generated in the shortest amount of time. In terms of bodyweight training, it means how fast the body can be moved from one position to another. Think of explosive movements like jumping squats or plyometric pushups where your body is propelled with such force it actually leaves the ground. Explosive strength can be measured using the test 'Vertical Jump'.

c) Strength endurance

Strength endurance is the ability to resist a force for long time or to make repeated muscle contractions against a force. It is a specific form of strength displayed in activities which require a relatively long duration of muscle tension with minimal decrease in efficiency. Sports that involve strength endurance are numerous in nature such as swimming, rowing and wrestling.

Strength endurance is assessed by curl up or sit up test.

3) COORDINATIVE ABILITIES

Coordinative abilities facilitate to perform complex motor exercises and require coordination of various body parts like arm, eye, foot etc. It indicates integration of nervous system and muscular system to carry out harmonious movements with various body parts. Development of coordinative abilities is a requirement for success in all sports. There are 5 basic coordinative abilities; reaction time, rhythm, balance, kinesthetic differentiation and space and time orientation.

Coordinative abilities have been proven to be an important factor for better performance in many sports events like gymnastics, swimming, racket sports etc. There are number of activities that develop the coordinative abilities including; change of direction drills, agility

ladder work, dynamic exercises, plyometrics and medicine ball throws.

4) POWER

Power is the capacity that enables an athlete to apply the greatest amount of their maximal strength in the shortest period of time. It is the speed at which strength can be applied or the rate at which force can be developed. Power is crucial for many sports like shot put.

Most athletic activities involve far faster movements and far higher power outputs than are found in maximal strength exercises. An athlete can be exceptionally strong but lack significant explosive power if they are unable to apply their strength rapidly.

5) ENDURANCE

I). Aerobic Endurance

Aerobic means "with oxygen", because here oxygen intake is higher or at least in balance with the body's oxygen demand. Therefore the body receives enough oxygen to generate its energy from glucose and fat. During aerobic exercise the heart rate has to stay between 50 - 70(80)% of the maximum heart rate. During aerobic work, the body is working at a level that the demands for oxygen and fuel can be met by the body's intake. The only waste products formed are carbon dioxide and water which are removed by sweating and breathing.

Aerobic endurance can be sub-divided as follows:

- Short aerobic - 2 minutes to 8 minutes (lactic/aerobic)
- Medium aerobic - 8 minutes to 30 minutes (mainly aerobic)
- Long aerobic - 30 minutes + (aerobic)

Aerobic endurance can be assessed by The Harvard Step test. Aerobic endurance can be developed using continuous and interval running. Continuous duration runs to improve maximum oxygen uptake (VO₂max) while Interval training to improve the heart as a muscular pump.

II) Anaerobic endurance

Anaerobic means "without oxygen". In this type of endurance, the body continue activity for a short period without the supply of oxygen. Behind the anaerobic threshold of about 70-80% of the maximum heart rate, lactate, as metabolic waste product from burning sugar, begins to accumulate in the blood, because it can't be removed as fast as it is produced. While training at this level the muscles use glucose as their only energy source. During anaerobic work involving maximum effort, the body is working so hard that the demands for oxygen and fuel exceed the rate of supply and the muscles have to rely on the stored reserves of fuel. The muscles, being starved of oxygen, take the body into a state known as oxygen debt and lactic starts to accumulate in the muscles. This point is known as the lactic threshold or anaerobic threshold. Activity will not be resumed until the lactic acid is removed and the oxygen debt repaid.

Anaerobic endurance can be sub-divided as follows:

- Short anaerobic - less than 25 seconds (mainly alactic)
- Medium anaerobic - 25 seconds to 60 seconds (mainly lactic)
- Long anaerobic - 60 seconds to 120 seconds (lactic +aerobic)

Anaerobic endurance can be developed by using repetition methods of high intensity work with limited recovery.

III) Speed endurance

Speed endurance is the ability to maintain near maximal speed continuously for longer period. Example of activity involving speed endurance is long sprints (200 and 400 mts). Speed endurance is an important component in high performance in events such as football, soccer, hockey and basketball. Speed endurance can be measured by 150 meters speed endurance test.

IV) Strength endurance

The strength endurance is the ability to resist a force over time or to make repeated muscle contractions against a force. It is a measure of the ability of a muscle or muscle group to work continuously without fatigue. It has a meaning similar to muscle endurance, but with strength endurance there is a greater emphasis on the amount of the

force which can be resisted. Boxing, swimming and rowing are some of the sports events involving strength endurance.

6) AGILITY

Agility is the ability to change the direction of the body in an efficient and effective manner. It is the a rapid whole body movement with change of velocity or direction in response to a stimulus. Agility is a combination of other qualities like balance, speed, strength and co-ordination and it is an important component of many team sports. A boxer dodging a punch, a wrestler finishing a take-down, or like basketball or football players suddenly change direction and fake their opponent could all be considered examples of agility.

Importance of Agility: Agility is a specific athletic attribute that is fundamentally important to sports performance for three reasons. First, developing agility will provide a strong foundation for neuromuscular control and motor skill function, thereby establishing overall athleticism. Second, changing directions is a common cause of injury, so by teaching individuals proper movement mechanics we may be able to reduce injury risk. Finally, as an athlete matures, a heightened ability to quickly change directions will enhance overall performance in both proactive offensive and reactive defensive circumstances.

Assessment: Agility is usually measured by Illinois Agility Test

COSMETIC FITNESS

Having a stronger or more developed body will be appreciated and eventually people with stronger body became more confident and it boosts their self-esteem. Cosmetic fitness simply means to working out for the purpose of looking fit. Physical fitness denotes the individual capacity to carry out daily physical task